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por el

DR. LUIS RAZETTI

Organo de la Academia Nacional de Medicina
y del Congreso Venezolano de Ciencias Médicas

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Gaceta Médica
de Caracas

Órgano oficial de la Academia Nacional de Medicina
y del Congreso Venezolano de Ciencias Médicas

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Rifky Octavia Pradipta, Ferry Efendi

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INDEX

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Noticias y cartas al editor
Varios

Los trabajos enviados deberán cumplir con los requisitos que se describen a continuación.

EDITORIALES

Esta sección estará dedicada al análisis y la reflexión sobre los problemas de salud de la población, los distintos enfoques preventivos y terapéuticos, así como los avances logrados en el campo de la investigación biomédica y otros que considere la Dirección-Redacción.

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Deberán contener en la página frontal, el título conciso e informativo del trabajo; nombre(s) y apellido(s) de cada autor; grados académicos de los autores e institución en la cual se realizó el trabajo; nombre y dirección actual del autor responsable de la correspondencia; un título corto de no más de 40 caracteres (contando espacios y letras) y las palabras clave.

Los trabajos originales, revisiones sistemáticas y metanálisis deben tener un resumen estructurado, como se indica a continuación:

Debe contener un máximo de 250 palabras, y los siguientes segmentos:

- Introducción: ¿Cuál es el problema principal que motivó el estudio?
- Objetivo: ¿Cuál es el propósito del estudio?
- Métodos: ¿Cómo se realizó el estudio? (selección de la muestra, métodos analíticos y observacionales).
- Resultados: ¿Cuáles son los aspectos más importantes? (datos concretos y en lo posible su significancia estadística)
- Conclusión: ¿Cuál es la más importante que responde al objetivo?

Al final se anotarán 3 a 6 palabras clave.

Resumen en inglés

Debe corresponderse con el resumen en español.Se sugiere que este sea revisado por un traductor experimentado, a fin de garantizar la calidad del mismo.

Introducción

Incluir los antecedentes, el planteamiento del problema y el objetivo del estudio en una redacción libre y continua debidamente sustentada por la bibliografía.

Método

Señalar claramente las características de la muestra, el o los métodos empleados con las referencias pertinentes, de forma que se permita a otros investigadores, realizar estudios similares.

Resultados

Incluir los hallazgos importantes del estudio, comparándolos con las figuras estrictamente necesarias y que amplíen la información vertida en el texto.

Discusión

Relacionar los resultados con lo reportado en la literatura y con los objetivos e hipótesis planteados en el trabajo.

Conclusión

Describir lo más relevante que responda al objetivo del estudio.

Agradecimientos

En esta sección se describirán los agradecimientos a personas e instituciones así como los financiamientos.

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Deberán constar de resumen en español e inglés (máximo 100 palabras) en formato libre. Constará de introducción, presentación del caso, discusión, ilustraciones y referencias, con una extensión máxima de 10 cuartillas y apegadas a las instrucciones a los autores.

Historia y filosofía de la medicina

En esta sección se incluirán los artículos relacionados con aspectos históricos, filosóficos, bases conceptuales y éticas de la medicina. Aunque su estructura se dejará a criterio del autor, deberá incluir resúmenes en español e inglés (máximo 100 palabras) en formato libre, referencias bibliográficas citadas en el texto y en listadas al final del

manuscrito, siguiendo los lineamientos citados para los manuscritos de GMC.

Actualidades terapéuticas

Se informará sobre los avances y descubrimientos terapéuticos más recientes aparecidos en la literatura nacional e internacional y su aplicación en nuestro ámbito médico. La extensión máxima será de cuatro cuartillas y con un máximo de cinco referencias bibliográficas. Deberá incluir resúmenes en español en inglés, en formato libre (máximo 100 palabras).

Información epidemiológica

Será una sección de información periódica sobre los registros epidemiológicos nacionales e internacionales, destacando su importancia, su comparación con estudios previos y sus tendencias proyectivas. La extensión máxima será de cuatro cuartillas y deberá incluir resúmenes en español en inglés (máximo 100 palabras), en formato libre.

Comunicaciones breves

Serán considerados en esta sección, los informes preliminares de estudios médicos y tendrán la estructura formal de un resumen como se describió previamente (máximo 150 palabras). Se deberán incluir 10 citas bibliográficas como máximo.

Bioética

Se plantearán los aspectos éticos del ejercicio profesional y aquellos relacionados con los avances de la investigación biomédica y sus aplicaciones preventivas y terapéuticas. Su extensión máxima será de cuatro cuartillas y cuatro referencias bibliográficas, deberá incluir resúmenes en español e ingles (máximo 100 palabras) en formato libre.

El médico y la ley

Esta sección estará dedicada a contribuciones tendientes a informar al médico acerca de las disposi-ciones legales, riesgos y omisiones de la práctica profesional que puedan conducir a enfrentar problemas legales. Su máxima extensión será de cuatro cuartillas y no más de cinco referencias bibliográficas. Deberá incluir resúmenes en español e inglés (máximo 100 palabras).

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7. Un máximo de nueve referencias.
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The Changing Face of Metabolic Disorders: Current Trends and Future Directions

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Metabolic diseases, such as obesity, diabetes mellitus, and metabolic syndrome, have emerged as significant global public health concerns. Their rising prevalence, accompanied by changing lifestyles, urbanization, and dietary regimes, requires further updates on the underlying mechanisms, epidemiology, and therapeutic interventions. This editorial aims to synthesize recent findings and trends in metabolic diseases, highlighting the contribution of genetics, environmental factors, and innovative therapeutic approaches.

Over the last couple of decades, the global burden of metabolic diseases has grown quite dramatically. Recent estimates suggest that the prevalence of diabetes in adults was 6.4 % in 2010 and would increase to 7.7 % by 2030-a trend of metabolic syndrome and its associated risks, including hypertension and cardiovascular diseases, that is cause for concern according to Na et al. (1). The Indonesian Health Survey 2023 reports increased diabetes prevalence, highlighting potential undiagnosed cases within communities. Compared to the data from Basic Health Research (Riset Kesehatan Dasar, Riskesdas) 2018, diabetes prevalence diagnosed by doctors rose from 1.5 % in 2018 to 1.7 % in 2023 across all age groups and from 2.0 % in 2018 to 2.2 % in 2023 among individuals aged 15 and above. The provinces with the highest prevalence in 2023 are DKI Jakarta, DI Yogyakarta, and East Kalimantan, while the lowest prevalence rates are in East Nusa Tenggara, Papua, and Maluku (2).

Furthermore, metabolic dysregulation is drawing increasing attention from scientific publications, with a special focus on its various manifestations, like polycystic ovary syndrome. Still, its connection to cardiovascular disease risk is yet insufficiently discussed (3). The increasing percentage of obesity and type 2 diabetes mellitus has been described as a pandemic, taking into consideration the overall healthcare challenges on a global scale (4).

In this regard, lifestyle changes remain central in preventing and managing metabolic diseases. The harmful influences of metabolic syndrome may be significantly minimized with a shift towards healthier dietary patterns coupled with increased physical activity (5). Recently, it has been indicated that fasting may be used as an effective dietary intervention for maintaining metabolic risk factors and thus may add a new approach to the management of the conditions. Large-scale public health campaigns for awareness and education regarding the benefits of healthy life choices are obviously a much-needed step toward reining in the ever-mushrooming spread of metabolic diseases. Community-based interventions addressing physical inactivity and dietary habits play an important role in containing the epidemic of metabolic disorders. It, therefore, goes without saying that education forms a very key part of any strategy for limiting the burden of metabolic diseases.

Community cadres can, therefore, potentially contribute to raising awareness about risk factors

for these conditions. A study by Ojo et al. (6) shows that community partnerships between community health workers and medical staff considerably raised knowledge and attitudes among members of the communities on Noncommunicable Diseases (NCD) prevention in Uganda (6). Such alliances may improve metabolic disease risk factor knowledge whereby individuals might be motivated to attend care with the aim of preventing the disease by making healthier lifestyle changes. In Indonesia, transforming primary healthcare aligns with empowering communities to manage and prevent diabetes mellitus effectively. This approach involves integrating health education, regular screening, and community support systems to raise awareness, detect cases early, and provide ongoing support for diabetes management. Community health volunteers and peer support groups, such as health cadres, play a vital role in educating and supporting patients, particularly in rural areas. Additionally, leveraging mobile health technologies and telemedicine can enhance accessibility, allowing for self-monitoring and remote guidance. Together, these efforts create a community-centered model that strengthens diabetes prevention and management at the grassroots level.

In summary, metabolic disease trends represent a complex problem requiring coherent efforts by the scientific community, healthcare providers, and policymakers. By combining health education, community screening, peer support, and technology, Indonesia can create a comprehensive and sustainable approach to diabetes prevention and management that aligns with its unique healthcare challenges and community strengths.

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El Rostro Cambiante de los Trastornos Metabólicos: Tendencias Actuales y Direcciones Futuras

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Las enfermedades metabólicas, como la obesidad, la diabetes mellitus y el síndrome metabólico, han surgido como importantes preocupaciones de salud pública mundial. Su creciente prevalencia, acompañada de cambios en los estilos de vida, la urbanización y los regímenes alimentarios, requiere más actualizaciones sobre los mecanismos subyacentes, la epidemiología y las intervenciones terapéuticas. Este editorial tiene como objetivo sintetizar los hallazgos y las tendencias recientes en enfermedades metabólicas, destacando la contribución de la genética, los factores ambientales y los enfoques terapéuticos innovadores. En las últimas dos décadas, la carga mundial de enfermedades metabólicas ha crecido de manera bastante drástica. Estimaciones recientes sugieren que la prevalencia de diabetes en adultos fue del 6,4 % en 2010 y aumentaría al 7,7 % para 2030, una tendencia del síndrome metabólico y sus riesgos asociados, incluida la hipertensión y las enfermedades cardiovasculares, que es motivo de preocupación según Na y col. (1). La Encuesta de Salud de Indonesia de 2023 informa un aumento de la prevalencia de diabetes, lo que destaca los posibles casos no diagnosticados dentro de las comunidades. En comparación con los datos del *Basic Health Research* (Riset Kesehatan Dasar, Riskesdas) de 2018, la prevalencia de diabetes diagnosticada por médicos aumentó del 1,5 % en 2018 al 1,7 % en 2023 en todos los grupos de edad y del 2,0 % en 2018 al 2,2 % en 2023 entre las personas de 15 años o más. Las provincias con la prevalencia más alta en 2023 son DKI Jakarta, DI Yogyakarta y Kalimantan Oriental, mientras que las tasas de prevalencia más bajas se encuentran en Nusa Tenggara Oriental, Papúa y Maluku (2). Además, la desregulación metabólica está atrayendo cada vez más atención en las publicaciones científicas, con un enfoque especial en sus diversas manifestaciones, como el síndrome de ovario poliquístico. Sin embargo, su conexión con el riesgo de enfermedad cardiovascular aún no se ha discutido lo suficiente (3). El creciente porcentaje de obesidad y diabetes mellitus tipo 2 se ha descrito como una pandemia, teniendo en cuenta los desafíos generales de la atención médica a escala mundial (4). En este sentido, los cambios en el estilo de vida siguen siendo fundamentales para prevenir y controlar las enfermedades metabólicas. Las influencias nocivas del síndrome metabólico pueden minimizarse significativamente con un cambio hacia patrones alimentarios más saludables junto con una mayor actividad física (5). Recientemente, se ha indicado que el ayuno puede utilizarse como una intervención dietética eficaz para mantener los factores de riesgo metabólicos y, por lo tanto, puede agregar un nuevo enfoque al manejo de las afecciones. Las campañas de salud pública a gran escala para la concienciación y la educación sobre los beneficios de las opciones de vida saludables son, obviamente, un paso muy necesario para frenar la propagación cada

vez mayor de las enfermedades metabólicas. Las intervenciones basadas en la comunidad que abordan la inactividad física y los hábitos alimentarios desempeñan un papel importante en la contención de la epidemia de trastornos metabólicos. Por lo tanto, no hace falta decir que la educación forma parte fundamental de cualquier estrategia para limitar la carga de enfermedades metabólicas. Por ello, los cuadros comunitarios pueden contribuir potencialmente a aumentar la conciencia sobre los factores de riesgo de estas afecciones. Un estudio de Ojo y col. (6) muestra que las asociaciones comunitarias entre los trabajadores de salud comunitarios y el personal médico aumentaron considerablemente los conocimientos y las actitudes entre los miembros de las comunidades sobre la prevención de las Enfermedades no transmisibles (ENT) en Uganda (6). Estas alianzas pueden mejorar el conocimiento de los factores de riesgo de las enfermedades metabólicas, lo que podría motivar a las personas a acudir a los centros de atención con el objetivo de prevenir la enfermedad mediante cambios más saludables en su estilo de vida. En Indonesia, la transformación de la atención primaria de salud se alinea con el empoderamiento de las comunidades para gestionar y prevenir la diabetes mellitus de manera eficaz. Este enfoque implica la integración de la educación sanitaria, la detección periódica y los sistemas de apoyo comunitario para crear conciencia, detectar casos de forma temprana y proporcionar apoyo continuo para el control de la diabetes. Los voluntarios de salud comunitarios y los grupos de apoyo de pares, como los cuadros de salud, desempeñan un papel vital en la educación y el apoyo a los pacientes, en particular en las zonas rurales. Además, el aprovechamiento de las tecnologías sanitarias móviles y la telemedicina puede mejorar la accesibilidad, lo que permite el autocontrol y la orientación a distancia. Juntos, estos esfuerzos crean un modelo centrado en la comunidad que fortalece la prevención y el control de la diabetes a nivel de base. En resumen, las tendencias de las enfermedades metabólicas representan un problema complejo que requerirá esfuerzos coherentes de la comunidad científica, los proveedores de atención sanitaria y los responsables de las políticas. Al combinar la educación sanitaria, la detección comunitaria, el apoyo de pares y la tecnología, Indonesia puede crear un enfoque integral y sostenible para la prevención y el control de la diabetes que se alinee con sus desafíos sanitarios únicos y las fortalezas de la comunidad.

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During the COVID-19 pandemic, the impact of religious caring behavior increases the immunity of medical-surgical nurses

Durante la pandemia de COVID-19, el impacto de la conducta de cuidado religioso aumenta la inmunidad de las enfermeras médico-quirúrgicas

Abu Bakar[1a]*, Laily Hidayati[2a], Lailatun Ni'mah[3a], Ika Nur Pratiwi[4a], Siti Nur Qomariah[5b]

SUMMARY

Introduction: *Caring is a fundamental service basis in nursing because it is the main behavior of nurses in carrying out nursing care. Islamic caring could stabilize the psychological condition of nurses and patients. Psychologically stable nurses and patients could increase immunity in giving care nursing during the COVID-19 pandemic. This study aimed to analyze the impact of Islamic caring behavior on nurses, particularly in terms of enhancing their psychospiritual comfort, preparedness, and immunity. This research's findings open avenues for further exploration into the potential of Islamic caring to improve nurses' psychospiritual comfort and immunity.* **Methods:** *This is pre-experimental research with a pre-post-test design. The population is all medical-surgical nurses at Muhammadiyah Gresik Hospital. A sample of 16 nurses was recruited using a purposive sampling technique. Religious Islamic caring, comfortable psychospiritual, preparedness, and immunity were variables. The instrument was an inspection of complete blood count and modified questionnaire from previous study. Data analysis was carried out with the Wilcoxon test at a significance level of $p \leq 0.05$.* **Results:** *All respondents had complete COVID-19 vaccination status and 81.3 % were female. In nurses, religious caring increased comfortable psychospiritual, preparedness, and erythrocytes ($p = 0.043$, $p = 0.043$ and $p = 0.015$). Hemoglobin, hematocrit, platelets, and leukocytes were not significantly influenced by religious caring ($p = 0.145$, $p = 0.641$, $p = 0.287$, and $p = 0.103$).* **Conclusion:** *Religious caring is influential in the comfortable psychospiritual and preparedness of medical-surgical nurses. Religious Islamic caring enhances immunity, as seen by enhancing erythrocytes.*

Keywords: *COVID-19, immunity, islamic caring behavior, nurse medical-surgical.*

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RESUMEN

Introducción: *El cuidado es una base fundamental del servicio en enfermería porque es el comportamiento principal de las enfermeras al llevar a cabo la atención de enfermería. El cuidado islámico podría estabilizar la condición psicológica de las enfermeras*

y los pacientes. Las enfermeras y los pacientes psicológicamente estables podrían aumentar la inmunidad al brindar cuidados de enfermería durante la pandemia de COVID-19. Este estudio tuvo como objetivo analizar el impacto del comportamiento de cuidado islámico en las enfermeras, particularmente en términos de mejorar su comodidad psicoespiritual, preparación e inmunidad. **Métodos:** *Se trata de una investigación preexperimental con un diseño de prueba pre-post. La población son todas las enfermeras médico-quirúrgica del Hospital Muhammadiyah Gresik. Se reclutó una muestra de 16 enfermeras utilizando la técnica de muestreo intencional. Las variables fueron el cuidado islámico religioso, la comodidad psicoespiritual, la preparación y la inmunidad. El instrumento fue un análisis de sangre completo y un cuestionario modificado del estudio anterior. El análisis de datos se llevó a cabo con la prue-ba de Wilcoxon a un nivel significativo de* $p \leq 0.05$. **Resultados:** *Todos los encuestados tenían un estado de vacunación completo contra la COVID-19 y el 81,3 % eran mujeres. El cuidado religioso aumentó la comodidad psicoespiritual, la preparación y los eritrocitos de las enfermeras (*$p = 0,043$, $p = 0,043$ *y* $p = 0,015$*). La hemoglobina, el hematocrito, las plaquetas y los leucocitos no se vieron significativamente influenciados por el cuidado religioso (*$p = 0,145$, $p = 0,641$, $p = 0,287$ *y* $p = 0,103$*).* **Conclusión:** *El cuidado religioso influye en la comodidad psicoespiritual y la preparación de las enfermeras médico-quirúrgicas. El cuidado religioso islámico mejora la inmunidad, como se ve al mejorar los eritrocitos.*

Palabras clave: *Comportamiento de cuidado islámico, enfermera médico-quirúrgica, inmunidad.*

INTRODUCTION

Human immunity is a complex system of cell, tissue, and organ performance that aims to protect the body from "enemy" disturbances to be destroyed (1). Keeping the immune system working optimally can be done with a healthy lifestyle, such as getting enough sleep, exercising regularly, eating healthy foods, managing stress, and not smoking (2). Individual stress management is strongly influenced by external conditions, one of which is the COVID-19 pandemic. The pandemic significantly increases the facility health load (3). An enhancement burden was seen with existing nurses who experienced work fatigue and boredom caring for patients. This follows research showing that the COVID-19 pandemic affects intelligence, emotional well-being, spirituality, and intellectual ability (4).

As the tip of the spear in providing nursing services, nurses' immunity must be guarded against the many effects of the COVID-19 pandemic. Nurses' immunity in this study was seen from psychological and physiological perspectives. The nurse's psychology was assessed from psychospiritual comfort and preparedness, while the physiological was estimated from a blood test. Previous research has shown that nurses experience psychological problems facing the COVID-19 pandemic, indicated by digestive disorders (59 %), fatigue (55 %), difficulty sleeping (45 %), nervousness (28 %), frequent crying (26 %), and experiencing burnout (5,6). Anxiety and stress indicate nurses who do not feel comfortable psychospiritually. This condition is also supported by data showing that nurses still have preparedness problems (7,8). The research data have not been found in several areas of East Java, especially in the Gresik area. However, a preliminary study at the Gresik Muhammadiyah Hospital showed that nurses experienced digestive disorders and fatigue at work during the COVID-19 pandemic. This situation can lead to more severe problems if not identified and treated promptly. Evidence indicates that unaddressed emotional, spiritual, and intellectual issues reduce health (4). In addition, public health officials were unprepared for the outbreak which had an impact on reducing the ability to prevent, control, and manage COVID-19 patients (9).

This condition indicates the need for an intervention to deal with and resolve the problem. Religious care nursing is one possible solution because it emphasizes caring behavior, which refers to religious values. The optimal practice of religious caring will lower anxiety and increase the immunity of nurses (10). Based on the above concept, the exemption is comfortable psychospiritual, preparedness, and complete blood count examination. Spiritual comfort is the achievement of prosperity where the individual becomes more grateful for all the blessings and accepts all challenges patiently and sincerely (11). Nurses' preparedness to deal with COVID-19 requires knowledge and attitude as

internal factors (12). Complete blood count as an indicator of immunity that was achived by a complete blood analysis assessing red blood cells (RBC), hemoglobin (HGB), hematocrit (HCT), platelets (PLT), and white blood cells (WBC) (13-16). This study aimed to assess howthat was achived by a complete blood analysis assessin how religious caring influences the immunity of medical-surgery nurses during the COVID-19 pandemic.

METHODS

The research design was experimental, with a pre-post test group design to analyze preparedness, comfort, and complete blood count. The research statement was that religious caring influences nurses' preparedness and comfort, psychospiritual, and immunity during the COVID-19 pandemic. This study included all nurses at private Muhammadiyah Hospital Gresik, East Java, Indonesia. A sample of 16 nurses was recruited using a purposive sampling technique. The technique was determined by the criteria for an active and functional nurse who works according to shift and is not currently on paid leave or holiday.

Religious caring uses modules published in previous study (17). Respondents were given a religious, caring intervention three times over three weeks. The first was given by conducting online workshops. After the seminar, respondents were directed to apply religious care. The second meeting was conducted online two days after the first meeting to evaluate the problematic application of religious caring. The third meeting was conducted a day after the second and was an accompaniment application of religious caring and evaluation for five days. Respondents were allowed to apply religious caring after accompaniment seven days later.

Dependent study variables were COVID-19 preparedness, comfort, psychospiritual, and nurse immunity. The questionnaire on COVID-19 preparedness was modified from a previous study (6). The questionnaire on psychospiritual comfort was published in an earlier study (18). The validity and reliability results are promising (r=0.25 and Cronbach's alpha= 0.712). The nurse immunity system used a laboratory sample of complete blood count (erythrocytes, hemoglobin, hematocrit, platelets, and leucocytes).

Data was collected for four months, from March 18, 2021, to August 25, 2021, at Muhammadiyah Hospital Gresik. After the respondents had signed the informed consent form, pre-data collection intervention related to preparedness and comfort psychospiritual was completed with an online instrument questionnaire. The respondent was asked to fill out the *Google Forms* link for the questionnaire. After filling, the respondent had venous blood taken for a complete blood count test (erythrocytes, hemoglobin, hematocrit, platelets, and leucocytes) as pre-intervention data. Respondents were given religious, caring behavior intervention, a complete intervention three times over three weeks. Post-intervention data collection was conducted after respondents had applied religious care for seven days, and after eight days, the respondents filled in *a Google Forms* link related to the questionnaire; taking venous blood was recommended. The data were analyzed by looking at the frequency and percentage. Primary data analysis used a Wilcoxon statistical test with a significance degree of 0.05.

The research procedure was tested and declared ethical by the Commission Ethics Faculty of Health Research Airlangga University Nursing on November 16, 2020, with the number certificate ethics no. 2129-KEPK. The ethical principles applied to this study include, among others, that participants were given information and filled out informed consent before data collection. They have the right to data confidentiality by using names and initials.

RESULTS

Table 1 shows the characteristics of 16 samples. Respondents were mostly female (81.3 %), most early mature (43.8 %). Their education was mostly a Bachelor of Nursing (75 %), and their employee status was almost permanent (87.5 %). All medical-surgical nurses received the COVID-19 vaccine once or twice

Table 1. Characteristics of Medical-Surgical Nurses n=16

Characteristic	n	%
Sex		
Female	13	81.3
Male	3	18.7
Age		
17-25 years old	1	6.2
26-35 years old	7	43.8
36-45 years old	4	25.0
46-55 years old	4	25.0
Education		
Diploma in Nursing	4	25.0
Bachelor in Nursing	12	75.0
Status of Employment		
Permanent	14	87.5
Not Permanent	2	12.5
COVID-19 Vaccination Status		
Complete	16	100.0

(100 %).

Results for spiritual comfort, COVID-19 preparedness, and laboratory blood are shown in Table 2. The psychospiritual comfort of nurses before and after the intervention shows an increased score. Wilcoxon test results show a significant difference between comfortable psychospiritual medical-surgical nurses before and after being given religious care ($p=0.043 < 0.05$). Preparedness of medical-surgical nurses before and after intervention showed an increased score. Wilcoxon test results show a significant difference between the preparedness of medical-surgical nurses before and after being given religious care ($p=0.043 < 0.05$).

In a complete blood count test, nurses showed results mainly within normal limits, following the reference limit values from the laboratory examination site. Red blood cell (RBC) analysis shows that the average score before and after the intervention is within normal limits. However, some nurses showed RBC results before and after the intervention below the reference limit value. RBC results between before and after intervention are indicated by increased score average. The Wilcoxon test results show a significant difference between the RBC of medical-surgery nurses and others before and after receiving religious caring ($p=0.015 < 0.05$).

The hemoglobin (HGB) level averages were

Table 2. Examination Results of Medical-Surgical Nurses n= 16

Measurement	Pre-test	Post-test	Reference Value	*p-Value
Comfortable				
M ± SD	51.50 ± 4.73	53.13±4.03	-	0.043
Min-Max	36 - 56	42 - 56		
Preparedness				
M ± SD	66.44 ± 6.59	72.00 ±6.51	-	0.043
Min-Max	52.00 - 77.00	64 - 80		
RBC				
M ± SD	4.72 ± 0.39	4.52 ± 0.22	4.10 - 5.10	0.015
Min- Max	3.60 - 5.33	3.99 - 5.18		
Hemoglobin				
M ± SD	13.48 ± 1.51	3.28 ± 0.73	12.3 - 15.3	0.145
Min- Max	10.00 - 15.90	11.50 - 15.40		
Hematocrit				
M ± SD	39.40 ± 3.54	39.28 ± 1.95	36.0 - 45.0	0.641
Min- Max	30.50 - 45.70	34.00 - 44.50		
Platelet				
M ± SD	293.19 ± 48.76	290.50 ± 22.25	150 - 450	0.287
Min- Max	196 - 369	227 - 338		
WBC				
M ± SD	7.61 ± 2.99	6.81 ± 0.72	4.0 - 10.0	0.103
Min- Max	3.66 - 17.22	4.94 - 8.71		

within the range score reference (standard) before and after the intervention. However, HGB before and after the intervention was still found to be below standard value. Wilcoxon test results show no HGB difference for medical-surgical nurses before and after being given religious caring (p=0.145> 0.05). The hematocrit level (HCT) shows the average score before and after the intervention within the range score reference (standard). However, HCT before and after intervention still found scores under standard value. The Wilcoxon test results show no statistical difference between HCT medical-surgical nurses who were subsequently given religious caring (p=0.641 > 0.05).

Platelet concentration (PLT) or platelets show the average score before and after the intervention within the range score reference (standard). Wilcoxon test results show no difference between PLT medical-surgical nurses before and after being given religious caring (p=0.287 > 0.05). White blood cells (WBC), the number of leucocytes, show that the average score before and after the intervention is within the range score reference (standard). WBC between before and after the intervention showed that it was not below the standard value. Wilcoxon test results show no statistical difference between WBC medical-surgical nurses before and after being given religious care (p=0.103 > 0.05)

DISCUSSION

The results showed a change in the immunity of medical nurses before and after the religious caring intervention. Nurses' exemptions that showed significant changes included psychospiritual comfort, preparedness, and red blood cells/erythrocytes. This can be explained as follows: the results show nurses' psychospiritual comfortableness before and after giving intervention and after showing increased scores. Statistical results show a significant difference between medical-surgical nurses' satisfaction with psychospiritual levels before being given religious care. These results align with a previous study that found that nurses who did religious caring could increase patients' psychospiritual comfortableness (18). In the previous study, patients were the subject, while in this study, nurses (Health Officers) were the subject, but the results were the same. Though there is a different subject, the same result shows that religious caring could provide comfort for themselves and patients as recipients of nursing caring (19). This indicates that religious caring is significantly related to psychospiritual comfort. Religious caring consists of maintaining faith, compassion, and competence. By considering the characteristics of nurses and nurses' spiritual behavior, religious caring can increase psychospiritual comfort.

Preparedness of medical-surgical nurses before and after intervention showed increased scores. The improvement in preparedness was statistically significant before and after being given religious caring. This aligns with a study that previously stated that the existing connection means knowledge with preparedness for handling bird flu outbreaks in the emergency department (7). Results show repair is possible because of the ability of nurses. These results supported a previous study where someone's level of knowledge is influenced by age, education, and experience (20). The higher the medical-surgical nurses' education, the better the Strata 1 (Bachelor) level. The higher the level of education a person has, the more breadth of insight and openness they possess.

Knowledge is a supporting factor for medical-surgical nurses in nurse readiness to treat COVID-19 patients. Knowledge about governance care for COVID-19 patients needs continuously to be upgraded along with the development and characteristics of the disease caused by the coronavirus, which constantly mutates. The medical-surgical nurses must enhance their knowledge of governance care regarding COVID-19. This is seen in the theory that says that behavior is influenced by experience, environment, and encouragement for avoiding disease threats or the occurrence of a possible risk to health (20). Behavioral standby in applying five actions, including washing hands and managing personal protective equipment, is an effort to avoid the risk of disease infection. Another effort to upgrade is actively looking for information on developing governance care for COVID-19 patients.

Red blood cells (RBC) show scores below the reference before and after an intervention.

However, there was a statistical increase in the average score of erythrocytes after being given religious caring, indicating that medical-surgical nurses receiving religious caring training can increase red blood cells. The number of red blood cells is influenced by age, individual activity, nutrition, altitude, pace, and temperature (2). Following the theory, it is seen that the activity of nurses in giving religious care nursing, as well as behavior preparedness, could influence the production of erythrocytes. Increased erythrocytes could be interpreted as nurses have enhanced immunity. Erythrocytes play a direct and significant role in immunity (13,14).

The primary function of erythrocytes is oxygen carriers; however, they also play an important role in the immune system. Erythrocytes recognize and adhere to antigens and promote phagocytosis. The abnormal morphology and function of erythrocytes are also involved in the pathological processes of some diseases. A previous study stated that a change in the metabolism of red blood cells could contribute to a change in function immunity and natural dualistic modulation of immune erythrocytes. Erythrocytes directly participate in the immune complex reaction (bacteria, complement, and antibody), and this specific binding suggested a central role for this cell type. In addition, by suppressing neutrophil signaling, erythrocytes help prevent excessive inflammation and tissue damage. Studies have shown that blood lacking erythrocyte surface receptors (Duffy receptors) exhibit high levels of plasma chemokines after lipopolysaccharide exposure (13).

Blood hemoglobin (HGB) shows that the average score before and after intervention increased the score reference (standard). However, there was no HGB statistical differences between a nurse's HGB before and after being given religious caring, indicating that a nurse has no disturbance in health and a decrease in their immunity.

Evidence shows that functions other than HGB can interact with system immunity well by direct means or by binding to the associated pattern molecular pathogen. The role of HGB in system immunity is primarily related to the interaction between HGB, pathogen, component cell host, and cell immunity must be further explored (16).

However, HGB before and after intervention still scored below standard but increased before and after. Possibly, this is because the number of red blood cells is related to HGB levels. A reduction in hemoglobin levels accompanies a decrease in the number of erythrocytes, so a decrease in hemoglobin levels indicates a decline in the number of erythrocytes (21). A low RBC result means low HGB levels, and these results are shown in the same respondents.

The average score of the hematocrit level (HCT) before and after the intervention increased score reference (standard). HCT before and after intervention still found scores under standard value, but there was an increase between before and after the religious caring intervention. Indeed, there was a statistical difference in HCT before and after giving religious caring. A higher value of hematocrit in the body may indicate individual dehydration. Platelet levels (PLT) show that the average score before and after intervention increased the score reference (standard). However, platelets were not statistically different before and after the intervention.

This result may indicate that medical-surgical nurses' immunity is generally in good condition with no drop in immunity. Platelets play an important role in the vessel. Following their formation from megakaryocytes, platelets exist in circulation for 5-7 days and primarily function as regulators of hemostasis and thrombosis. Following vascular insult or injury, platelets become activated in the blood, resulting in adhesion to the exposed extracellular matrix underlying the endothelium, platelet plug formation, and finally, formation and consolidation of a thrombus consisting of both a core and shell. In addition to the regulation of hemostasis in the vessel, platelets have also been shown to play an important role in innate immunity as well as the regulation of tumor growth and extravasations in the vessel (2). Platelets are cell effectors of inflammation that can influence innate and adaptive immune responses. The capacity of platelets to participate in innate immunity is largely due to their ability to release a myriad of inflammatory and bioactive molecules stored within granules or synthesized upon activation.

These mediators attract and modulate the effector cells of the innate immune system (22). The cell communication process includes the release of trapped extracellular induced neutrophil platelets, platelet Ag presentation to T cells, and modulation platelets from secretion cytokines monocytes discussed in the context of infectious disease and sterile attention primary in human health (15).

White blood cells (WBC)/leucocytes show that the average score before and after intervention increased the score reference (standard). WBC before and after the given intervention showed below-standard values after an intervention. There was no statistical difference in the immunity of medical-surgical nurses before and after being given religious caring. White blood cells, or leukocytes, are part of the immune system and participate in innate and humoral immune responses. They circulate in the blood and mount inflammatory and cellular responses to injury or pathogens; they detect and eradicate foreign microorganisms, such as viruses, bacteria, and parasites that carry disease (2). Leucocytes could become a description influence on immunity in giving religious caring to medical-surgical nurses. Leucocytes were found below normal before providing religious care; however, they were within normal limits after religious caring. This is similar to the results observed concerning erythrocytes, hemoglobin, and hematocrit after giving religious caring. One of the study's limitations is the sample size due to the COVID-19 pandemic and some hospitals not permitting research data collection. Many prospective respondents were unwilling to go to hospitals that provided research permits because the workload was already high during the pandemic. In addition, this research is limited to religious-based hospitals, requiring further study and modification of the module to be implemented in other religion-based hospitals.

CONCLUSION

Research showed that religious caring behavior increases nurses' comfort in psychospiritual, preparedness, and erythrocytes. Hemoglobin, hematocrit, platelets, and leukocytes were not significantly influenced by religious caring. Religious caring behavior affects nurses' comfortable psychospiritual preparedness and enhances immunity by enhancing erythrocytes. Religious caring behavior can be applied throughout the hospital's care, so nurses must use it consistently. Evaluation of immunity through specific Interleukin-2 (IL2) in nurses who apply religious caring behavior would be recommended to be conducted in future research.

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Factors associated with diabetes distress and depression in diabetes mellitus patients in rural East Nusa Tenggara Indonesia

Factores asociados con la angustia y la depresión por diabetes en pacientes con diabetes mellitus en la región rural del este de Nusa Tenggara Indonesia

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SUMMARY

Introduction: *Patients with diabetes mellitus frequently experience depression and diabetes distress. Patients with diabetes mellitus who experience depression, diabetic distress, or both can find it difficult to manage their condition on their own, which can lead to complications, lower quality of life, or even death. The purpose of this research is to identify the risk variables for depression and diabetes distress in individuals with diabetes mellitus.* **Methods**: *This cross-sectional survey was conducted from February to April 2023. Consecutive sampling (n=72) was used to choose the study's sample. Patients with diabetes mellitus between 25 and 65 years and conscious (capacity to relate to oneself and surroundings) are inclusion criteria. The binary logistic regression test and Chi-Square were utilized in the data analysis.* **Results:** *The results of multivariate analysis showed that there was a significant relationship between glycemic control (AOR: 3.151.95 % CI: 1.014-9.794, p-value 0.047) and diabetes distress. There was a significant relationship between complications (AOR: 4.688.95 % CI: 0.990-22.202, p-value 0.052) and glycemic control (AOR: 8.471.95 % CI: .428-2.558, p-value 0.001) and depression.* **Conclusion:** *Individuals suffering from diabetes mellitus who maintain inadequate blood sugar levels are more susceptible to depression and diabetes-related distress compared to those who maintain appropriate blood sugar levels. Individuals with diabetes mellitus who have more than one complication or none at all are more likely to experience depression.*

Keywords: *Depression, diabetes distress, diabetes mellitus.*

RESUMEN

Introducción: *Los pacientes con diabetes mellitus frecuentemente experimentan depresión y malestar por diabetes. Los pacientes con diabetes mellitus que experimentan depresión, sufrimiento diabético o ambos pueden tener dificultades para controlar su afección por sí solos, lo que puede provocar complicaciones, una menor calidad de vida o incluso la muerte. El propósito de esta investigación es identificar las variables de riesgo de depresión y angustia diabética en personas con diabetes mellitus.* **Métodos:** *Esta encuesta transversal se realizó entre febrero y abril de 2023. Se utilizó muestreo consecutivo para elegir la muestra del estudio (n=72). Pacientes con diabetes mellitus entre 25 y 65 años, conscientes (capacidad de relacionarse con uno mismo y el entorno) son criterios*

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de inclusión. En el análisis de los datos se utilizaron la prueba de regresión logística binaria y Chi-Cuadrado. **Resultados:** *Los resultados del análisis multivariado mostraron que existía una relación significativa entre el control glucémico (AOR: 3,151,95 % IC: 1,014-9,794, valor de p 0,047) y el malestar por diabetes. Hubo una relación significativa entre las complicaciones (AOR: 4,688,95 % IC: 0,990-22,202, valor de p 0,052) y el control glucémico (AOR: 8,471,95 % IC: 2,428-29,558, valor de p 0,001) y la depresión.* **Conclusión:** *Las personas que padecen diabetes mellitus y mantienen niveles inadecuados de azúcar en sangre son más susceptibles a la depresión y a la angustia relacionada con la diabetes en comparación con aquellos que mantienen niveles adecuados de azúcar en sangre. Las personas con diabetes mellitus que tienen más de una complicación o ninguna tienen más probabilidades de experimentar depresión.*

Palabras clave: *Depresión, diabetes mellitus, malestar por diabetes.*

INTRODUCTION

Diabetes mellitus (DM) is a growing health issue in both industrialized and developing nations. Approximately 422 million people worldwide suffer from diabetes mellitus, with the majority residing in low- and middle-income nations (1). The prevalence of diabetes mellitus (DM) in Indonesia grew from 6.9 % in 2013 to 8.5 % in 2018, according to blood test findings (2). Anxiety and depression are two mental health conditions that people with diabetes mellitus are more likely to experience. Comorbid mental health issues make it difficult for patients with diabetes mellitus (DM) to follow their treatment regimens, which raises the risk of major short- and long-term complications. These complications can include blindness, amputation, stroke, cognitive decline, kidney failure, a lower quality of life, and early death (3,4).

About one-third of diabetics struggle with mental and social issues, which makes it difficult for them to manage their diabetes on their own. This affects low glycemic control, a rise in DM complications, early mortality, and rising healthcare expenses (5). Depression, anxiety, and post-traumatic stress disorder, which increase the risk of dying 10-20 years earlier, are among the mental health problems often experienced by diabetes mellitus patients. Depression increases between 40 % and 60 %, anxiety increases by about 20 %, and one in four diabetics will have diabetes distress (6). Patients with diabetes mellitus who live in rural locations report higher levels of diabetes distress (35.6 %) compared to those who live in urban areas (18.2 %) (7). Adult DM patients in Indonesia have mental health issues at a rate of 19.3 % (8). Poor food, low socioeconomic level, insufficient exercise, lack of physical activity, and poor sleep quality are all potential contributing factors to mental health issues (6,8).

One of the mental health issues that people with DM frequently experience is depression. Depression is twice as likely to strike people with DM. Women, young people, the elderly, poor glycemic control, prolonged DM symptoms, poverty, long-term consequences from DM, reduced physical activity, obesity, and psychological stress are risk factors for depression in DM patients. Depression can make diabetic patients' clinical problems worse since it can lower their drive to take care of themselves, stick to their treatment plan, and experience long-term complications and a lower quality of life (3,8). However, research on factors related to mental health problems, such as depression and diabetes distress in rural areas in Indonesia, is still limited.

Diabetes distress is another mental health problem DM patients frequently experience (9). Diabetes distress is the specific emotional distress related to the load, medication, and interpersonal aspects of managing diabetes daily (10). The National Diabetes Services Scheme (NDSS), an initiative of the Australia Government, administered by Diabetes Australia, defines diabetes distress as the emotional burden of individuals living with DM and managing diabetes (11). Patients with diabetes mellitus have an increased risk of developing diabetes distress, which, over time, can lead to both macrovascular and microvascular complications as well as an increased chance of dying (12). Diabetes distress ranges from moderate to high in about 41.6 % of adult DM patients (7). In Indonesia, 45.5 % of diabetes patients experience moderate levels of diabetes distress (13). According to study findings, interpersonal distress is more common among diabetic patients living in rural areas (35.6 %) than it is in urban areas (18.2 %) (7). Previous

research has identified several characteristics, including low education, complicated treatment, single status, obesity, overweight, and HbA1c values higher than 6.5, that are linked to diabetes distress (7).

Our research aimed to identify factors associated with depression and diabetes distress in a rural area in the province of East Nusa Tenggara, Indonesia. The conceptual framework used for this study is based on concepts of health promotion and the conclusions of previous studies on type 2 DM-related factors associated with depression and diabetes distress (14). These variables include glycemic control, gender, complication, and long-suffering from DM. These factors were selected because the rural study site has few infrastructure options, low income, and very limited facilities. As a result, patients with diabetes who have had the disease for longer than five years may have poor glycemic control and experience numerous complications, which can worsen depression and diabetes-related distress.

METHODS

This research is a quantitative study with a cross-sectional design that aims to determine the factors associated with mental health problems: depression and diabetes distress in diabetes mellitus patients, especially in rural areas in Indonesia. The population in this study was diabetes mellitus patients in Manggarai Regency, NTT, with a total sample of 72. The Lemeshow formula is used to calculate sample size, confidence level 95 %, anticipated population proportion (P) = 0.05, and absolute precision required on either side of the proportion (d) = 0.05 (15). The Lemeshow formula:

$$n = z^2_{1-\alpha/2} P(1-P)/d^2$$

Sampling techniques used consecutive sampling based on certain criteria. This sampling technique is used to find respondents who meet the inclusion criteria throughout the research period so that the required number of respondents is reached. Inclusion criteria include diabetes mellitus patients aged 25-65 years, conscious (capacity to relate to oneself and surroundings), and willing to be involved in research. Exclusion criteria: DM patients with severe hypoglycemia and diabetic retinopathy. Data were gathered in the Manggarai region of East Nusa Tenggara province, at the Ruteng General Hospital, and in the city health center's operational area. Before any research was conducted, the investigator explained the study's goals and requested informed consent from the respondents. This research was conducted in February-April 2023.

The research instrument used a questionnaire consisting of demographic data, depression and diabetes distress questionnaires. The demographic data questionnaire contains the respondent's name (initial), age, gender, highest level of education, length of time suffering from DM, employment status, use of anti-diabetic drugs, blood sugar test results in the last month, complications (hypertension, stroke, kidney failure, heart disease), and family history of mental disorders. Depression questionnaire was the Patient Health Questionnaire (PHQ-9). This questionnaire consists of nine question items. The depression questionnaire evaluates the respondent's state during the previous two weeks, evaluating lack of motivation, feeling hopeless or depressed, sleeping diffigulties, appetite loss or overeating, low self-esteem, difficulty focusing, moving or speaking slowly, and feeling better off quickly. Each of the nine DSM-IV depression criteria is scored from 0 (not at all) to 3 (almost daily). If a total score of ≥ 10 out of a total score of 27, this indicates depression (16). The diabetes distress questionnaire used the Diabetes Distress Scale (DDS-17). The diabetes distress questionnaire contains emotional burdens, physical, medication-related, and interpersonal distress. The questionnaire consists of 17 items and is given a score of 0 (not a severe problem) to a score of 6 (a severe problem). The total means score of 1-2.9 is categorized as mild-moderate diabetes distress, while the total means score ≥ 3 is categorized as severe diabetes distress (16). According to reliability test results, Cronbach's alpha values for the depression and diabetic distress questionnaires were 0.926 and 0.915, respectively. The validity test results using

Pearson correlation on the diabetes distress and depression questionnaire for all question items were considered valid with a calculated r value > r table (0.361).

Data analysis was using Chi-Square and binary logistic regression tests. The Chi-Square test was carried out on bivariate analysis to find out the relationship between gender, duration of diabetes, complications, and glycemic control with depression and diabetes distress. Binary logistic regression predicts the dependent variable (depression and diabetes distress) by assessing the relationship between the independent variables (gender, duration of diabetes, complications, and glycemic control) and the dependent variables. This research has passed the ethical test carried out by the ethics commission of the Catholic University of Indonesia Santu Paulus Ruteng with ethical test number 17a / USP / R01 / PE02 / K / 01/2023.

RESULTS

Table 1 shows the characteristics of DM respondents. Most respondents, 45 (62.5 %), aged 45-59 years, 36 (50 %) were female and male 36 (50 %). 22 (30.6 %) had a recent college education, 54 respondents (75 %) were jobless (did not have a fixed income), 38 respondents (52.8 %) were long-suffering from DM > 5 years, and 33 respondents (45.8 %) were taking oral anti-diabetic drugs, and 39 respondents (54.2 %) had complications of hypertension.

Table 1

Characteristics of Diabetes Mellitus Respondents (n = 72)

No.	Characteristics of Respondents	n	%
1	**Age (years)**		
	25-44 (youth)	5	6.9
	45-59 (middle-age)	45	62.5
	≥ 60 (elderly)	22	30.6
2	**Gender**		
	Female	36	50
	Male	36	50
3	**Education**		
	No education	7	9.7
	Elementary School	13	18
	Junior High School	12	16.7
	Senior High School	18	25.0
	College	22	30.6
4.	**Employment status**		
	Jobless	54	75
	Work	18	25
5	**Long-suffering from DM**		
	≤ 5 years	34	47.2
	>5 years	38	52.8
6	**Anti-diabetic Drugs**		
	Not taking medication	4	5.6
	Oral	33	45.8
	Insulin	16	22.2
	Oral insulin and insulin	19	26.4
7	**Complications**		
	No complications	10	13.9
	Hypertensive	39	54.2
	Stroke	3	4.2
	Renal failure	14	19.4
	Heart disease	6	8.3

Table 2

Bivariate and Multivariate Analysis: Factor Influencing Diabetes Distress in Diabetes Mellitus Patients (n = 72)

Variable	Bivariate Analysis					Multivariate Analysis			
	Diabetes distress				P	AOR	P	95 %CI	
	Mild-moderate		Severe					Lower	Upper
	n	%	n	%					
Gender:									
Female	22	61.1	14	38.9		1.000		0.154	1.438
Male	27	75	9	25	0.226	0.470	0.186		
Long Suffering from DM:									
≤ 5 years	27	79.4	7	20.6		1.000		0.648	6.707
>5 years	22	57.9	16	42.1	0.006	2.085	0.218		
Complications:									
No or only one complication	43	72.9	16	27.1		1.000		0.736	12.894
More than one complication	6	46.2	7	53.8	0.061	3.081	0.123		
Glycemic control									
Good	27	81.8	6	18.2		1.000		1.014	9.794
Bad	22	56.4	17	43.6	0.021	3.151**	0.047		

Table 2 shows the bivariate and multivariate analysis results of factors affecting diabetes distress in patients with diabetes mellitus. The bivariate analysis using the Chi-Square test showed a significant relationship between the duration of suffering from DM (p-value 0.006) and glycemic control (p-value 0.021) with diabetes distress in DM patients. The multivariate analysis using binary logistic regression showed a significant relationship between glycemic control (AOR: 3.151.95 % CI: 1.014-9.794, p-value 0.047) and diabetes distress in DM patients. DM patients who have poor glycemic control are 3,151 times more likely to experience diabetes distress compared to DM patients with reasonable glycemic control.

Table 3

Bivariate and Multivariate Analysis: Factors Influencing Depression in Diabetes Mellitus Patients (n=72)

Variable	Bivariate Analysis					Multivariate Analysis			
	Depression				P	AOR	P	95 %CI	
	Not depressed		Depression					Lower	Upper
	n	%	n	%					
Gender:									
Female	21	58.3	15	41.7		1.000		0.216	2.016
Male	24	66.7	12	33.3	0.465	0.659	0.465		
Long Suffering from DM:									
≤ 5 years	24	70.6	10	29.4		1.000		0.408	4.103
>5 years	21	55.3	17	44.7	0.180	1.293	0.622		
Complications:									
No or only one complication	40	67.8	19	32.2		1.000		0.990	22.202
More than one complication	5	38.5	8	61.5	0.048	4.688**	0.052		
Glycemic control:									
Good	28	84.8	5	15.2		1.000		2.428	29.558
Bad	17	43.6	22	56.4	0.0001	8.471***	0.001		

Table 3 shows the results of bivariate and multivariate analysis of factors affecting depression in patients with diabetes mellitus. The results of bivariate analysis using the Chi-Square test showed a significant association between DM complications (p-value 0.048) and glycemic control (p-value 0.048) and glycemic control (p-value 0.0001) with depression in DM patients. The results of multivariate analysis using binary logistic regression showed that there was a significant relationship between DM complications (AOR: 4.688.95 % CI: 0.990-22.202, p-value 0.052) and glycemic control (AOR: 8.471.95 % CI: 2.428-29.558, p-value 0.001) with depression in DM patients. DM patients who had more than one DM complication were 4.688 times more likely to develop depression compared to DM patients who had no or only one complication. DM patients who had poor glycemic control had an 8.471 times higher risk of depression compared to DM patients with reasonable glycemic control.

DISCUSSION

Factors affecting diabetes distress in patients with diabetes mellitus

Poor glycemic control was found to be a significant factor associated with diabetes distress in patients with diabetes mellitus. The findings are consistent with Nagabhushana (2021), who found a strong correlation between diabetic distress and inadequate glycemic control (17). Poor glycemic control is strongly linked to higher healthcare expenses and utilization, which can be stressful emotionally (18). DM patients who live in rural areas with poor glycemic control are at higher risk of experiencing diabetes distress for three reasons. First, patients with poor glycemic control require more complex treatment, which requires more effort and costs for DM patients, which can cause a psychological burden. Second, patients with poor glycemic control usually experience complications due to limited costs for self-care and the inadequate availability of facilities in rural areas. This causes patients to feel guilty for failing to treat DM (19). Third, demographic characteristics such as gender, insufficient family income, and being jobless also influence poor glycemic control, which has an impact on increasing psychological burdens, one of which is diabetes distress (20). The results of our research show that the majority of DM patients who experience diabetes distress are female, have low income, and are jobless (do not have a fixed income).

DM patients in the Manggarai district are at high risk of experiencing diabetes distress. This is due to low socioeconomic conditions, where most Manggarai people are farmers with low incomes, limited health facilities, and cultural influences on DM management. Uncontrolled hyperglycemia conditions make DM patients feel burdened because they require high treatment costs, low income, and limited health facilities that support DM patient care. Cultural influences are also closely associated with poor glycemic control and diabetes distress in DM patients in Manggarai Regency. In DM patients with low self-awareness, the habit of eating foods high in carbohydrates and fats in traditional feast dishes can affect dietary adherence.

Factors affecting depression in patients with diabetes mellitus

The findings demonstrated that poor glycemic control and the existence of complications from diabetes mellitus were the two characteristics that were strongly linked to depression in people with the disease. Patients with diabetes mellitus who live in rural areas with poor glycemic control and complications may develop depression because of treatment barriers brought on by cultural factors, poverty, stigma, and limited access to services (20,21). Previous research has shown that there is a positive association between diabetes complications and persistent depressive symptoms with AOR (adjusted ORs) of depressive symptoms 1.025 (95 % CI: 0.606, 1.733) (22). Another study conducted in rural areas by Yu (2016) showed that one of the factors that were significantly associated with depression in diabetes mellitus patients in rural areas was diabetes mellitus patients living with more than two additional diseases (23). The results of this study are also supported by Chew (2016), that

there is a relationship between microvascular complications and depression in DM patients with a value of 0.014 (24).

DM patients living in rural areas, especially in Manggarai Regency, have a high risk of DM complications, both microvascular and macrovascular complications, due to poor glycemic control, which has an impact on increasing depression in DM patients. This can be seen from the results showing that most DM patients have poor glycemic control. This condition can trigger the occurrence of diabetes distress in patients with DM and further progression to depression. The lack of health facilities that support DM management, low income, cultural influences that have the habit of consuming foods that are high in carbohydrates and fats, smoking and consuming alcohol can be factors that contribute to the increase in complications in DM patients in Manggarai district and trigger depression.

Depression in individuals with diabetes mellitus is also substantially correlated with inadequate glycemic management. The findings are supported by earlier research showing a substantial relationship between glycemic control and depression symptoms in individuals with diabetes mellitus (25). Individuals with diabetes mellitus who reside in rural locations, particularly in the Manggarai district, often have inadequate glucose regulation, which might exacerbate their depressive symptoms. Poverty, cultural impacts on DM management, and limited access to DM treatment are the causes of this. The findings of this study are consistent with earlier research on the prevalence of depression in developing nations, which demonstrated that low socioeconomic status and complications were linked to higher rates of depressive symptoms in DM patients in these regions and that depression was linked to inadequate glycemic control (26).

CONCLUSION

Depression and diabetes distress are the two mental health problems that DM patients in rural locations are most likely to experience. In people with diabetes, inadequate glycemic control is one condition that is strongly associated with diabetes, distress and depression. DM patients who have poor glycemic control have a higher risk of experiencing distress and depression compared to DM patients with good glycemic control. Another factor that is significantly associated with depression in DM patients is DM complications. DM patients who have more than one complication are at higher risk of depression than DM patients without complications or only one complication. It is recommended for health workers to screen earlier for symptoms of diabetes distress and depression in DM patients and intervene with a cultural approach to factors related to diabetes distress and depression in DM patients. We recommend further research to develop culture-based interventions that reduce symptoms of diabetes distress and depression in DM patients and glycemic controls.

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Conflict of interest

The researcher discloses no conflicts of interest.

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The relationship between length of illness and quality of life in patients with colorectal cancer

La relación entre de la duración de enfermedades y la calidad de vida en pacientes con cáncer colorrectal

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SUMMARY

Introduction: *The length of illness often results in changes in the quality of life of colorectal cancer patients in several aspects of life, such as psychological, physiological, and social, especially the initial condition of the patient diagnosed. Due to the high risk of death from colorectal cancer, it is recommended that the timing of diagnosis be important for all colorectal cancer patients. The aim was to determine the relationship between length of illness and quality of life in colorectal cancer patients.* **Methods:** *The research method uses a correlational design with a cross-sectional approach. The sampling method is purposive sampling, with a sample size of 72 patients. The research variables are the length of illness and quality of life. The research instrument is the WHOQOL-BREF questionnaire. Univariate data analysis displays frequency distribution and the Chi-Square test (bivariate analysis).* **Results:** *The Chi-Square test results, with a p-value of 0.001, show a relationship between the length of illness and quality of life in patients with colorectal cancer. Patient awareness is important, as well as checking their health when they experience signs and symptoms. The role of nurses and other health workers is to provide education through health promotion.* **Conclusion:** *This research found that the importance of quality of life in patients with colorectal cancer, even when viewed in terms of age and length of illness, does not ensure that a person's quality is getting better, so there is a need for other positive support to support improvements in the patient's quality of life.*

Keywords: *Colorectal cancer, length of illness, quality of life.*

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RESUMEN

Introducción: *La duración de la enfermedad muchas veces cambia la calidad de la vida del paciente de cáncer colorrectal, en los varios aspectos de la vida, como la psicológica, fisiológica y social, especialmente en la condición inicial del diagnóstico del paciente. Debido al alto riesgo de muerte por cáncer colorrectal, se recomienda que el momento de diagnóstico sea importante para todo paciente de cáncer de colorrectal. El objetivo fue determinar la relación entre la duración de la enfermedad y la calidad de vida de pacientes con cáncer colorrectal.* **Métodos:** *El método de investigación utilizó un diseño de correlación con un enfoque transversal; la población furon pacientes*

con cáncer colorrectal con un tamaño de muestra de 72 individuos; el método de muestreo fue la muestrea intencional; las variables de investigación fueron la duración de la enfermedad y la calidad de vida; el instrumento de investigación fue el cuestionario WHOQOL-BREF; el análisis de datos univariado muestra la distribución de la frecuencia; y la prueba Chi-Cuadrado (análisis bivariado). **Resultados:** *Los resultados de la prueba de Chi-Cuadrado, con valor p<0,001 indica que existe una relación entre la duración de la enfermedad y la calidad de vida en el paciente con cáncer colorrectal. De allí la importancia de la conciencia del paciente en verificar su salud al experimentar signos y síntomas. El papel de los enfermeros y otros trabajadores sanitarios es necesario para proporcionar educación a través de la promoción de la salud.* **Conclusión:** *Esta investigación encontró que la importancia de la calidad de vida en los pacientes con cáncer colorrectal, incluso cuando se ve en términos de edad y duración de la enfermedad, no garantiza que la cualidad de una persona se está mejorando, por lo que existe la necesidad de otro apoyo positivo para apoyar las mejoras en la calidad de vida del paciente.*

Palabras clave: *Cáncer colorrectal, calidad de vida, duración de la enfermedad.*

INTRODUCTION

Colorectal cancer is a multifactorial disease. It is the third most frequently diagnosed cancer, and the second most common cause of cancer-related deaths worldwide. The increase in colorectal cancer affects the quality of life of sufferers. Some problems arise in aspects of life, such as psychological problems such as stress, anxiety, and depression, followed by several physiological side effects such as hair loss, pain, fatigue, nausea, and vomiting; several social side effects, such as social isolation and loss of role and function, which in the end further worsen the patient's quality of life (1-3). Reluctance to resume professional activities after surgery, refraining from social contact, and changes in recreational activities that allow a passive role and limit contact with others (4-7).

The incidence of colorectal cancer in Indonesia is 8.6 %, with a mortality rate of 5.17 %. This figure places colorectal cancer in fourth position as the cancer with the highest incidence in Indonesia (8). Secondary data from the medical records of Bethesda Hospital Yogyakarta for the period 2013-2021 shows that the incidence of colorectal cancer is higher in men, old age, complaints in the form of changes in defecation patterns, histopathology of epithelial cell type (adenocarcinoma), stage IV, the most common treatment many are surgical, and 2-year survival is 20.8 % (9-13). The impact of colorectal cancer on survivors is physical rejection, finding it difficult to accept their situation, feeling low self-esteem, and not feeling confident when meeting other people (14).

Data showed that colorectal cancer patients in Dr. Pirngadi Hospital in 2019-2020 had as many as 75 respondents, while in Murni Teguh Hospital, 56 respondents (2). With the increasing number of colorectal cancer patients with a poor prognosis, even if the predicted age after diagnosis is five years, this will significantly affect the physical, psychological, social, and spiritual of patients in living their lives, and this condition will become a burden on nursing services and health services in general. Due to the high risk of death from colorectal cancer, it is recommended that the timing of diagnosis be important for all colorectal cancer patients.

The cause of colorectal cancer is still unknown, but the level of education affects the patient's acceptance of their condition and is higher with a person's highest education (15). This study focuses on the quality of life in cancer survivors in the long term with instruments including 26 items that represent the four domains of quality of life: physical, psychological, social, and spiritual. Based on the phenomenon, it is necessary to know the relationship between length of illness and quality of life in patients with colorectal cancer (16). This study aimed to determine the relationship between length of illness and quality of life in colorectal cancer patients.

METHODS

The study was conducted at the Santa Elisabeth Medan Hospital in October 2023. The research method is quantitative with a cross-sectional research design. The population is colorectal cancer patients. The samples were taken using the purposive sampling technique,

with a sample size of 72 respondents. The tool used to measure quality of life is WHOQOL-BREF (17). Demographic data is the tool used to determine the length of illness. The inclusion criteria are age 18-80, patients being treated in the inpatient ward, patients who survive after surgery and adjuvant therapy within 0-3 years, and patients with sufficient literacy. Exclusion criteria: patients who refuse to be research subjects, patients aged < 18 years, and patients who cannot complete the questionnaire according to the specified research period.

Before applying the questionnaire to the respondents, they were asked for informed consent. The quality of life was measured through the questionnaire by covering four domains, namely physical, psychological, social, and spiritual aspects, with good indicators of 76 %-100 %, enough of 56 %-75 %, and not enough of <56 %. Data analysis was performed using univariate and bivariate tests. Data analysis shows a frequency distribution: age, gender, education, profession, duration of disease, and quality of life. Using the Chi-Square test, bivariate analysis was used to determine whether there is a relationship between the duration and the quality of life of a patient with colorectal cancer. This research was declared appropriate by the health research ethics committee of Stikes Santa Elisabeth Medan No: 043/KEPK-SE/PE-DT/IX/2023.

RESULTS

1. Univariate Analysis

The distribution based on respondent characteristics is shown in Table 1. Most respondents were >64 years old (27.8 %), male sex (59.7 %), the highest level of education (most of the respondents had high school (38.95 %), most of the employment was private (37.5 %), and a long-term majority illness <1 year (45.8 %).

Table 1. Distribution of Respondent Characteristics Based on Age, Gender, Education, and Occupation.

	Characteristics	Frequency (n)	Percentage (%)
1	Age		
	25-34 years	7	9.7
	35 – 44 years	8	11.1
	45 – 54 years	19	26.4
	55 – 64 years	18	25.0
	65 – 74 years	20	27.8
	72	100	
2	Gender		
	Male	43	59.7
	Female	29	40.3
	72	100	
3	Education		
	None	1	1.4
	Primary school	6	8.3
	Middle school	10	13.9
	High school	28	38.9
	College and above	27	37.5
	72	100	
4	Job		
	Civil servants	11	15.3
	State-owned enterprises	7	9.7
	Private employees	27	37.5
	Self-employed	16	22.2
	Farmer	11	15.3
		72	100.3

Table 2 shows that 33 respondents had a prolonged illness of less than one year (45.8 %), 11 respondents had a prolonged illness of 2-3 years (15.3 %), and 28 respondents had a prolonged illness of more than three years (38.9 %).

Table 2. Distribution of respondents based on length of illness.

	Length of illness	Frequency (n)	Percentage (%)
1	<1 year	33	45.8
2	2-3 years	11	15.3
3	>3 years	28	38.9
		72	100

Table 3 shows that 63.9 % had enough, 19.4 % had a good quality of life, and 16.7 % had insufficient.

Table 3. Distribution of respondents' quality of life.

	Quality of life	Frequency (n)	Percentage (%)
1	not enough	12	16.7
2	enough	46	63.9
3	good	14	19.4
		72	100

2. Bivariate analysis

Based on Table 4, the analysis relationship between long illness and quality of life in colorectal cancer patients showed that of the 33 respondents, 36.4 % had a length of illness of less than one year and did not have enough quality of life, and 63.6 % had enough quality of life. Of the 11 respondents with an extended illness of 2-3 years, 100 % had a good quality of life. Of the 28 respondents with an illness lasting more than three years, 50 % had an adequate quality of life, and 50 % had a good quality of life. Based on the Chi-Square statistical test results, it is concluded that there is a relationship between the length of illness and quality of life of colorectal cancer patients with a p-value = 0.001 <0.05

Table 4. Correlation between length of illness and quality of life in colorectal cancer patients.

		Quality of life (Y)			Total	p value
		not enough	enough	good		
Length of illness (X)	< 1 year	12	21	0	33	0.001
		36.4 %	63.6 %	0.0 %	100 %	
	2-3 years	0	11	0	11	
		0.0 %	100 %	0.0 %	100 %	
	>3 years	0	14	14	28	
		0.0 %	50.0 %	50.0 %	100 %	
		12	46	14	72	
		16.7 %	63.9 %	19.4 %	100 %	

DISCUSSION

The incidence of colorectal cancer is more common in people aged > 50 years and more often in men (4,18,19). Men have approximately twice the risk of developing advanced adenomas or cancer compared to women (9). According to the American Cancer Society (2014), the increasing incidence of colorectal cancer in men is caused by smoking habits and frequent consumption of alcohol, while most women do not consume

alcohol or cigarettes. In women, there is the hormone estrogen, which can reduce the risk of colorectal cancer. Men are at a higher risk for advanced adenomas and colorectal cancer earlier than women. This is in line with research which states that women consult more frequently than men so that women are better prepared to face illness (20). In another study, it was found that there is a difference between the quality of life of female and male colorectal cancer patients, where the quality of life of women is lower, and they experience more difficulties in coping and adjusting compared to their male counterparts, and work and adjuvant therapy can be considered strong independent predictor factors for functional scale in patients with colorectal cancer (21).

Education will determine a person's level of knowledge; higher education makes it easier for a person to receive information, making it possible for them to learn more. This is in line with a previous study, which states that the higher a person's knowledge, the better their attitude toward the incidence of colorectal cancer (15). The length of illness affects the quality of life of cancer patients, especially at the beginning of diagnosis or less than one year, because, in general, the diagnosis of colorectal cancer patients when visiting the hospital is at stage III-IV with a poor prognosis. In this study, it was found that young adults who had been diagnosed with colorectal cancer for more than 5 years still have a low quality of life.

The initial condition of the patient diagnosed with colorectal cancer causes the sufferer to be unsure of their ability to carry out self-care, feel tired quickly every time they do activities, not comply with treatment according to schedule, be bored and fed up with their illness, and feel that they are a burden on their family because they repeatedly have to be treated in the hospital (22).

CONCLUSION

This research found that the importance of quality of life in patients with colorectal cancer, even when viewed in terms of age and length of illness, does not ensure that a person's quality of life is getting better. Therefore, there is a need for other positive support to support improvements in the patient's quality of life. To recognize these signs and symptoms, nurses and other health workers must provide education through health promotion, which will ultimately be implemented simultaneously with curative action.

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Functional status outcomes of adolescents with mental disorders: A descriptive study

Resultados del estado funcional de adolescentes con trastornos mentales: un estudio descriptivo

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SUMMARY

Introduction: *Mental disorder impacts various aspect of an individual's ability to function in daily life and their living environment. There are still limited studies that describe the functional health status of adolescents with mental disorders. This study aimed to determine the functional status of adolescents with mental disorders.* **Methods:** *This study was cross-sectional. Data were obtained from 50 family caregivers of adolescents aged 12-18 who experience mental disorders. The sample was conducted by purposive sampling. The variable measured in this study was functional status. The data was measured using a questionnaire and analyzed using descriptive analysis.* **Results:** *The functional status of adolescents with mental disorders, such as activity engagement (50 %), hope (50 %), and speech components (38 %), are in good categories. Adolescents often have trouble sleeping (48 %), tiredness (46 %), eating patterns (64 %), mood depression (92 %), concentrating on schoolwork (78 %), and feeling bad about themselves (76 %).* **Conclusion***: Adolescents with mental disorders still have poor functional abilities, especially trouble sleeping, tiredness, poor eating patterns, mood depression, concentrating on schoolwork, and feeling bad about themselves. Family caregivers need to increase their understanding and recognize adolescents' abilities in carrying out their daily activities, facilitate the importance of having positive expectations, and give an understanding of the importance of having goals in life to achieve and recognize the problem of sleep patterns, tiredness and mood in adolescents to help overcome the issues in adolescents.*

Keywords: *Adolescent, functional health status, mental disorder.*

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RESUMEN

Introducción: *Los trastornos mentales afectan varios aspectos de la capacidad de un individuo para funcionar en la vida diaria y en su entorno vital. Aún existen estudios limitados que describen el estado de salud funcional de los adolescentes con trastornos mentales. Este estudio tuvo como objetivo determinar el estado funcional de los adolescentes con trastornos mentales.*

Métodos: *Este estudio fue un estudio transversal. Los datos se obtuvieron de 50 cuidadores familiares de adolescentes de 12 a 18 años que padecen trastornos mentales. La variable medida en este estudio fue el estado funcional. La muestra se realizó mediante un muestreo intencional. Los datos se midieron mediante un cuestionario y se analizaron mediante análisis descriptivo.* **Resultados:** *El estado funcional de los adolescentes con problemas psiquiátricos, a saber, la participación en la actividad (50 %), la esperanza (50 %) y los componentes del habla (38 %) se encuentran en categorías buenas. Los adolescentes a menudo tienen problemas para dormir (48 %), cansancio (46 %), patrones de alimentación (64 %), depresión del estado de ánimo (92 %), concentración en el trabajo escolar (78 %) y sentirse mal consigo mismos (76 %).* **Conclusión:** *Los adolescentes con trastornos mentales aún presentan capacidades funcionales deficientes, especialmente problemas para dormir, cansancio, malos patrones de alimentación, depresión del estado de ánimo, concentración en las tareas escolares y sentirse mal consigo mismos. Los cuidadores familiares deben aumentar su comprensión y reconocer las capacidades de los adolescentes para llevar a cabo sus actividades diarias, facilitar la importancia de tener expectativas positivas y hacer comprender la importancia de tener metas en la vida que alcanzar y reconocer el problema de los patrones de sueño, el cansancio y el estado de ánimo en los adolescentes para ayudar a superar los problemas en los adolescentes.*

Palabras clave: *Adolescente, estado de salud funcional, trastorno mental*

INTRODUCTION

Adolescence, a phase that usually spans from ages 10 to 19, represents a pivotal stage of development characterized by the profound shift from childhood to adulthood. This transformative period encompasses substantial physical, cognitive, and emotional changes as individuals endeavor to shape their identities and strive for optimal well-being (1). The World Health Report (2000) stated that 20 % of children and adolescents have a mental illness severe enough to cause damage (2). The most common mental disorders experienced by adolescents were anxiety disorders, including social phobia and generalized anxiety disorder, at 3.7 % and was followed by major depressive disorder at 1.0 %, conduct disorder at 0.9 %, and both post-traumatic stress disorder (PTSD) and attention deficit hyperactivity disorder (ADHD) at 0.5 % (3). Another study found that the most prevalent diagnoses of mental disorders in children and adolescents were as follows: mood disorders at 8.6 %, ADHD at 7.4 %, conduct disorders at 6.1 %, and anxiety disorders at 4.8 % (4).

Children and adolescents with mental health disorders are likely to experience symptoms throughout their lives, which increases their risk of dropping out of school, substance abuse, suicidal thoughts, reduced physical activity, and more extended periods of mental health service utilization (5). Mental disorders in adolescents could interfere with their normal development and functioning (6). Hence, functional status has emerged as a crucial measure of outcome, as it evaluates how adolescents with mental disorders fare compared to those without such conditions. Although it is generally believed that functional status is low among adolescents with mental disorders, there is some variation in this regard.

Functional status refers to the disability a patient experiences due to their health condition in any domain (7). It reflects an individual's capacity to perform everyday activities, meet basic needs, fulfill typical roles, and promote health and well-being. Functional status assesses these health domains and evaluates the impact of disease on a patient's life (7). Past mental health status is important as information and to understanding current functional status in adolescents because disease parameters are often considered to affect adolescents' psychosocial adjustment (8,9) in the social aspect of adolescents.

Mental disorders impact various aspects of an individual's ability to function in daily life and their living environment (10). The Global Burden of Disease Study, using Disability Adjusted Life Years (DALYs), has shed light on the considerable impact of mental health issues on disability. Psychiatric disorders have been linked to decreased functional status and more disability days compared to not having a mental illness. A diagnosis of a mental disorder has a far-reaching effect on individuals and their families, affecting all areas of life, including daily functioning, planning, organizational skills, and consistent decline in performance (11). Mental disorder in individuals affect their functional outcomes

such as psychological outcomes, health behavior outcomes, economic and social outcome (8) and also well-being and functioning (12).

In Indonesia, approximately 6 % of individuals aged 15 and above experience symptoms of anxiety or depression (13). Adolescent functional limitations are essential factors in disabled adolescents' psychosocial adjustment. There is a need for a broader range of preventive interventions in adolescents in mental health services. There are still limited studies that describe the functional status of adolescents with mental disorders. The objective of this study was to evaluate the functional capabilities of adolescents diagnosed with mental disorders.

METHODS

Study Design

This study was a cross-sectional study.

Participants

This study was conducted in a Mental Hospital in Surabaya. The study period was two months (September-October 2022). The population was family caregivers for adolescents aged 12-19 years with psychiatric problems who were on outpatient treatment at the Menur Mental Hospital in Surabaya. The number of participants was 50, who visited the hospital for a check-up and were chosen by purposive sampling. The inclusion criteria were families living at home with adolescents who experienced psychiatric problems for a minimum of 6 months and family caregivers aged >18 years. The exclusion criteria were families with psychiatric problems.

Data Collection

Data on adolescents experiencing psychiatric problems was obtained from outpatient data from mental hospitals. When the family was visiting outpatient care at the adolescent psychiatric clinic, the researcher approached the family and asked whether the family met the criteria the researcher wanted. Prospective respondents who are willing to take part in the study are asked to fill out informed consent and fill out a questionnaire.

The instrument in this study used a demographic questionnaire, which contained the age of the adolescent patient, gender, length of illness, and diagnosis of psychiatric problems. The questionnaire, which was further modified from Patient Health Questionnaire-9 (PHQ-9) for adolescents (14). The question concerns nine symptoms that occurred during the past two weeks. The instrument assessed activity engagement, hope, speech, sleeping, tiredness, eating patterns, mood depression, concentrating on schoolwork, and feeling bad about self.

Ethical Consideration

This study was ethically approved by the ethical commission of the Faculty of Nursing Universitas Airlangga, number 2361.

Data Analysis

Data were analyzed using IBM SPSS with descriptive analysis.

RESULTS

As shown in Table 1, the results indicate that most adolescents with psychiatric problems are male (62 %), the mean age is 14.74 years, the illness duration is 6.1 years, and the majority diagnosis is behavior disorder (42 %). The health status of adolescents with psychiatric problems, namely the Activity engagement (50 %), Hope (50 %), and Speech components (38 %), are in good categories. Adolescents often have trouble sleeping (48 %), tiredness (46 %), eating patterns (64 %), mood depression (92 %), concentrating on schoolwork (78 %), and feeling bad about themselves (76 %) (Table 2).

Table 1

Respondents Characteristics

Variable	Frequency (n)	Percentage (%)	Mean
Sex			
Female	19	38.0	
Male	31	62.0	
Age (year)			14.74
Illness duration (year)			6.10
Diagnosis			
Schizophrenia	4	8.0	
Depression	7	14.0	
Developmental disorder	11	22.0	
Behavior Disorder	21	42.0	
Anxiety	6	12.0	
OCD	1	2.0	

DISCUSSION

Almost half of the adolescents with mental disorders had activity engagement, hope, and speech ability in good categories. Activities of daily living (ADL) are the daily routine tasks that people perform, including eating, dressing, moving, and engaging with others, such as family and community. A previous study revealed that adolescents with intellectual disabilities generally demonstrate proficiency in performing ADL. However, it was noted that the abilities of adolescents with disabilities could not be directly compared to those of typical adolescents (15). Different diagnoses for mental disorders will affect the engagement ability in adolescents; for example, in school engagement (16). Adolescents with mental disorders should be actively involved in daily activities to enhance their independence in line with their abilities. Family caregivers need to understand the adolescents' capabilities better and support them in their daily tasks. Engaging in activities is vital for developing adolescents' self-care skills and fulfilling their needs. Adolescents with mental disorders should be encouraged to participate in daily activities to promote their independence based on their abilities. Family caregivers should strive to understand the adolescents' capabilities better and support them in carrying out their daily tasks. Engaging in activities is crucial for developing adolescents' self-care skills and meeting their needs.

The majority of adolescents had good hope. Adolescents with a strong sense of hope tend to experience higher physical and psychological well-being levels (17). Hope entails looking forward to the future with a positive outlook and purpose. It gives us the belief that there is a better future ahead and helps us deal with present challenges, encouraging us to view difficult times as opportunities for personal development (18). Hope is considered an essential value in the recovery from schizophrenia and mental illness in general (19). Adolescents with mental disorders need to understand the importance of having positive expectations and setting life goals to achieve them.

Adolescents who have emotional and behavioral disorders frequently exhibit limited proficiency in language and communication (20). Earlier research has indicated that specific elements of language and communication are closely linked to mental health. For instance, adolescent psychotic experiences have been associated with poor pragmatic language skills (21) and adolescents with depression (22). Intervention should apply in both speech and language therapy and psychotherapy for adolescents with mental disorders who experience speech difficulties.

Most adolescents with mental disorders in this study often have trouble sleeping, tiredness, poor eating patterns, mood depression, concentrating on schoolwork, and feeling bad about themselves.

Table 2

An adolescent with Mental Disorder Functional Status Characteristics

Variable	Frequency (n)	Percentage (%)
Activity Engagement		
Good	25	50.0
Average	13	26.0
Poor	12	24.0
Hope		
Poor	14	28.0
Average	11	22.0
Good	25	50.0
Sleep disorder		
Never	3	6.0
Seldom	10	20.0
Sometimes	13	26.0
Often	24	48.0
Tiredness		
Never	1	2.0
Seldom	14	28.0
Sometimes	12	24.0
Often	23	46.0
Eat pattern		
Good	10	20.0
Average	8	16.0
Poor	32	64.0
Speech		
Poor	14	28.0
Average	17	34.0
Good	19	38.0
Mood Depression		
Average	4	8.0
Poor	46	92.0
Concentrating on schoolwork		
Good	2	4.0
Average	8	16.0
Poor	39	78.0
Feeling bad for self		
Good	3	6.0
Average	7	14.0
Poor	38	76.0

The results of previous studies indicated that adolescents with mental disorders experience poor sleep quality, such as insomnia, delayed sleep-phase wake disorder, and poor sleep efficiency (23). Addressing fatigue and sleep problems in adolescents with mental disorders is challenging due to a lack of motivation among young people to make behavioral changes aimed at managing fatigue and sleep difficulties (24). Difficulties with sleeping and persistent tiredness can be more than just standalone problems; they can also manifest as transdiagnostic symptoms across a range of mental health disorders (24). Healthcare professionals often do not prioritize common sleep and tiredness issues and do not emphasize addressing fatigue and sleep problems in the context of mental illness. Family caregivers must recognize the significance of sleep patterns in adolescents and provide support in overcoming any sleep problems they may have.

A prior study found that mental disorders such as depression related to lower academic scores, especially in math achievement (25). School is crucial for supporting adolescents with conditions like mental disorders and can provide primary treatment support (26). Thus, schools, like other organizations, play an essential role in supporting and promoting mental health among adolescent students with mental disorders.

A prior study found that unhealthy dietary patterns are associated with behavioral issues in children (27). Overeating and undereating have a complex impact, sometimes improving feelings of well-being and at other times leading to guilt, depression, anxiety, and deprivation (28). Family caregivers should monitor the changing eating patterns of adolescents to identify any problems they are experiencing.

Adolescents grappling with depression often describe experiencing heightened and varying negative emotions, such as intensified feelings of sadness, anger, and nervousness. Additionally, they may note a decreased balance between positive and negative emotions (29). Experiencing mental disorders in adolescents was described as an unplanned journey. The mood shown by adolescents in everyday life cannot be predicted, but most of them show a depressed mood. This result had implications for nursing practice, included developing interventions and conducting health education for adolescents with mental disorders about the development and enhancement of healthy coping skills (30).

Most adolescents with mental disorders experience difficulty concentrating on schoolwork. Previous research has indicated that a rise in depressive symptoms correlates with a range of factors indicating diminished academic

performance (31). Suffering from mental health disorders can heighten the likelihood of skipping school, having to repeat a grade, and ultimately leaving school altogether (32). The educational setting significantly influences the development of adolescents with mental disorders. Adolescents spend a substantial portion of their time at school, where they navigate social interactions, academic pressures, cognitive challenges, and psychological stress. Psychiatric nurses should join forces with school nurses, mental health professionals, parents, teachers, and school administrators to gain insight into the unique factors that impact the academic achievement of adolescents with mental health conditions. This collaboration is essential for identifying and implementing targeted interventions.

The findings of this study have implications for nurses and health workers to improve caregiver knowledge in recognizing the daily abilities of adolescents with psychiatric problems. It's important to note that this study has limitations. It cannot be used to establish cause-and-effect relationships, and it only provides a general understanding of the functional health status of adolescents

CONCLUSION

Adolescents affected by mental disorders often exhibit compromised functional capabilities, mainly manifesting as disruptions in sleep patterns, fatigue, irregular eating habits, and mood dysregulation. Familial caretakers must cultivate an enriched comprehension of the adolescent's proficiency in executing their routine pursuits. This finding necessitates fostering optimistic prospects and teaching the significance of formulating and pursuing life objectives while concurrently acknowledging and addressing sleep irregularities, fatigue, and mood-related challenges that adolescents encounter. These efforts can significantly contribute to alleviating the hurdles faced by adolescents.

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Preparedness of coastal communities in facing a tsunami disaster

Preparación de las comunidades costeras para afrontar un desastre por tsunami

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SUMMARY

Introduction: *Disaster education for coastal communities has not been implemented well. Community disaster preparedness supports successful disaster management. This study aimed to assess if there is a link between disaster education and coastal community readiness for a tsunami disaster.* **Method:** *The research design is a correlational study using a cross-sectional approach. The sample obtained was 104 respondents using a simple random sampling technique. Analysis was performed using the Chi-Square test.* **Results:** *There was a relationship between disaster education and the preparedness of coastal communities in dealing with a tsunami disaster in Puger Kulon Village, Jember Regency; with a p-value< 0.0001 < 0.05, thus H1 is accepted, which means there is a relationship between disaster education and the preparedness of coastal communities in facing the tsunami disaster.* **Conclusion:** *The recommendation is that the quality of disaster education must be further improved so that the public can better understand and manage information to improve community preparedness in dealing with a tsunami disaster.*

Keywords: *Disaster education, disaster preparedness, tsunami.*

RESUMEN

Introducción: *La educación acerca desastres para las comunidades costeras no se ha implementado bien. La preparación comunitaria para desastres apoya la gestión exitosa de desastres. El propósito de este estudio fue evaluar si existe un vínculo entre la educación sobre desastres y la preparación de la comunidad costera ante un desastre de tsunami.* **Método:** *Se uso un diseño de estudio correlacional utilizando un enfoque transversal. La muestra fue de 104 encuestados mediante una técnica de muestreo aleatorio simple. El análisis se realizó con la prueba de Chi-Cuadrado.* **Resultado:** *Hubo una relación entre la educación sobre desastres y la preparación de las comunidades costeras para hacer frente a un desastre de tsunami en Puger Kulon Village, Jember Regency, con un valor de p<0,0001 < 0,05, por lo que se acepta H1, lo que significa que hay una relación entre la educación sobre desastres y la preparación de las comunidades costeras para enfrentar el desastre del tsunami.* **Conclusión:** *La recomendación de es que se debe mejorar aún más la calidad de la educación sobre desastres para que el público pueda comprender*

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y gestionar mejor la información a fin de mejorar la preparación de la comunidad para hacer frente al desastre del tsunami.

Palabras clave*: Educación sobre desastres, preparación para desastres, tsunami.*

INTRODUCTION

Natural disasters cause immense loss of human lives. Between 1996 and 2015, 1.35 million people have been killed by 7 000 natural disasters worldwide, of which 56 % are victims of earthquakes and tsunamis (1). Indonesia is a disaster-prone country. Quoting data from the American National Agency for International Strategy for Disaster Risk Reduction (UNISDR), geographically, Indonesia is an archipelagic country located at the meeting point of four tectonic plates, namely the Asian continent plates, the Australian continent, the Indian Ocean plate, and the Pacific Ocean: known as Ring of fire. There is a volcanic belt (volcanic arc) in Indonesia's southern and eastern parts. Stretching from the islands of Sumatra-Java-Nusa Tenggara-Sulawesi, the sides are old volcanoes and lowlands. This condition has a high potential and is prone to disasters such as volcanic eruptions, earthquakes, tsunamis, floods, and landslides. Indonesia ranks 36th in the country with a high Disaster Risk Index of 10.36 %. Efforts can be made to reduce disaster risks by developing knowledge and skills and raising awareness of the threat of disasters through disaster education. Jember Regency is a district with a diverse topography in coastal, lowland, and highland areas. Highland areas have relatively unstable mountainous contours and are prone to disasters, especially floods, and landslides (1,2).

Disaster education needs to be done to minimize the impact of disaster risks. Disaster education covers various important aspects related to disaster preparedness, such as recognition of potential disasters in the environment, history of disasters that have occurred, forms of disaster anticipation/mitigation, the impact of disaster on individuals and groups, forms of handling when a disaster occurs, and how to save oneself from a disaster occurred (3). Efforts to reduce disaster risk through disaster education for the community, especially in coastal areas, are still very minimal. This means that knowledge, skills, and awareness of the threat of tsunamis in coastal communities are still problems that must be resolved (4). Community preparedness in responding to disasters is evaluated in that Indonesian society is still relatively less reactive and responsive in facing natural disasters, which cannot predict when and where a disaster will occur, so community preparedness regarding a tsunami disaster is a problem that must be faced (5). Preliminary studies revealed that many people still underestimate the tsunami disaster, which is the highest potential disaster in the place where they live. There is minimal community participation in educational activities carried out by BPBD, and many people still misperceive the tsunami disaster. Disaster Emergency Preparedness and Handling Capacity in Indonesia reaches 35 %. The preparedness of the people of East Java Province is in the low category at 25 %. The preparedness of the Jember community has reached 25 %, plus Puger District is ranked first in areas with high tsunami potential (4). Coastal community preparedness can be influenced by knowledge and behavior, socioeconomics, socio-psychology, and structural and normative influences (6).

Based on the description that has been provided, disaster education is considered capable of increasing community preparedness in facing disasters. As stated before, this disaster education is expected to provide valuable insight into community perspectives regarding disaster risk and its impacts and preparedness measures and contribute to the development of effective strategies for disaster management (6,7). Another important disaster education is estimating a disaster's arrival time (EAT or ETA = Estimated Times of Arrival). This is important to increase preparedness for disasters (8). Thus, further research is needed regarding the relationship between disaster education and community preparedness for the tsunami.

METHODS

The research design was carried out using a correlational study using a cross-sectional approach to determine the relationship between

disaster education and the preparedness of young adults on the coast to face a tsunami disaster. This study measures the independent and dependent variables simultaneously, with no follow-up. The research was conducted in the coastal area of Puger Kulon Village, Jember Regency, which has a population of 141 people. From the population, a research sample was determined to represent the population in providing answers using a simple random sampling technique of 104 respondents. Data were analyzed using univariate analysis carried out on each variable from the results and bivariate analysis to determine whether there was a relationship between disaster education and the preparedness of coastal communities to face tsunami disasters. Bivariate analysis was carried out using the Chi-Square test.

RESULTS

The research results describe the relationship between disaster education and the preparedness of coastal communities to face tsunami disasters in Puger Kulon Village, Jember Regency. Data was collected from 104 respondents over 14 days, from 16-30 May 2022. The data includes the respondent community's characteristics, disaster education, and preparedness.

Respondents in this study were characterized based on age, gender, ethnicity, religion, and the highest level of education and occupation. The data in Table 1 show that most respondents in this study were aged 20 - 40, as much as 58.7 %; there were more women (51 %) than men; the majority are Javanese (60.6 %); the most education was high school (63.3 %); and the most common job is as a fisherman (42.3 %).

Table 1

General characteristics of respondents (n=104)

Characteristics	Frequency	Percent (%)
Age		
20 – 40 years	61	58.7
41 – 60 years	43	41.3
Gender		
Man	51	49.0
Woman	53	51.0
Etnics		
Jawa	63	60.6
Mature	41	39.4
Education		
Elementary school	11	10.6
Yunior High School	22	21.2
SMA	71	68.3
Employment		
Self-employed	30	28.8
Fisherman	43	41,3
IRT	31	29,8

Table 2. Distribution of respondents based on attendance at disaster education (n=104)

Attendance	Frequency	Percent (%)
Not Present	37	35.6
Present	67	64.4
Total	104	100.0

Table 2 shows that most respondents attended disaster education activities

Table 3. Distribution of respondents based on attendance at disaster education (n=104)

Level Preparedness	Frequency	Percent (%)
Very ready	29	27.9
Ready	33	31.7
Almost ready	21	20.2
Not ready	18	17.3
Not ready yet	3	2.9
Total	104	100.0

Table 3 shows that the respondents' preparedness in facing the tsunami disaster was the lowest in the not ready category (2.9 %) and the highest in the ready category (31.7 %).

Table 4. Analysis of the relationship between disaster education and respondents' preparedness in facing the tsunami disaster

	Chi-Square Tests		
	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	79.027	4	0.0001
Likelihood Ratio	95.657	4	0.0001
Linear-by-Linear Association	64.878	1	0.0001
N of Valid Cases	104		

Table 4 shows Chi-Square test results, with a p-value of 0.0001. Thus, the H1 Hypothesis is accepted, meaning that there is a relationship between disaster education and the preparedness of coastal communities for a tsunami disaster in Puger Kulon Village, Jember Regency.

DISCUSSION

Disasters occur that are not expected by everyone and often happen beyond human control (15). Disasters are divided into two, namely natural disasters and human-caused disasters. Natural disasters include earthquakes, volcanic eruptions, floods and/or tsunamis, landslides and forest fires (9). All regions worldwide are experiencing the same fate, namely being hit by disasters. However, the types and degrees of disasters vary. The impacts of disasters differ depending on the community's type, degree and preparedness (10). The impact of disasters can be vast and cover many sectors such as infrastructure, economy, livelihoods, society, and others (8). Disaster management is generally divided into before, during, and after a disaster. Before a disaster occurs, disaster education is a very important variable in disaster management (11).

Our results show that most coastal communities in Puger Kulon Village attended disaster education activities, with 67 respondents (64.4 %).

Conceptually, disaster education aims to change a person's behavior, including increasing aspects of knowledge, understanding, changes in attitudes and actions, as well as awareness of disaster prevention (12). Mujiburrahman et al. agree with that, and revealed that disaster education is one of the pre-disaster activities to increase knowledge, awareness, and attitudes of the community to reduce losses that arise during a disaster (13).

Increasing a person's knowledge is expected to be able to change his behavior. This is to Lawrence W. Green's theory, which states that three factors can influence and follow up on it by changing, maintaining, or improving behavior in a better direction, namely predisposing factors, enabling factors and reinforcing factors (6,14) therefore, an essential step toward mitigating their current and future risks. This study provides a systematic review of coastal community resilience frameworks for disaster risk management, covering their content, structure, and assessment. Sixty-four critical resilience criteria under four dimensions are identified by analyzing the convergence and divergence of the consideration of assessment indicators in the reviewed frameworks. Existing frameworks focus mostly on 'governance and institutions', 'infrastructure', and 'society and the economy'. Despite significant risks, the impacts on the environment and potential risks of climate change are not prioritized. Only 22 % of the frameworks consider future risks, rendering the remainder inadequate for assessing projected risks from climate change. None of the frameworks consulted the full spectrum of stakeholders (public, government, and experts). In this case, disaster education, as part of the predisposing factors, must be of good quality to increase public knowledge about efforts to deal with tsunami disasters. *Disaster education* is one of the important activities to reduce the number of losses in a tsunami, a potential disaster in Puger Kulon Village. In general, the disaster education carried out by BPBD Jember Regency has not been optimal. This was shown by most respondents stating they were present (64.4 %) and respondents stating they were not present (35.6 %). These conditions indicate that the disaster education carried out by BPBD Jember Regency has not yet received its maximum benefits from coastal communities in Puger Kulon Village (4) .

The evidence indicates that educational or counseling activities need to be provided with

special methods so that people want to understand and apply what has been given by the instructors, namely by providing poster leaflets that can be posted on the doors of each house so that when the extension is forgotten, then they can still remember the material by looking at the poster. There are still many people who do not attend the tsunami disaster education activities carried out by BPBD Jember Regency due to several reasons, namely that they are busy with their work, so they cannot take part in disaster education activities, the public's perception of the disaster education being carried out seems monotonous and less interesting. The perception is that the tsunami is an unproven issue. Of course, this must be an evaluation for education implementers, namely BPBD Jember Regency (10).

Coastal Community Preparedness in Facing Tsunami Disasters in Puger Kulon Village Kabupaten Jember

The results show that coastal community preparedness is divided into five categories: 27.9 % in the very ready category, 31.7 % in the ready category, 20.2 % in the almost ready category, 17.3 % in the less ready category, and 2.9 % in the not ready category. The results listed by coastal communities in Puger Kulon Village, Jember Regency, are classified as communities with preparedness in the ready category.

Disaster preparedness is an activity that aims to ensure that the necessary resources can respond and take effective action during a disaster to minimize disaster risk through effective, timely and efficient action (7). There is a theory that explains several factors that can influence community preparedness, namely knowledge and behavior, socioeconomics, socio-psychology, and structural and normative influences (1,5), as preparation related to meeting food needs (10).

Preparedness of coastal communities is very important in facing a tsunami, the most significant potential disaster in the area. Therefore, disaster education has an important role in changing and strengthening community preparedness behavioral factors, including predisposing factors consisting of education, knowledge, attitudes and perceptions. Supporting factors (enabling factors) consisting of disaster training and education, as well as the availability and affordability of Kulon facilities and infrastructure, namely the existence of an Early Warning System (EWS) located on Pancer Beach, evacuation routes installed along the southern highway, banners and billboards installed at several points along the coast and evacuation places situated on the sand dunes, and reinforcing factors consisting of management commitment, the role of community leaders, the role of health workers, and the role of disaster management officers (15).

The roles of community leaders, health workers, and disaster management officers are well-known in efforts to reduce the risk of a tsunami disaster (16). This is known from the activities carried out by health workers related to disaster mitigation, such as outreach about first aid to members of the Puger Kulon Village organization and disaster education carried out by the village government for fishermen groups to maximize community preparedness for a tsunami disaster.

The Relationship between Disaster Education and the Preparedness of Coastal Communities in Facing Tsunami Disasters in Puger Kulon Village Kabupaten Jember

It was found that 64.4 % attended disaster education activities, and 35 % did not attend disaster education activities. Statistical tests using Chi-Square show an asymptotic significant value (2-sided) of 0.001; thus it can be concluded that H1 is accepted; there is a significant relationship between disaster education and the preparedness of coastal communities facing a tsunami disaster in Puger Kulon Village, Jember Regency (17) nurses must be adequately prepared to respond effectively to disasters. Therefore, it is necessary to assess nurses' disaster management capacity to know their preparedness levels, especially for a densely populated Megapolis like Dhaka, which is at high risk of disasters. Thus, the study aimed to examine Dhaka city nurses' knowledge, skills, preparedness (KSP). This can also be interpreted that the more optimal disaster education is, the better the level of preparedness of coastal communities in facing tsunami disasters (18).

It is very important to continue to carry out and improve disaster education quality because disaster education has a big impact on the preparedness behavior of coastal communities when facing a tsunami, the most significant potential disaster in the area (19). Not only is disaster education a predisposing factor for preparedness behavior that needs to be improved in quality, but the synergy of community leaders, health workers, disaster resilient village organizations, as well as the availability of facilities and infrastructure that can support increasing community preparedness and the ease of the community in reaching and accessing the availability of facilities and infrastructure are also important (20). In managing disaster preparedness, a transdisciplinary approach is hoped to be used for affected communities (21). Another thing that needs to be educated for the public to prevent disasters is integrating components into the environment (22). Our advice regarding disaster preparedness is that it is very important to develop disaster mitigation education in every region, including in Indonesian schools, as also written in the article (23). The government's role is also vital in disaster preparedness. The government needs to communicate effectively with the community so that people can understand disaster risks and how to prepare themselves. The government can carry out outreach through social media, brochures, posters, or public events that educate the public about disaster risks and how to overcome them[&](24).

CONCLUSION

It can be concluded that there is a relationship between disaster education and the preparedness of coastal communities in facing a tsunami disaster in Puger Kulon Village, Jember Regency, where the disaster education of coastal communities in Puger Kulon Village, Jember Regency is in the good category at 64.4 % and the preparedness of coastal communities in facing the tsunami disaster in Puger Kulon Village, Jember Regency in the ready category with 31.7 %.

RECOMMENDATIONS

The research results give several suggestions to the community, health services (Puskesmas), and the Regional Disaster Management Agency. The community is expected to increase awareness of the importance of preparedness for minimize the risk of tsunami disasters, which are the highest potential disasters in the area. Apart from that, health institutions, especially community health centers, can be more sensitive to preparedness issues by determining policies to improve health programs in the form of disaster risk prevention and reduction, especially those related to the tsunami disaster, and health promotion related to disaster mitigation in the community needs to be further improved to overcome community preparedness problems. Finally, suggestions for regional disaster management agencies can further enhance the quality of disaster education in the community to motivate people to participate in disaster preparedness efforts.

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The effect of health media in reminiscence therapy on cognitive disorders in post-stroke patients

El efecto de los medios sanitarios en la terapia de reminiscencia sobre los trastornos cognitivos en pacientes que han sufrido un accidente cerebrovascular

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SUMMARY

Introduction: *One of the psychosocial obstacles that often arise in post-stroke patients is cognitive obstacles. These obstacles include various problems in cognitive function, ranging from disturbed attention and difficulty in maintaining orientation to time, place, or situation to problems in memory and thought processes. This study aims to investigate the effect of health media in reminiscence therapy on cognitive disorders in post-stroke patients in Medan City.* **Methods:** *This research uses quantitative research methods. Data was collected by distributing questionnaires to respondents in seven hospitals in Medan City.* **Results:** *Analysis of respondents' characteristics shows the dominance of the age group over 45, with the majority having a Diploma/S1 education level. The reliability and validity of the variables, particularly the influence of health media in reminiscence therapy, demonstrate a high level of reliability and validity, instilling confidence in the research's methodology.* **Conclusions***: Provide valuable guidance for the development of more effective interventions in the management of post-stroke patients.*

Keywords: *cognitive disorders, health media, post-stroke patients, reminiscence Therapy*

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RESUMEN

Introducción: *Uno de los obstáculos psicosociales que a menudo surgen en pacientes que han sufrido un ictus son los obstáculos cognitivos. Estos obstáculos incluyen diversos problemas en la función cognitiva, como la atención alterada, la dificultad para mantener la orientación en el tiempo, el lugar o la situación, hasta problemas en la memoria y los procesos de pensamiento. Este estudio tiene como objetivo investigar el efecto de los medios de comunicación de salud en la terapia de reminiscencia sobre los trastornos cognitivos en pacientes que han sufrido un ictus en la ciudad de Medan.* **Métodos:** *Esta investigación utiliza métodos de investigación cuantitativos. Los datos se recopilaron distribuyendo cuestionarios a los encuestados en*

siete hospitales de la ciudad de Medan. **Resultados:** *Los resultados de la investigación muestran que el análisis de las características de los encuestados muestra el predominio del grupo de edad de más de 45 años, y la mayoría tiene un nivel de educación de Diploma/S1. Los resultados de la fiabilidad y validez de las variables muestran variabilidad en el nivel de fiabilidad, destacando la influencia de los medios de comunicación de salud en la terapia de reminiscencia como una variable que tiene una buena fiabilidad y validez*. **Conclusiones:** *Proporcionar una valiosa orientación para el desarrollo de intervenciones más eficaces en el tratamiento de pacientes que han sufrido un ictus*.

Palabras clave: *Medios de salud, terapia de reminiscencia, trastornos cognitivos, pacientes post-ictus*.

INTRODUCTION

Stroke is a major global health problem involving both physical and psychosocial health. Psychosocial well-being is frequently threatened following stroke. Depressive symptoms, anxiety, general psychological distress, cognitive impai-rement and social isolation are prevalent (1).These include various problems in mental function, such as distracted attention and difficulty in maintaining orientation to time, place, or situation, ranging from problems in memory and thought processes (2). Patients often struggle to focus on certain tasks, remember new information, or make everyday decisions (3). Apart from cognitive impairment, stroke can also cause various physical disabilities. Limited movement, paralysis, or weakness in the limbs often occurs because of brain damage during stroke (1). Sensory problems can also occur, including cognitive and psychological disorders such as anxiety and even depression. This condition can significantly disrupt a patient's quality of life, affecting their ability to function independently, interact socially, and experience happiness in everyday life (4).

Stroke is the number one cause of disability and the second cause of death worldwide after heart disease. In Indonesia, stroke is also the leading cause of death. According to the 2018 Indonesia Basic Health Research (Riskesdas) results, the prevalence of stroke in Indonesia increased from 7 per 1000 population in 2013 to 10.9 per 1 000 population in 2018 (5). This shows that stroke is an increasingly worrying health problem in Indonesia (6). In terms of financing, stroke is also one of the catastrophic diseases, with the third largest funding after heart disease and cancer, reaching 3.23 trillion rupiahs in 2022. This number has increased significantly compared to the previous year, namely 1.91 trillion in 2021. These data show that the economic burden caused by stroke is also growing from year to year, emphasizing the importance of stroke prevention, management, and rehabilitation efforts in Indonesia (7).

Even though stroke is the second leading cause of disability and death in the world after heart disease, an interesting fact is that around 90 % of stroke cases can be prevented by controlling certain risk factors. These factors include hypertension, smoking, unbalanced diet, lack of physical activity, diabetes, and atrial fibrillation (8). Data from Riskesdas in 2018 highlights that the prevalence of hypertension reached 8.4 % in the population aged over 18 years, and the prevalence of diabetes was 10.9 % in the population aged over 15 years. As many as 95.5 % of the population had a fruit and vegetable consumption pattern that did not comply with health standards, especially in the age group over five years (9). These figures emphasize that controlling stroke risk factors is still a major challenge in efforts to prevent and control stroke in Indonesia (10). More serious efforts are needed to increase public awareness of the importance of a healthy lifestyle, routine health monitoring, and appropriate interventions to reduce the prevalence of risk factors associated with stroke (11). This emphasizes the important role of the health system and public health education in changing behavior and lifestyle that can treat post-stroke by using health media such as reminiscence in treating post-stroke patients in the future (12).

Health media in reminiscence therapy can be an effective tool in helping emotional control in post-stroke patients. According to Chiang et al., 2010 (13), reminiscence therapy has several broad and significant goals (14). One is providing a pleasant experience to improve the patient's quality of life. By recalling cherished moments from the past, this therapy offers joy

and emotional satisfaction and helps patients find meaning in their life experiences (15). Apart from that, reminiscence therapy also aims to improve socialization and relationships with other people. By discussing shared memories, patients can strengthen bonds with their family, friends, and caregivers, increasing social support and psychological well-being (16). This therapy also provides important cognitive stimulation, as it requires processing information and memories of past events (17). By stimulating cognitive functions such as memory, attention, and problem-solving, reminiscence therapy can help maintain or improve a patient's mental abilities (18). This therapy also enhances verbal and non-verbal communication between patients, nurses, families, and fellow patients. Better communication can help patients communicate their needs, feel heard, and strengthen interpersonal relationships (19).

The media used in reminiscence therapy activities are objects related to the patient's past (20). One media often used is a reminiscence kit, a box filled with various items relevant to the patient's past (21). These items can include personal photos and devices for playing music and videos. Apart from that, sensory stimulation is also included in this kit, such as different smells such as chocolate or orange, as well as materials to stimulate tactile sensors such as animal fur, wool and flannel, sand, mud, and so on (22). These past objects have an important role in reminiscence therapy because they help patient recall past experiences related to these objects (23). When patients interact with these objects, it can trigger related memories and speed up their memory process. This media can also help patients share past experiences with others, be they therapists, family or friends (24). Through this process, the goals of reminiscence therapy to improve quality of life and strengthen connections with the past can be achieved more effectively (25). Thus, using relevant and varied media in reminiscence therapy provides a valuable contribution to facilitating the recovery process and improving the patient's emotional well-being after a stroke (26).

Therefore, reminiscence therapy is a reflective experience about the past and a holistic therapeutic intervention with significant benefits for the patient. Health media can also stimulate social interaction and communication between patients and those closest to them, such as family and friends (27). Discussion of photos or shared memories can strengthen interpersonal relationships and build social support, which is important in post-stroke recovery (28). Thus, using health media in reminiscence therapy helps improve the emotional well-being of post-stroke patients, strengthens social bonds, and promotes holistic recovery (29). The importance of using health media in this therapy emphasizes the need for an integrated multidisciplinary approach to caring for post-stroke patients, considering their physical, psychological, and social conditions (30).

Several studies have discussed the effect of health media in reminiscence therapy on cognitive disorders in post-stroke patients. Previous research by Abtaru et al., 2024 discussed the impact of memory therapy on cognitive ability in non-hemorrhagic stroke patients at Empa Lawang Regency Hospital (31). The results of the study showed that cognitive ability in non-hemorrhagic stroke patients before being given memory therapy was 20.10. The cognitive ability of non-hemorrhagic stroke patients after being given memory therapy was 26.60, and there was an effect of memory therapy on cognitive ability in non-hemorrhagic stroke patients at the Empat Lawang Regency Hospital ($p = 0.0001 < \alpha$). Hospitals can utilize this study as an alternative solution for the treatment of non-hemorrhagic stroke patients with impaired cognitive function at the Empat Lawang Regency Hospital (32), as well as the research conducted by Cheng et al. (33) who assessed the benefit of a reminiscence therapy-based care (RTBC) program on cognitive impairment restoration, anxiety, and depression reduction in acute ischemic stroke patients showing that reminiscence therapy-based care could help reduce cognitive impairment, anxiety, and depression in post-stroke management for acute ischemic stroke patients.

The present study focused on studying the effect of health media in reminiscence therapy on cognitive disorders in post-stroke patients. The aim was to evaluate the influence of health media on memory therapy and cognitive control in post-stroke patients. Then the latest research explained by the researcher is the effect of health media memory therapy on emotional

control in post-stroke patients using the Health Reminiscence Kit. The memorabilia is filled with various items from the past, such as magazines, cooking utensils, clothes, playground equipment, personal photos, tools for playing music, videos, and tapes, as well as different odor stimuli, such as chocolate, orange, etc. Materials for stimulating tactile sensors include animal fur, wool, flannel, sand, and mud.

METHODS

Data Collection

This study uses a primary data model obtained from questionnaires distributed to respondents. The questionnaire is a data collection technique that applies a series of written questions to respondents to be answered. The questionnaire was created using a Google Form. The researcher distributed a questionnaire to respondents in seven hospitals in Medan City. A brief explanation of the format and types of questions used on Google Forms can add to an understanding of how data are collected. The format used in this questionnaire includes closed-ended questions with a Likert scale, multiple choice, and open-ended questions. Using these questions allows researchers to collect quantitative and qualitative data effectively.

Before the questionnaire was distributed, validity and reliability tests were carried out to ensure that the measuring tools used were valid and consistent. Validity is tested through factor analysis and construct validity, while reliability is tested using Cronbach's alpha. This questionnaire has been tested previously in a preliminary study to ensure its reliability and suitability in the context of this study. In addition, specific criteria were used to ensure proper representation in the selection of hospitals. These include hospital categories based on type, geographic location, and number of patients. The choice of these hospitals affects the generalization of the research results, where the results are more relevant for hospitals with similar characteristics. This needs to be considered when drawing broader conclusions from the results of this study.

Sampling Technique

The sample was determined using an area or cluster sampling technique, which randomizes the group, not the individual subjects, including exclusion criteria applied to selecting hospitals and respondents. The inclusion criteria include hospitals with specific facilities and the number of patients according to the characteristics of the study. In contrast, the exclusion criteria include hospitals that do not meet these minimum standards. Similarly, respondents were selected based on inclusion criteria such as age, gender, and specific health conditions, while exclusion criteria were applied to respondents who did not meet those criteria (34). Area or cluster sampling techniques are used to determine samples if the object to be studied or data source is very broad, such as the population of a country, province, or district. Samples were taken based on predetermined population areas to determine which population would be used as a data source. Seven hospitals were taken as samples in Medan City. Seven hospitals were chosen as research samples purposively and close to each other.

Measurement and Analysis Techniques

Data management used SEMpls software to test the correlation between the research variables and prove the researcher's hypothesis regarding the influence of health media in reminiscence therapy on cognitive control in post-stroke patients. Regression tests were carried out to obtain valid data on the questionnaire score indicators, using the Likert scale approach (1. Strongly disagree, 2. Disagree, 3. Neutral, 4. Agree, and 5. Strongly agree).

This structural equation modeling (SEM) model was set to analyze the relationship between variables. SEM evaluates the relationship structure between hypothetical independent and dependent variables. SEM allows researchers to test complex models involving many latent variables and causal relationships between them, simultaneously considering the measurement of error and construct validity. This SEM model is perfect for testing complex hypotheses and

providing a deeper understanding of the variable dynamics in this study.

RESULTS

Table 1. Respondent data on the influence of health media in reminiscence therapy on cognitive control in post-stroke patients

Characteristic	Freq	%
Age		
17-25 years	1	1.7
26-35 years	9	15.3
36-45 years	33	3.4
>45 years	57	79.7
Gender		
Man	57	54.3
Woman	43	45.7
Last education		
elementary school	10	9.5
Junior High School	16	15.2
Senior High School	19	18.3
Bachelor	54	51.4
Master	6	5.6

Based on data from researchers distributing questionnaires to respondents in seven hospitals in Medan City, several significant findings reflect variations in age, gender, and highest level of education. As shown in Table 1, the age of the Medan City population shows dominance in the age group over 45 years, with 79.7 % of the total population, while only a small portion is in the 17-45-year age range. Regarding gender, the population distribution tends to be balanced, although there are slightly more men, with a percentage of 54.3 %, compared to women, who reach 45.7 %. Looking at the latest education level, most of the population has a Diploma/S1 education level, reaching 51.4 %. However, there is also significant representation from other levels of education, such as SMA/SMK (18.3 %), SMP/MTS (15.2%), and SD (9.5 %). The highest level of education, namely a master's degree, has a lower number with a percentage of 5.6 %. Researchers distributed questionnaires to respondents in seven hospitals located in Medan City with the hope of obtaining fairly representative and varied data for further analysis regarding the characteristics of the population in the area.

Research Variable Reliability

Table 2. Composite reliability and Cronbach's alpha inspection results reminiscence therapy for cognitive control in post-stroke patients

Variable	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Photos from the past	0.325	0.547	0.614	0.378
Music player device	0.128	0.173	0.668	0.527
Fragrance sensory stimulation	1.000	1.000	1.000	1.000
Touch sensory stimulation	0.513	-1.386	0.803	0.671
Media Influence Health in	0.513	0.523	1.000	1.000

The results of the variable construction analysis in this study show several indicators relevant to reminiscence therapy in post-stroke patients (Table 2). Using photos in the past has Cronbach's alpha value of 0.325, indicating a low reliability. Meanwhile, music-playing devices have an even lower Cronbach's alpha value, namely 0.128, indicating that the reliability of this variable needs further attention. On the other hand, fragrance sensory stimulation had perfect Cronbach's alpha and Rho A values (1.000), indicating a very high level of consistency in

measuring these variables. However, it should be noted that several indicators show negative Rho A values, such as touch sensory stimulation. This suggests problems in inter-item reliability, which could indicate that this variable may not be suitable for measuring a particular construct.

On the other hand, the effect of health media in reminiscence therapy on cognitive control in post-stroke patients shows satisfactory values in all aspects, with Cronbach's alpha, Rho_A, composite reliability, and average variance extracted (AVE) values reaching 1.000. Overall, the results of this analysis provide valuable insight regarding the reliability and validity of the variables involved in reminiscence therapy in post-stroke patients. Further efforts are needed to improve the unsatisfactory reliability of indicators and ensure the use of appropriate variables in measuring the construct in question.

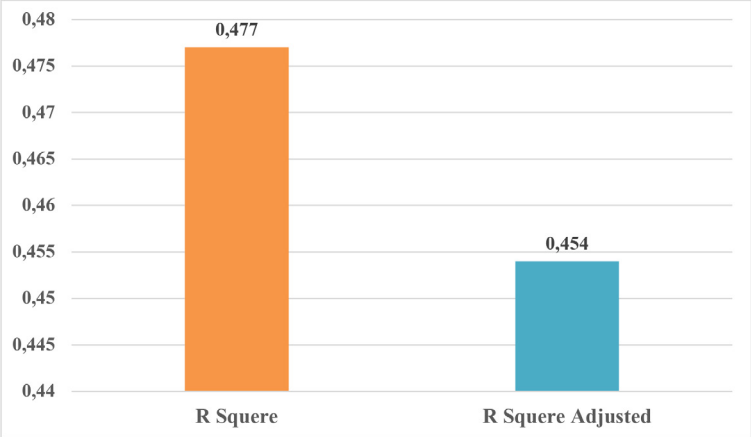

Figure 1. Regression results on the influence of health media in reminiscence therapy on cognitive control in post-stroke patients.

The analysis results show that the model used to measure the influence of health media in reminiscence therapy on cognitive control in post-stroke patients can explain the variability in this phenomenon. As shown in Figure 1, R square, a measure of model strength, shows that the variables included in the model explain approximately 47.7 % of the variation in the influence of health media in reminiscence therapy on cognitive control in post-stroke patients. Next, adjusted R square is a measure that considers the number of independent variables in the model. The adjusted R square value of 45.4 % shows that this model maintains a good power level in explaining variability, even after considering the number of independent variables used.

Hypothesis testing was carried out between independent and dependent variables using the bootstrapping method in SEMPLS to determine the validity and reliability of the research data. This test uses T-statistics and P-values, which will later be presented as a t-table, to find valid research data for T- T-statistic values> 1.96 and P-values < 0.05.

Based on the results in Table 3, it can be concluded that the observed variables have undergone a t-statistical test (T-statistics) to determine the significance between the sample and the population average. Photos from the past test results show that the sample average (M) is 0.251 with a standard deviation (STDEV) of 0.083. The resulting T-statistics are 2.762, with a p-value of 0.006. Because the p-value is less than the specified significance level, namely 0.05, the hypothesis is accepted, indicating statistical significance between the variable "Photos from the past" and the observed population. The music player device variable's sample mean (M)

Table 3. T-statistical test (T-statistics) to determine the significance between the sample and the population average

Variable	Original Sample (O)	Sample Mean (M)	STDEV	T-Statistics (|O/STDEV|)	P value	Hypothesis
Photos from the past	0.230	0.251	0.083	2.762	0.006	Accepted
Music player device	0.218	0.180	0.111	1.975	0.049	Accepted
Fragrance sensory stimulation	0.229	0.207	0.078	2.920	0.004	Accepted
Touch sensory	0.532	0.483	0.187	2.849	0.005	Accepted

is 0.180, with a standard deviation (STDEV) of 0.111. The resulting T-statistics were 1.975, with a p-value of 0.049. Since the p-value is less than the established significance level, the hypothesis is also accepted for this variable, indicating the presence of statistical significance. The sample mean (M) for fragrance sensory stimulation was 0.207, with a standard deviation (STDEV) of 0.078. The T-statistics is 2.920 with a p-value of 0.004. As before, the hypothesis is accepted because the p-value is smaller than the specified significance level. This variable's sample mean (M) for touch sensory stimulation was 0.483, with a standard deviation (STDEV) of 0.187. The resulting T-statistics was 2.849, with a p-value of 0.005. Again, the hypothesis is accepted because the p-value is less than the specified significance level. Thus, all observed variables show statistical significance, indicating a significant relationship between these variables and the observed population.

DISCUSSION

The study emphasized that using past photos as a memory therapy medium can significantly impact cognitive recovery in post-stroke patients. A p-value<0.05 indicates a real relationship between applying past photos and improving patients' cognitive function. This is in line with the theory of nostalgia-based therapy by Haslam et al., 2008, where using past photos helps restore cognitive impairment while improving the patient's confidence and emotional well-being (35). Theoretically, photos from the past can re-stimulate long-term memory by activating brain areas related to visual and emotional processing. This is supported by Gibson et al. 2022, who state that familiar visual media such as family photos can trigger improvements in spatial orientation and working memory in post-stroke patients (36). Therefore, a visual-based approach utilizing photo media improves cognitive function, especially in patients with stroke disorders. In addition, these findings reinforce the relevance of nostalgia-based therapy in cognitive care programs in various health services, especially in rehabilitation centers. A deeper understanding of how visual memory works in stimulating brain recovery could provide new insights for medical practitioners to develop more personalized interventions based on patients' emotional needs.

Furthermore, the music player device variable also significantly influenced the results of memory therapy or cognitive function. These findings support the hypothesis that using music player devices is closely related to improved cognitive function in patients, especially post-stroke patients. Sarkamo et al. 2008, have also shown that music therapy can have a positive impact on cognitive function, particularly on aspects of verbal memory and attention (37). This confirms that listening to music through a player allows patients continuous and personalized stimulation. Furthermore, de Witte et al. (2020) emphasize that music can facilitate neuroplasticity in the brain, which plays an important role in recovery from stroke damage (38). Music serves as a

stimulus and promotes synaptic regeneration that supports cognitive improvement. In this case, music player devices play an important role as they allow patients to select music according to their preferences, thus providing better comfort and accessibility. From the author's point of view, these results reinforce the idea that music can serve as an effective therapeutic medium in cognitive care. Music can influence emotions and cognition and can be a multifunctional tool—both as entertainment and therapy. Music player devices allow patients to engage in therapy more independently and personally, indirectly encouraging their commitment to the therapy program.

In the sensory stimulation section, the use of fragrance has a significant influence on cognitive recovery. These results indicate that the hypothesis is accepted, thus confirming a significant relationship between sensory stimulation through scent and cognitive enhancement in patients. These findings align with Moss et al. (2003), who showed that certain scents, such as rosemary and lavender, can stimulate cognitive function, including improved memory and attention (39). In therapy for post-stroke patients, pleasant and familiar scents have been shown to help calm patients and stimulate parts of the brain related to memory and sensory processing. It emphasizes that sensory stimulation through fragrances, when applied consistently in therapy, can support the cognitive recovery of patients with brain disorders, such as stroke. From the authors' point of view, these results reinforce the argument that a holistic approach to treating patients with cognitive impairment should include sensory elements. As part of therapy, certain fragrances provide an emotionally calming experience and stimulate areas of the brain that are important for cognitive recovery. Therefore, healthcare practitioners must consider using fragrances as part of a holistic therapeutic approach.

Our results show that sensory stimulation through touch significantly influenced cognitive recovery in post-stroke patients. The hypothesis was accepted with a p-value <0.05, indicating a significant association between touch therapy and improved cognitive function. These results are in line with Field et al. (2004), showing that tactile stimulation through therapeutic massage can enhance cognitive function and mood, especially in individuals with depression or neurological disorders (40). These findings are relevant for post-stroke patients who often experience mood decline and cognitive impairment. Therapeutic touch provides emotional support and stimulates the brain's parts related to memory and sensory processing. From the authors' point of view, these results reinforce the importance of a holistic approach in cognitive recovery therapy by paying special attention to sensory aspects that are often overlooked. Touch as a form of tactile sensory stimulation can be a simple but effective intervention in improving the quality of life of post-stroke patients. This shows that touch therapy is not only related to the physical aspect but also has an important emotional dimension in recovery.

CONCLUSION

This study concluded that memory therapy has significant potential to improve cognitive control in post-stroke patients, especially among the residents of Medan City, which is dominated by the age group above 45 years with a balanced gender distribution and varying levels of education. Although the health media in this therapy shows good reliability, variables such as past photos and music player devices still need improvement through the development of standard guidelines and training for health workers. It is recommended that therapy materials be tailored to the patient's level of understanding and the specific needs of age groups over 45 years and integrated with other effective therapeutic approaches. Further research is needed to evaluate the long-term effects of memory therapy and improve the missing aspects. Implementing this recommendation is expected to increase the effectiveness of memory therapy interventions in the cognitive recovery of post-stroke patients.

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Relationship between self-control as an internal factor and internet addiction in adolescents

Relación entre el autocontrol como factor interno y la adicción a internet en adolescentes

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SUMMARY

Introduction: *The increasing interest of adolescents in internet usage has heightened the risk of internet addiction. Self-control, a crucial internal factor, has been the focus of our study. We aimed to investigate the relationship between self-control and internet addiction.* **Methods**: *Using a correlational design with a cross-sectional approach, we surveyed 165 senior high school students selected through cluster sampling. Self-control was the independent variable, and internet addiction was the dependent variable. Data collection involved questionnaires, including the Internet Addiction Test and Self-control Scale, followed by the Spearman Rho test analysis.* **Results**: *We discovered a significant relationship between self-control and internet addiction (p = 0.0001; r = -0.456).* **Conclusion**: *Our findings underscore that higher levels of self-control are linked to lower instances of internet addiction. This suggests that fostering self-control among adolescents is a practical and effective strategy for preventing internet addiction.*

Keywords: *Adolescents, internal factors, Internet addiction, self-control, well-being*

RESUMEN

Introducción: *El creciente interés de los adolescentes por utilizar Internet los hace más susceptibles a la adicción a Internet. El autocontrol se destaca como un factor interno crucial para los adolescentes. Este estudio tuvo como objetivo examinar la correlación entre el autocontrol y la adicción a Internet.* **Métodos:** *Empleando un diseño correlacional con un enfoque transversal, el estudio encuestó a 165 estudiantes de secundaria seleccionados por muestreo por conglomerados. El autocontrol fue la variable independiente y la adicción a Internet fue la variable dependiente. La recolección de datos utilizó cuestionarios, incluida la prueba de adicción a Internet y la escala de autocontrol, seguidos de un análisis mediante la prueba de Spearman Rho.* **Resultados:** *Se obtuvo una relación significativa entre el autocontrol y la adicción a Internet (p =0,0001; r = -0,456).* **Conclusión:** *Los hallazgos indican que niveles más altos de autocontrol corresponden a casos más bajos*

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de adicción a Internet. En consecuencia, fomentar el autocontrol entre los adolescentes es fundamental para prevenir la adicción a Internet.

Palabras clave*: Adolescentes, factores internos, adicción a Internet, autocontrol, Bbenestar.*

INTRODUCTION

Internet use among adolescents is relatively high and provides an opportunity to cause compulsive behavior that is demanding to control and also possibly develops into internet addiction. Internet addiction is a mental disorder characterized by excessive or uncontrolled preoccupation with computer use and internet access, which causes disturbance or distress (1). Adolescents are susceptible to experiencing internet addiction, considering that they are at an identity crisis stage, where they have exceedingly high curiosity, consistently desire to try new things, and are easily influenced by their peers (2).

Internet users in Indonesia are experiencing extremely rapid growth. Based on survey results from the Indonesian Internet Service Providers Association (APJII), there were 210.03 million internet users in the country in the 2021-2022 period. This number increased by 6.78 % compared to the previous period, which amounted to 196.7 million people. The growing number of internet users in Indonesia has brought the internet penetration rate in Indonesia to 77.02 %. Based on age prevalence, the highest internet penetration rate is in the 13-18-year age group, namely 99.17 %7 %. The second position is occupied by the 19-34-year age group with a penetration rate of 98.64 %. The internet penetration rate in the 35-54 age range is 87.30 %. The internet penetration rate in the age groups 5-12 years and 55 years and over is 62, 43 %, and 51.73 %, respectively (3).

Adolescents tend to focus on using media such as the internet more than adults, which makes them more vulnerable to internet addiction (4). Excessive use of the internet could lead to negative consequences that cause problems and ultimately have an adverse influence on their lives (5). Internet addiction can harm adolescents because their use has exceeded reasonable limits (6,7). Adolescents with internet addiction will damage social relationships; individuals with internet addiction will spend much of their time accessing the internet, having financial problems, disturbed physical conditions, and academic failure. There are external and internal factors that influence internet addiction (8). The external factors include family, peers, and social culture. Meanwhile, internal factors are personality, such as self-control, interests, motives, and age. Other studies found that, of several internet addiction factors, self-control is the most critical. Those with poor self-control directly influence problem behavior, thus stating that increasing self-control is critical to reducing problem behavior, such as internet addiction (9).

The self-control model is the ability to control one's behavior and tend to perform positively (10). Self-control negatively affects internet use problems in adolescents. The inability to control oneself is caused by the failure to think in advance concerning the impending impact experienced and tends solely for pleasure. The feelings arising from internet problems will influence thoughts about continuing to use the internet to fulfill one's needs (11). The prolonged usage of the internet creates a challenging cycle wherein individuals find it hard to break away and increasingly rely on it for frequent usage (12). This research aimed to analyze the relationship between self-control as an internal factor and internet addiction among adolescents at SMA (Senior High School) Negeri 5 Surakarta, Indonesia.

METHODS

This research employed a correlational design with a cross-sectional approach, focusing on adolescents from SMA Negeri 5 Surakarta, specifically class XI, totaling 165 students. Probability sampling was utilized, employing a cluster sampling technique, which involves randomly selecting several groups from the population and then sampling all or some elements from each chosen group. The independent variable in this study was self-control, while the dependent variable was the level of internet addiction. The instruments utilized included the

Self Control Scale (SCS) (13) and the Internet Addiction Test (IAT) (14,15), respectively. Data collection commenced after obtaining consent from willing respondents. Non-parametric statistical analysis, specifically the Spearman Rank Correlation test, was employed to determine the relationship between self-control and the level of internet addiction.

The Ethics Committee approved this study with Number 908/HRECC.FODM/XII/2022. Participants were informed and agreed to provide informed consent before the study began.

RESULTS

Respondents' characteristics

As outlined in Table 1, the research involved 165 students. The data indicate that the dominant gender was female, comprising 98 students (59.4 %), while middle teenagers accounted for 116 students (70.3 %). More than one-third of them, 62 respondents (37.6 %), access the internet for social media like Facebook, Instagram, and Twitter, and more than three-quarters, 128 (77.6 %), spent time using the internet for more than seven hours in one day.

Table 1

Respondents' characteristics

		Characteristic	f	%
Gender		Male	67	40.6
		Female	98	59.4
	Total		165	100.0
Age (years)		10-14 years old	3	1.8
		15-17 years old	116	70.3
		18-19 years old	46	27.9
	Total		165	100.0
Internet usage		Social media	62	37.6
		Playing games	18	10.9
		Reading news	5	3.0
		Chatting	54	32.7
		Doing the task	6	3.6
		Watching movies	20	12.1
	Total		165	100.0
Time		≤ 2 hours/day	0	0
		3-4 hours/day	3	1.8
		5-6 hours/day	34	20,6
		≥ 7 hours/day	128	77.6
	Total		165	10.0

Distribution of respondents' self-control and Internet addiction level

Table 2 shows the distribution of respondents' self-control and internet addiction levels. Most respondents, 63 (38.2 %), have a moderate level of self-control, and 57 respondents (34.5 %) still have a low level. Indicators show respondents' behavior control is mostly moderate (45.5 %) and high (45.4 %). Meanwhile, cognitive control is almost evenly distributed at all levels, with the highest being at the lowest level for 58 respondents (35.2 %).

Table 2 also explains the internet addiction level. Data showed that 60 responders (36.4 %) were experiencing low internet addiction, and 20 responders (33 %) had high internet addiction levels. Based on analysis, tolerance is the most frequently experienced by 73 respondents (44.2 %), especially at low levels. Meanwhile, almost half of the responders, 65 (39.4 %), have a high level of mood modification.

Table 2

Distribution of self-control and internet addiction level based on indicators

Variables/Indicators	Normal		Low		Moderate		High		Total	
	f	%	f	%	f	%	f	%	f	%
Self-control	-	-	57	34.5	63	38.2	45	27.3	165	100
Behavior control	-	-	15	9.1	75	45.5	75	45.5	165	100
Cognitive control	-	-	58	35.2	50	30.3	57	34.5	165	100
Decision control	-	-	48	29.1	58	35.2	59	35.8	165	100
Internet addiction level	29	17.6	60	36.4	43	26.1	33	20.0	165	100
Salience	10	6.1	68	41.2	48	29.1	39	23.6	165	100
Mood modification	13	7.9	42	25.5	45	27.3	65	39.4	165	100
Tolerance	13	7.9	73	44.2	58	35.2	21	12.7	165	100
Withdrawal	19	11.5	69	41.8	34	20.6	43	26.2	165	100
Conflict	21	12.7	69	41.8	67	40.6	8	4.8	165	100
Relapse	22	13.3	57	34.5	41	24.8	45	27.3	165	100

Correlation between self-control and internet addiction level

Table 3 shows the cross-tabulation distribution between self-control, internet addiction level and the statistical test result. The result of the Spearman Test shows a p-value = 0.0001 with a significance level of $\alpha < 0.05$, indicating that there was a relationship between self-control and the level of internet addiction. The correlation coefficient, r= -0.456, means a negative correlation, concluding that the higher the self-control, the lower the level of internet addiction.

Table 3

Correlation between self-control and internet addiction level

		Internet Addiction Level									
		Normal		Low		Moderate		High		Total	
		f	%	f	%	f	%	f	%	f	%
Self-Control	Low	3	1.8	15	9.1	19	11.5	20	12.1	57	34.5
	Moderate	8	4.8	26	15.8	17	10.3	12	7.3	63	38.2
	High	18	10.9	19	11.5	7	4.2	1	0.6	45	27.3
	Total	29	17.6	60	36.4	43	26.1	33	20.0	165	100.0

Spearman's Rank test (p) = 0.0001 (r) = -0.456

DISCUSSION

Present results show respondents have relatively good self-control at medium and high levels. Self-control is the ability to control oneself and tend to have a positive attitude (10). Self-control allows individuals to control themselves and behave correctly and according to their hearts and minds. Self-control makes individuals realize that this has dangerous consequences for the actions they take to be able to regulate their emotions. Respondents can still integrate, direct, control, and regulate online behavior by considering the consequences of choosing the right action. Adolescents use the internet and cell phones as a daily activity to study and look for references for assignments given by teachers after school. This study showed that adolescents'

behavioral and decision-making control are quite high. This is related to the developmental stage of middle adolescence, which is confusing because the adolescent knows whether to decide, is sensitive or doesn't care, and is idealistic. Middle adolescents begin experimenting with ideas, developing insights, and reflecting on others' feelings, which is also done using the internet. Having high self-control, especially control in terms of behavior and decision-making, will help adolescents achieve a good self-identity and support healthy mental growth (16,17).

The results show that most internet addiction levels are mild. Internet addiction is an addictive behavior in individuals that is related to excessive use of online applications, which has a detrimental effect on a person's life (18,19). When activities like browsing news online or engaging in social media are pleasurable, the body perceives them as comfortable and desires repetition, increasing the risk of addiction. Respondents displayed mild addictive behaviors, such as spending more time online than planned, prioritizing online activities without neglecting assignments, occasionally checking social media before other tasks, anticipating online time, feeling boredom without internet access, sacrificing sleep for late-night online sessions, maintaining productivity while online, attempting to limit online time, seeking new online connections, and choosing online activities over socializing with friends.

The data show that self-control is negatively associated with the level of internet addiction. The higher self-control, the lower the level of internet addiction. Individuals with high self-control possess the ability to manage their online behavior effectively (20,21). They can assess the consequences of their actions, enabling them to make informed decisions. Those with high self-control can regulate their internet usage, ensuring they do not become consumed by it. They use the internet purposefully, balancing online activities and real-life engagements. Moreover, individuals with high self-control refrain from using the internet as a means of escaping from problems. Conversely, those with low self-control struggle to regulate their behavior and usage patterns (22) SD = 0.65.

The research showed that of the 63 respondents with sufficient self-control, 60 of them had mild internet addiction. This does not align with previous studies, which stated that there was a positive relationship between self-control and internet addiction; this was due to adolescents' awareness of accessing the internet (8,23,24). The high level of internet addiction is caused by the demand to fulfill their information needs or as a method of relaxation, so each adolescent has different needs in using the internet. From our results, it can be concluded that internet use is not always harmful but has positive aspects if used appropriately and wisely; adolescents with good self-control and who use the internet appropriately will avoid internet addiction. Age is one of the factors influencing self-control. In this case, it can be observed from the respondents' age, most of whom were in their middle teens (25). Adolescents' age means their control function still requires to be consolidated, reducing their problems and awareness (26,27). Adolescents with poor self-control potentially become addicted when using the internet.

CONCLUSION

Self-control plays a pivotal role as an internal factor in teenagers, serving as a crucial deterrent against internet addiction. Enhanced self-control correlates with reduced levels of internet addiction among adolescents. Therefore, it is imperative to bolster self-control among teenagers as a preventive measure against internet addiction.

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Conflicts of Interest

We declare none of us has a conflict of interest

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The relationship between family support, subjective well-being and dietary adherence in diabetes mellitus patients

La relación entre el apoyo familiar, bienestar subjetivo y adherencia dietética en pacientes con diabetes mellitus

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SUMMARY

Objective: *The research aims to explain the correlation between family support and subjective well-being with dietary adherence in diabetes mellitus (DM) patients.* **Methods:** *This research used a cross-sectional design. This research applied proportional simple random sampling with 110 respondents in Krembung Health Center. Data was collected using the Hensarling Diabetes Family Support Scale (HDFSS), subjective well-being questionnaires, and Self-Management Dietary Behaviors Questionnaire (SMDBQ). Data analysis used Spearman's rho relation test with a significance level of* $\alpha \leq 0.05$. **Results:** *This research involved 79 female respondents with an age range of 46-55 years (98 persons), married status of 89 persons, and had suffered from DM for 1-2 years of 63 people. There was a significant correlation between family support (p=0.0001; r=+0.787) and subjective well-being (p=0.0001; r=+0.823) with DM dietary adherence. Subjective well-being has a stronger relationship than family support with dietary adherence in DM patients.* **Conclusion:** *The higher the family support and subjective well-being, the higher the DM's dietary adherence. The research underscores the need for health centers to provide educational media and information for DM patients. This can increase their value of family support and subjective well-being, helping DM sufferers develop routines for setting the right meal schedule to maintain stable blood glucose levels.*

Keywords: *Diabetes, diet, family support, wel-being, healthcare.*

RESUMEN

Objetivo: *Este estudio tiene como objetivo explicar la relación entre el apoyo familiar y el bienestar subjetivo*

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con la adherencia dietética en pacientes con diabetes mellitus (DM). **Métodos:** *Esta investigación utilizó un diseño transversal. Se utilizó un muestreo aleatorio simple proporcional con 110 encuestados en el área de trabajo del Centro de Salud Krembung. La recopilación de datos se realizó mediante la Escala de apoyo familiar para la diabetes de Hensarling (HDFSS), cuestionarios de bienestar subjetivo y el Cuestionario de conductas dietéticas de autogestión (SMDBQ). El análisis de datos utilizó la prueba de correlación rho de Spearman con un nivel de significancia de* $\alpha \leq 0{,}05$. **Resultados:** *Este estudio involucró a 79 encuestadas de sexo femenino, con 98 personas en un rango de edad de 46 a 55 años, estado civil casados de 89 personas y que habían sufrido DM durante 1 a 2 años de 63 personas. Existe una relación significativa entre el apoyo familiar (p=0,0001; r=+0,787), el bienestar subjetivo (p=0,0001; r=+0,823) con la adherencia alimentaria en pacientes con DM. El bienestar subjetivo tiene una relación más fuerte que el apoyo familiar con la adherencia alimentaria en pacientes con DM.* **Conclusión:** *Cuanto mayor sea el apoyo familiar y el bienestar subjetivo, mayor será la adherencia alimentaria en pacientes con DM. Los centros de salud deberían poder proporcionar medios educativos e información a los pacientes con DM para aumentar el valor del apoyo familiar y el bienestar subjetivo, de modo que los pacientes con DM puedan desarrollar rutinas para establecer el horario de comidas adecuado para mantener niveles estables de glucosa en sangre.*

Palabras clave: *Diabetes, adherencia alimentaria diabética, apoyo familiar, bienestar subjetivo.*

INTRODUCTION

The main treatment of diabetes mellitus (DM) is to change a person's lifestyle, especially by maintaining a healthy and balanced diet (1). Dietary adherence in DM is one of the most important components to its successful control, but it often has difficulty due to the low psychological condition of the patient and support from others (2). Physical and emotional health can be compromised when a person is diagnosed with DM (3). A person with DM will experience functional changes and psychological problems, such as stress and depression, that have an impact on a person's subjective well-being (4). A positive view of a person with DM towards themself is an indication of the high subjective well-being (5).

Diabetes is certain to be one of the most challenging health problems in the 21st century because of its complications; heart disease is taking a huge toll on people with diabetes, and most people living with diabetes do not realize it (1). The latest data according to the 10th edition of the International Diabetes Federation (IDF), indicate that 537 million people around 20 - 79 age years old in 2021 have diabetes mellitus. IDF also reported that Indonesia is among the top 10 countries with the highest number of DM sufferers, with about 19.5 million people (1). The East Java Health Office recorded 75 909 DM sufferers throughout 2021 in Sidoarjo Regency with a total of 2 526 sufferers and increased in January-November 2022 with a total of 2 552 sufferers, reaching 152 people in March 2023 from the Krembung Health Center area (6,7).

DM patients' health issues encompass both physical and psychological aspects, as long-term treatment is challenging to manage successfully (2). Long-term treatment bores, tense, and even stresses patients (8). Implementing a diet is one of the keys to effective diabetes management, but it requires patient compliance and commitment (9). Family and society also play an important role in improving a person's well-being by supporting the implementation of dietary compliance and a person's quality of life (10).

A person diagnosed with DM will assess their life situation differently. This assessment is influenced by the characteristics of the psychological health of DM patients to describe subjective well-being in a person (5). Subjective well-being is considered a subjective valuation of a person's entire life, which includes an affective valuation of the existence of feelings and cognitive in the form of happiness and satisfaction in life (11). Family support improves overall psychological well-being and increases DM patients' compliance with the diabetic diet (12,13). Luthfa (14) revealed that family support has a big impact on improving the quality of life for the patients. Health workers recommend and encourage families to improve psychological health so that dietary compliance and quality of life of DM sufferers increase (14). Thus, this research aimed to explain the correlation between

family support, subjective well-being, and dietary adherence in DM patients.

METHODS

Study Design

This study applied a descriptive correlation with a cross-sectional approach.

Sample and Settings

This study used all DM patients in Krembung Health Center, Sidoarjo, East Java. Sampling was carried out using the proportional random sampling technique, which was carried out by taking subjects from each region in a balanced manner with the entire population in each region. Samples were taken randomly according to the inclusion criteria: 1) duration of diabetes mellitus > 1 year; 2) diabetes mellitus patients in productive age (35-55 years); 3) diabetes mellitus patients living with family. Exclusion criteria include: 1) DM patients who experience other diseases or complications of DM, such as diabetic ulcers, gangrene, cataracts, and coronary heart disease; 2) DM patients who cannot communicate well. The sample consisted of 110 respondents, 24 from Krembung Village, 20 from Rejeni Village, 18 from Tambak Rejo Village, 14 from Mojoruntut Village, 12 from Jenggot Village, 11 from Wangkal Village, seven from Ploso Village, four from Kandangan Village. Independent variable data include family support and subjective well-being, while dependent variable data are obtained from filling out a questionnaire on dietary compliance. The data collection process was conducted on March 20-April 2, 2023, in the Krembung Health Center work area.

Instruments

The family support research instrument was obtained from a study conducted by Putri (15) based on the Hensarling Diabetes Family Support Scale (HDFSS) by Hensarling (2009), which has been tested for validity and reliability, the results being that validity = 0.4821 and reliability = 0.940. The questionnaire consists of 25 questions and four domains, namely informational, emotional, appreciation, and instrumental support, with two types of questions: favorable and unfavorable. The questionnaire uses a Likert scale consisting of 4 criteria, starting from the choices of never, rarely, often, and always (15).

The subjective well-being questionnaire was adopted from Maulida (16) based on the research of Husna (17) which explains that there are four domains in the subjective well-being of diabetic patients: positive affect, negative affect, life satisfaction, and satisfaction in the domain itself. The questionnaire consists of 24 questions and has passed the validity and reliability test. The validity test result was 0.514, and the reliability test was 0.938. The scoring category uses a Likert scale consisting of very inappropriate, inappropriate, appropriate, and very appropriate, with favorable and unfavorable questions.

The instrument for measuring diabetes diet compliance is the Self-Management Dietary Behaviors Questionnaire (SMDBQ) by Nazir (18) and adopted from Sundari (19), has been tested for validity and reliability with the results: validity = 0.4821 and reliability = 0.968. The questionnaire consists of 16 questions and four domains, namely recognizing calorie needs, choosing healthy foods, making meal schedules, and managing dietary behavior challenges, with two types of questions: favorable and unfavorable. The questionnaire uses a Likert scale of 4 criteria, starting from the choices of never, rarely, often, and always.

Data Analysis

Data were analyzed by univariate test for descriptive data, and to compare the observed and expected results, Spearman's rho correlation test was used, with a significance level of $\alpha \leq 0.05$.

Ethical Considerations

The Ethics Commission of the Faculty of Dentistry, Airlangga University, Surabaya, approved this research with the number 271/HRECC.FODM/III/2023. This research upholds ethical principles ranging from autonomy to fidelity and other principles of human ethics.

RESULTS

Table 1

Distribution of demographic characteristics of respondents

Characteristics	Category	f	%
Age	Late adulthood (35-45 years)	12	10.9
	Early elderly (46-55 years)	98	89.1
Gender	Man	31	28.2
	Woman	79	71.8
Marital status	Married	89	80.9
	Widow	14	12.7
	Widower	7	6.4
Education	Not yet graduated from elementary school	9	8.2
	Elementary school/equivalent	28	25.5
	Junior high school/equivalent	29	26.4
	High school/equivalent	43	39.1
	Bachelor's degree	1	0.9
Profession	Housewife	43	39.1
	Farmer	21	19.1
	Laborer	22	20.0
	Self-employed	18	16.4
	Civil servant	1	0.9
	Retired	5	4.5
Long time suffering of DM	1-2 years	63	57.3
	3-4 years	32	29.1
	5-6 years	15	13.6

Table 1 shows that the majority of the subjects were female: 79 people (71.8 %) with an age range of 46-55 years, 98 people (89.1 %), 89 people (80.9 %) with married status, and 63 people (57.3 %) who had suffered from DM for 1-2 years.

Table 2

The relationship of family support with dietary adherence in diabetes mellitus patients

Family support	Dietary adherence in diabetes mellitus patients				Total	
	Low		High			
	f	%	f	%	f	%
Low	30	27.3	1	0.9	31	28.2
High	10	9.1	69	62.7	79	71.8
Total	40	36.4	70	63.6	110	100.0

Spearman's rho p = 0.0001
Correlation value = +0.787

Table 2 indicated that the highest number of respondents with high family support are those who comply with a high DM diet, namely 69 people (62.7 %), while respondents with low family support comply with a high DM diet of 1 person (0.9 %).

Table 3

The relationship of subjective well-being with dietary adherence in diabetes mellitus patients

Subjective well-being	Dietary adherence in diabetes mellitus patients				Total	
	Low		High			
	f	%	f	%	f	%
Low	33	30.0	2	1.8	35	31.8
High	7	6.4	68	61.8	75	68.2
Total	40	36.4	70	63.6	110	100.0

Spearman's rho p = 0.0001
Correlation value = +0.823

Table 3 shows that the highest number of respondents who have high subjective well-being have high DM diet compliance, 68 people (61.8 %), while respondents who have low subjective well-being have high DM diet compliance, two people (1.8 %).

DISCUSSION

Diabetes diet compliance is defined as an effort to regulate food intake to suppress excessively high blood sugar levels (20). The present results indicate that most respondents have high family support and high values in implementing DM diet compliance. This is in accordance with Luthfa and Ardian (21), who stated that family is crucial for patients' success on the type 2 DM diet. Kencana et al. (22) also state that good family support will affect diet compliance in type 2 DM patients. Researchers argue that families can provide sufferers time, attention, and comfort so that they will encourage them to remain compliant in carrying out their diet. Sufferers must pay attention to the amount, type, and arrangement of diet patterns to control blood glucose levels (23).

This study demonstrated support from the family with good dietary compliance, but some respondents still needed to comply with the DM diet. The researchers argue that this is because the respondents have suffered DM for > 5 years, and it can affect a person's behavior when dieting. They believe they can do whatever they want and respondents feel bored and restricted because their families support their normal diet. In addition, respondents lost interest in maintaining their health and became lazy to follow the diet recommended by health workers. According to Yulia (24), the longer you have diabetes, the more likely you are to eat unhealthy foods, ignore diet plans, and become bored. This is also aligned with Gupta et al. (25) who defined family and partner support as helping increase compliance with lifestyle interventions and pharmacotherapy needed to achieve optimal glycemic control and avoid complications related to the duration of suffering from DM. Fachrudin et al. (26) explain that the duration of suffering from diabetes affects the patient's quality of life. Meanwhile, Adhanty et al. (27), showed no meaningful distinction between the duration of DM and diet compliance, which is the opposite of this study.

This research indicates that most respondents have high subjective well-being and high values in implementing DM diet compliance. This is in accordance with Sari (28), who states that subjective well-being is very important for the success of type 2 DM complication-prevention behavior (28). The subjective well-being that must be improved is understanding the meaning and purpose of life as a motivation to remain compliant in following a diet and preventing complications (28,29). A positive view of DM sufferers towards themselves indicates high subjective well-being (5). This is supported by Holo and Suhita (30), who stated that the ability of gratitude therapy affects emotions, changes all negative thoughts to positive ones, and high blood sugar levels. This finding is also in line with Prabowo and Laksmiwati (31), who showed a high relationship between gratitude and happiness; namely, gratitude positively correlates with happiness and vice versa.

In this study, individuals who have low subjective well-being but can still comply with the DM diet well have a married status. If someone is happy with their life situation, the individual is considered to have a high level of subjective well-being (32,33). Living with a family who provides support for DM management has a positive impact on glycemic control related to patient medication. Medication adherence is reported to be higher, especially in married individuals (32). According to Benjamin et al. (34), married people and those who live in pairs have high levels of subjective well-being. Researchers argue that those who are married have social, moral, and economic support to help each other when experiencing difficulties. In addition, those who are married have a better level of social integration in the form of acceptance of their social environment compared to those who are single, which has an impact on subjective well-being (35,36).

Psychological disorders that affect subjective well-being include anxiety, anger, sadness, shame, guilt, confusion, depression, hopelessness, boredom, and non-compliance due to diet and physical activity, reduced activity, and inability to accept oneself (37,38). DM sufferers who experience anxiety or sadness will act less actively to avoid complications because it will increase blood norepinephrine levels through the sympathetic nervous system so that a person feels alert, unable to concentrate on problems, and causes increased stress (39). Research by Miles et al. (5) revealed that different gene sets can affect women's and men's happiness, impacting subjective well-being. A study by Batz and Tay (40) it was also stated that several gender equality indicators and women's status are associated with higher life satisfaction.

Another finding of this study was high subjective well-being with high diet compliance, but there were still respondents who did not comply with the DM diet. The researchers argued that the respondents had suffered from DM for more than five years so they were bored with the daily routine. Respondents were also reluctant to eat because they were afraid of complications that would cause them to feel hopeless and withdraw from their environment. This is in accordance with Tristiana (2), who explained that psychological needs are very important because the long-term treatment that DM sufferers must undergo is complex to manage successfully. The length of time a person suffers from illness can interfere with their ability to deal with the problems they face, which will ultimately affect their health condition (41). The psychological impacts of DM include feelings of helplessness, irritation, feelings of uselessness, and high anxiety to depression (42). According to Irawandi (43), a person's anxiety level will increase over time as diabetes progresses.

The researchers were aware of this research's limitations. The cross-sectional research design was used because of the location and the limitation of personnel, so our proposition for the following research can be expanded on the reason for the correlation of circumstances in this case with a cohort design. Therefore, there was the possibility that the respondents may have shifted their health behavior. Other benchmarks have not been broadly included in the objective assessment.

CONCLUSION

Family support and subjective well-being have a one-way relationship with dietary compliance in DM patients. Respondents' high value of family support and subjective well-being is followed by an increase in the value of diabetes diet compliance. The Health Center must be able to provide educational media and information for DM patients to increase the value of family support and subjective well-being so that DM patients can develop a proper meal schedule routine to maintain stable blood glucose levels.

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Conflict of interest

There is no conflict of interest.

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The relationship between the level of knowledge and attitudes of premenopause women toward readiness to face the menopause phase at Curug Community Health Center

La relación entre el nivel de conocimientos y las actitudes de las mujeres premenopáusicas hacia la preparación para afrontar la fase de menopausia en el Centro de Salud Comunitario de Curug

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SUMMARY

Introduction: *According to the Indonesian Ministry of Health, in 2017, 14 million people in Indonesia, or 7.4 % of the total population, experienced menopause. It is estimated that 60 million women will experience menopause in Indonesia by 2025. Preliminary data on ten premenopausal women at the Curug Community Health Center, Tangerang Regency, show that most women do not know well about menopause. This study aims to identify the relationship between the knowledge and attitudes of premenopausal mothers toward readiness to face the menopause phase.* **Methods:** *This research used quantitative correlational analysis, a cross-sectional approach, and univariate and bivariate analysis. The results of the univariate analysis are presented in the descriptive statistics table, and the bivariate analysis using Chi-Square. The sample for this research was 50 women aged 40 - 45 in the Curug Community Health Center, using the accidental sampling technique from January to June 2024.* **Results:** *Most respondents are 42 years old, high school graduates, and housewives. They experienced their first menstruation at 11-14 and had at least two children. The Chi-Square test (p-value = 0.069 and 0.131) shows no relationship between knowledge and attitudes of premenopausal mothers toward readiness to face the menopause phase.* **Conclusion:** *Most premenopausal respondents' knowledge level was categorized as sufficient, their attitude toward preparedness to face the menopause phase was negative, and most premenopausal mothers' readiness to face the menopause phase was ready.*

Keywords: *Attitude, knowledge, premenopause, readiness.*

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RESUMEN

Introducción: *Según el Ministerio de Salud de Indonesia, en 2017, 14 millones de personas*

en Indonesia, o el 7,4 % de la población total, experimentaron menopausia. Se estima que 60 millones de mujeres experimentarán la menopausia en Indonesia en 2025. Los datos preliminares sobre 10 mujeres premenopáusicas en el Centro de Salud Comunitario de Curug, Tangerang Regency, muestran que la mayoría de las mujeres no conocen bien la menopausia. Este estudio tiene como objetivo identificar la relación entre los conocimientos y actitudes de madres premenopáusicas hacia la preparación para afrontar la fase de menopausia. **Métodos:** *Esta investigación utilizó un enfoque cuantitativo correlacional con un enfoque transversal con análisis univariado y bivariado. Los resultados del análisis univariado se presentan en la tabla de estadística descriptiva y el bivariado utilizó el Chi-Cuadrado. La muestra para esta investigación fue de 50 mujeres de 40 a 45 años en el Centro de Salud Comunitario de Curug mediante la técnica de muestreo accidental de enero a junio de 2024.* **Resultados:** *La mayoría de las encuestadas tienen 42 años, bachilleres y amas de casa. Experimentaron su primera menstruación entre los 11 y 14 años y tuvieron al menos 2 hijos. No existe relación entre el conocimiento y las actitudes de las madres premenopáusicas hacia la preparación para afrontar la fase de menopausia como lo demuestra la prueba de Chi-Cuadrado (valor p = 0,069 y 0,131).* **Conclusión:** *El nivel de conocimiento de la mayoría de las encuestadas premenopáusicas se clasificó como suficiente, y su actitud hacia la preparación para afrontar la fase de la menopausia fue negativa y la preparación de la mayoría de las madres premenopáusicas para afrontar la fase de la menopausia estaba preparada.*

Palabrasclave:*Actitud,conocimiento,Premenopausia, Preparación*

INTRODUCTION

Based on data from the World Health Organization (WHO), in 2022, 894 million women worldwide have reached menopause, and it is estimated that by 2030, the number of women over 50 years of age who will experience menopause will increase to 1.2 billion (1). This number has increased threefold compared to 2000. According to the Ministry of Health RI, in 2017, 14 million people in Indonesia, or 7.4 % of the total population, experienced menopause (2). It is estimated that 60 million women will experience menopause in Indonesia by 2025. Women who enter the premenopausal stage will usually feel changes in physical and psychological aspects. According to Duralde et al. (2023), these symptoms include hot flashes, night sweats, disrupted sleep, and genitourinary discomfort (3). Other common symptoms and conditions are mood fluctuations, cognitive changes, low sexual desire, bone loss, an increase in abdominal fat, and adverse changes in metabolic health (3). Ministry of Health RI (2022) said that treatment that can be done to reduce menopausal symptoms is avoiding certain foods and drinks, wearing light clothing to reduce hot flushes, applying relaxation techniques, and using water-based vaginal lubricants (4).

According to Holloway (2022), menopause can manifest through a wide range of signs and symptoms, including vasomotor, psychological, and genitourinary symptoms. Menopause can be an unsettling and distressing time, affecting women's well-being, mental sexuality, relationships, and work (5). Women with less education experience more serious complaints and women with higher education tend to have a better quality of life. This lack of knowledge leads to inadequate preparation for the current situation and weakens women's self-confidence. Fadhilla et al. (2023) state that involvement in various activities can increase self-confidence and a declining self-image through the feeling that one is still useful and can benefit others (6).

Nagda et al. (2023) indicates that there are moderate levels of anxiety, clinical depression, and mild cognitive impairment. The presence of psychosocial stressors had a significant impact on anxiety, depression, and cognitive impairment (7). Decreased reproductive function brings discomfort in life. For some women, menopause causes anxiety and worry. Anxiety is not only emotional pain but also because there has been an error in knowledge. The more knowledge you have, the easier it will be to overcome anxiety. Tariq et al. (2023) state that most women had limited knowledge and negative attitudes toward menopause, leaving them unprepared to cope with the physical and psychological changes associated with this stage of life. Improved menopause education is required to improve the quality of life during the menopausal transition (8). Researchers conducted an initial survey with ten women on 30 October and 25 November 2023 at the

Curug Community Health Center. The survey results showed that one of them knew well about menopause, having experience as a cadre for two years, and the other nine women did not know well about menopause. The phenomenon that occurs becomes a problem for premenopausal women with insufficient knowledge and response attitudes in dealing with the menopause phase they are experiencing. Based on this phenomenon, research is needed to determine the relationship between the level of knowledge and attitudes of premenopausal mothers and their readiness to face the menopause phase at Curug Community Health Center, Tangerang.

METHODS

This research used a cross-sectional study using quantitative correlational research methods to determine the relationship between knowledge and attitudes of premenopausal mothers at the Curug Community Health Center in the menopause phase. The population studied was premenopausal women aged 40 - 45 years registered at the Curug Community Health Center. This research collected samples using an accidental sampling technique with exclusion criteria of menopausal women. This study sample was 50 respondents from January until June 2024. Three questionnaires were applied. The knowledge questionnaire regarding menopause consisted of 25 statements; the attitude questionnaire comprised 13 questions; and the readiness questionnaire comprised 16 questions. Cronbach's alpha was 0.942 for the knowledge questionnaire and 0.941 for the readiness questionnaire. The Cronbach's alpha reliability test results from the attitude questionnaire for 13 statements were all reliable with a Cronbach's alpha (α) value of $0.932 > 0.6$. The data collection procedure starts with licensing.

The researcher submitted a request for a research ethics review to the FON Research Ethics Committee and was declared passed with number 020/KEPFON/I/2024. The researcher then applied permission for validity and reliability (VR) testing and research at the Tangerang District Health Service, Banten Province. The researchers visited the research area health center after obtaining a permission letter from the Health Service. Researchers were directed to contact cadres to collaborate in collecting data. The researcher accompanied the respondent while filling out the questionnaire so that the researcher could immediately explain what was not understood. In the final stage, the data was processed and analyzed after all the data had been collected. This research used univariate and bivariate analysis. The univariate analysis aimed to describe the characteristics, level of knowledge, attitudes, and readiness of premenopausal mothers. The bivariate analysis seeks to determine whether there is a relationship between the independent variable, the level of knowledge and attitudes of premenopausal mothers, and the dependent variable, the readiness to face the menopause phase. With nominal and ordinal measuring scales, it was assessed whether there is a relationship between variables and other variables using the Chi-Square test to evaluate the significance of the relationship between two nominal variables.

RESULTS

As shown in Table 1, most respondents were 42 years old, 14 people (28 %), while four were premenopausal mothers aged 44 years (8 %). Forty-eight people are Muslim (96 %), while two are Christian (4 %). Most respondents were high school graduates, namely 27 (54 %), while one person had elementary school education (2 %). Most respondents are housewives, namely 43 people (86 %); one person works as a civil servant (2 %), five people work as entrepreneurs (10 %), and one person works in another field (2 %). Most respondents experienced their first menstruation at the age of 11 - 14 years (normal menstruation), namely, 35 people (70 %), while the remainder experienced menstruation at the age of $\leq$ 10 years (early menstruation), there was one person (2 %) who experienced menstruation at the age of $\geq$ 15 years and 14 people (28 %) had late menstruation. Thirty-four respondents had $\leq$ 2 children (68 %), while 16 respondents (32 %) had more than two children.

Table 1

Distribution of characteristics of premenopausal mothers regarding readiness to face the menopause phase at Curug Community Health Center (n = 50)

Characteristic	n	%
Age		
40	9	18
41	5	10
42	14	28
43	12	24
44	4	8
45	6	12
Religion		
Muslim	48	96
Christian	2	4
Background Education		
Elementary School	1	86
Junior High School	20	2
Senior High School	27	10
Bachelor	2	12
Employment		
Housewife	43	86
Government employee	1	2
Self-employed	5	10
Others	1	2
Age of the first-time menstruation/menarche		
≤ 10 years (Early menarche)	1	2
11-14 years (Normal)	35	70
≥ 15 years (Late menarche)	14	28
Children		
≤ 2 children	34	68
≥ 2 children	16	32

Table 2

Distribution of knowledge level, attitudes and readiness of premenopausal mothers at Curug Community Health Center (n=50)

Variable	n	%
Knowledge level		
Good	5	10
Adequate	27	54
Low	18	36
Attitudes		
Positive	14	28
Negative	36	72
Readiness		
Ready	35	70
Not ready	15	30
Total	50	100

Table 2 shows that 27 respondents have sufficient knowledge regarding readiness to face the menopause phase (54 %), and 18 respondents (36 %) have insufficient knowledgea about the menopause phase. The remaining five respondents (10 %) have a good level of knowledge about the phases of menopause. Most respondents have a negative attitude toward readiness to face the menopause phase, namely 36 respondents (72 %), while 14 respondents (28 %) have a positive attitude toward readiness to face the menopause phase. Most respondents are ready to face the menopause phase, namely 35 respondents (70 %), while 15 respondents (30 %) are not prepared to face the menopause phase.

Table 3 shows that of the 50 respondents, 22 premenopausal mothers have adequate knowledge about the menopause phase and are ready to face it. Chi-Square tests show the p-value (0.069) > α (0.05), which means H0 is accepted and H1 is rejected. This shows no relationship between premenopausal mothers' knowledge level and their readiness to face the menopause phase at the Curug Community Health Center in 2024.

As shown in Table 4, of the 50 respondents, 23 premenopausal mothers have a negative attitude. Still, they are ready to face the menopause phase. Chi-Square analysis indicates a p-value of 0.131 > α (0.05), which means H0 is accepted and H1 is rejected. This shows that there is no relationship between the attitudes of premenopausal mothers and their readiness to face the menopause phase at the Curug Community Health Center in 2024.

DISCUSSION

The results show that most respondents with adequate knowledge are ready to face the menopause phase and that most respondents had a background education, with 54 % being high school graduates. There is no relationship between premenopausal mothers' knowledge

Table 3

Relationship between knowledge level of premenopausal mothers and readiness to face the menopause phase at the Curug Community Health Center (n = 50)

Knowledge level	Readiness				Total		p – Value
	Ready		Not ready				
	f	%	f	%	f	%	
Good	4	80	1	20	5	100	0.069
Adequate	22	81.5	5	18.5	27	100	
Low	9	50	9	50	18	100	
Total	35	70	15	30	50	100	

Table 4

Relationship between attitudes of premenopausal mothers and their readiness to face the menopause phase at the Curug Community Health Center (n = 50)

No Attitude		Readiness				Total		p - Value
		Ready		Not ready				
		f	%	f	%	f	%	
1	Negative	23	63.9	13	36.1	36	100	0.131
2	Positive	12	85.7	2	14.3	14	100	
	Total	35	7.0	15	30.0	50	100	

level and their readiness to face the menopause phase at the Curug Community Health Center in 2024. 63.9 % of respondents had negative attitudes and were ready to face the menopause phase at the Curug Community Health Center.

This research is in line with Purba (2024), who demonstrated that there is a relationship between knowledge of menopause and readiness to face menopause in premenopausal mothers with a strong level of equality (9), and Ratnaningsih (2021) who showed that most women's education levels from high school to university are quite ready to face menopause (10).

Our results show that most respondents were housewives (86 %). This is in line with Ratnaningsih (2021), who indicates that most of the respondents worked as housewives, so it is concluded that women's readiness to face menopause is not only influenced by their level of education but can also be due by occupation, age, and environment (10).

This research also found that most respondents were 42 years old (28 %), which is in line with Kusumawati (2019), who states that the level of knowledge is also influenced by age. The older a person gets, the more experience they have to increase their knowledge of an object, which can affect their thinking patterns and understanding ability (11). This is supported by Maharani, Isfentiani, and Kasiati (2022), who indicated that maternal factors include knowledge, attitudes, and anxiety, which can influence the readiness of women of childbearing age to face menopause (12). We also show that one respondent had good knowledge but was not ready

to face the menopause phase. This is supported by Ratnaningsih (2021), who established that not all highly educated women are prepared to face menopause (10). Women's ignorance can make women less prepared physically, psychologically, and spiritually. A lack of information about menopause, environmental conditions, and inadequate family roles can influence this.

This study aims to identify the relationship between the knowledge and attitudes of premenopausal mothers regarding readiness to face the menopause phase. It was found that 54 % of respondents had adequate knowledge, 72 % had negative attitudes, and 70 % were ready to face the menopause phase.

The results show that the level of knowledge of premenopausal mothers does not significantly correlate with readiness to face menopause. In effect, some respondents had good knowledge but were not ready to face menopause. The results of this study show that women's readiness to face the menopause phase is not only influenced by their level of education but can also be due to work, age, experience, and environment.

It was found that most respondents had a negative attitude (72 %), while 28 % had a positive attitude. According to Norisa et al. (2022), negative attitudes arise due to a lack of knowledge and complaints that are not understood (13). There is needed information regarding changes in signs and symptoms experienced and how to deal with them to increase knowledge and change mothers' attitudes to be better prepared to face menopause. This research has proven that most respondents with adequate knowledge have negative attitudes. The results of this research also show that most respondents had a negative attitude and were ready to face the menopause phase, with 23 respondents and respondents with a negative attitude not prepared to face the menopause phase as many as 13. Meanwhile, there were 12 respondents with a positive attitude and ready to face the menopause phase, and two respondents with a positive attitude but not ready to face the menopause phase (13).

The results of this study are not in line with Wulan (2020), who states that the more positive the premenopausal mother's attitude, the more prepared the mother is to face the menopause phase, while for mothers with a negative attitude, the lower the premenopausal mother's readiness to face the menopause phase (14). However, these results are in line with Sartika et al. (2023), who explained that attitudes can change positively if they are balanced with sufficient knowledge, information, and readiness, both physically, mentally, and spiritually (15). According to Riza (2018), a person is not born with attitudes and views, but attitudes can form and change throughout their development. So that each person has a different perspective when dealing with certain situations or conditions. Riza states that certain attitudes do not always end in behavior that matches the attitude (16).

Sukmawati et al. (2023) stated that there is no relationship between a mother's knowledge and a mother's readiness to face menopause. A woman's readiness to face menopause is characterized by a balanced nutritional diet, regular exercise, and avoiding bad habits such as smoking and drinking alcoholic beverages (17). A person's age also affects the readiness of perimenopausal women to face menopause. A person's age is associated with their knowledge and readiness to solve problems that arise in life. In this study, although the age of the respondents was almost the same, each individual's knowledge differed. Another study indicated that there is a relationship between knowledge of menopause and readiness to face menopause in premenopausal mothers with a strong level of equality (18). Purba stated that preparedness is not only influenced by knowledge, but a person's age also influences the readiness of premenopausal mothers to face menopause (18). The crucial role of educational programs is to equip women with the knowledge needed to navigate menopause effectively. Most women had limited knowledge and negative attitudes toward menopause, leaving them unprepared to cope with the physical and psychological changes associated with this stage of life. Tariq et al. (2023) indicated that improved menopause education is required to improve the quality of life during the menopausal transition and a most positive narrative of life postmenopause (19). Our data align with Afriani and Fatmawati (2020) at the Kenali Besar Health Center in Jambi City, who found that most respondents have good knowledge and negative attitudes (20). In their research at Padangan District of Winong, Agustiawati and Sulistiyaningsih (2017) found that most mothers

had a good knowledge level and attitude and were ready to face menopause (21). This is not in line with our results because Agustiawati and Sulistiyaningsih's (2017) results show there is a correlation between the level of knowledge of preparedness in the face of menopause (p-value = 0.003); and there is a correlation between the mother's attitude premenopausal toward readiness to face the menopause in the village Padangan District of Winong with p-value = 0.001 (21). Most research indicates a relationship between knowledge and attitude toward readiness to face the menopause phase. Another researcher found a relationship between knowledge and attitudes of premenopausal women in the Sekar Jaya Village, Ogan Komering Ulu (22), in the working area of the Kembang Mumpo Health Center with moderate closeness.

CONCLUSION

There is no relationship between premenopausal mothers' knowledge level and their readiness to face the menopause phase, and there is no relationship between their attitudes and their readiness to face the menopause phase. Most of the premenopausal mothers' level of knowledge was adequate, with negative mothers' attitudes and mostly ready to face the menopause phase at the Curug Community Health Center in 2024. Community health centers may be able to conduct seminars or education regarding menopause and changes in physical and psychological symptoms through health examination programs carried out at community health centers. This is related to mothers who are not aware of the symptoms of menopause they are experiencing and premenopausal mothers' relatively insufficient knowledge of menopause.

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Internet addiction, active school transport barriers and overnutrition of adolescents in urban areas: A Cross-sectional Study

Adicción a internet, barreras activas al transporte escolar y sobrenutrición de adolescentes en zonas urbanas: un estudio transversal

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SUMMARY

Introduction: *Overnutrition, such as obesity and overweight in adolescents in urban settings, is one of the most serious health problems in the 21st century. Several lifestyle factors cause the problem of overnutrition experienced by adolescents. This research aims to analyze the relationship between internet addiction, barriers to active school transport, and the incidence of overnutrition in adolescents in urban areas.* **Methods:** *This study used a cross-sectional design. Respondents were 231 adolescents in senior high schools in Surabaya, Indonesia, who were selected using proportional stratified random sampling techniques. The independent variables are internet addiction and active school transport barriers, and the dependent variable is the nutritional status of adolescents. The instruments used were the Internet Addiction Test and Perceived Barriers to Active School Transport questionnaire, weight scale and microtoise. Data were analyzed using the Spearman Rho test (α=0.05).* **Results:** *The study shows no relationship between internet addiction and nutritional status (p = 0.727; r = 0.023). However, there is a relationship between active school transport barriers and nutritional status in adolescents (p=0.028; r=0.145).* **Conclusion:** *A small number of adolescents who had mild levels of internet addiction experienced overnutrition. The higher the active school transport barriers, the higher the nutritional status of adolescents. Adolescents are expected to adopt a healthy lifestyle by increasing physical activity, such as walking or cycling to school, to prevent the risk of overnutrition.*

Keywords: *Obesity, overweight, internet addiction, active school transport barrier, adolescent.*

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RESUMEN

Introducción: *La sobrealimentación, como la obesidad y el sobrepeso en los adolescentes del medio urbano, es uno de los problemas de salud más graves del siglo XXI. El problema de la sobrealimentación que sufren los adolescentes está causado por varios factores relacionados con el estilo de vida. El objetivo de esta investigación es analizar la relación entre la adicción a internet, las barreras al transporte escolar activo y la incidencia de la sobrealimentación en adolescentes en el ámbito urbano.* **Métodos:** *Este*

estudio utilizó un diseño transversal. Los encuestados fueron 231 adolescentes de escuelas secundarias superiores de Surabaya, Indonesia, seleccionados mediante técnicas de muestreo aleatorio estratificado proporcional. Las variables independientes son la adicción a Internet y la barrera del transporte escolar activo; la variable dependiente es el estado nutricional de los adolescentes. Los instrumentos utilizados fueron la prueba de adicción a Internet y el cuestionario de barreras percibidas al transporte escolar activo, la báscula de peso y el microtoise. Los datos se analizaron mediante la prueba Rho de Spearman (α=0.05). **Resultados:** *Los resultados del estudio muestran que no existe relación entre la adicción a Internet y el estado nutricional (p = 0.727; r = 0.023). Existe relación entre las barreras del transporte escolar activo y el estado nutricional en adolescentes (p=0.028; r=0.145).* **Conclusiones:** *Un pequeño número de adolescentes que presentaban un nivel leve de adicción a internet experimentaban sobrealimentación. A mayores barreras de transporte escolar activo, mayor estado nutricional en los adolescentes. Se espera que los adolescentes adopten un estilo de vida saludable aumentando la actividad física, como ir andando o en bicicleta al colegio, para prevenir el riesgo de sobrealimentación.*

Palabras clave*: Obesidad, sobrepeso, adicción a internet, barrera de transporte escolar activo, adolescente.*

INTRODUCTION

Overnutrition in adolescents is one of the most serious health problems of the 21st century (1). Overnutrition consists of overweight, which is a mild accumulation of fat, and obesity, which is a very high accumulation of fat in the body. Children who live in urban areas tend to have a higher risk of overweight and obesity due to unhealthy dietary behaviors (2). Indonesia is a developing country which has complex problems, including overnutrition (3). According to the World Obesity Federation, Indonesia is one of the countries with the fastest increase in the prevalence of overnutrition in the last few decades (4,5). Adolescents are a vulnerable age group for experiencing overnutrition (6).

The increase in overnutrition is almost evenly distributed across all age groups, including adolescents. Data from Basic Health Research (Riset Kesehatan Dasar/ RISKESDAS) Indonesia shows that there was an increase in the prevalence of overweight and obesity from 2013 to 2018 in adolescents aged 16-18 years, from 5.7 % and 1.6 % to 9.5 % and 4 %. The prevalence of overnutrition status in Indonesia based on gender of adolescents aged 16-18 years shows 7.7 % of teenage boys are overweight and 3.6 % of them are obese, 11.4 % of teenage girls are overweight and 4.5 % of them have obesity. Adolescents in high school education (Sekolah Menengah Atas / SMA) have an overweight prevalence of 9.5 % and an obesity prevalence of 4 %. The prevalence of overweight and obesity in East Java ranks fifth highest in Indonesia. Surabaya, one of the metropolitan cities in Indonesia, has a prevalence of adolescents aged 16-18 years who are overweight and obese based on BMI/Age of 14.46 % and 3.30 % (7).

Based on a preliminary study of 10 teenagers in a public high school in Surabaya, eight teenagers were overweight, and two teenagers were obese. Seven out of 10 teenagers with overnutrition stated that they used the internet for 5-10 hours daily. They admitted that they would quickly feel bored and empty if they couldn't access the internet for a day. Besides that, 10 teenagers used motorcycles for transportation to school. The reason why they prefer motorcycles rather than walking and cycling is because they are faster, more efficient, and more convenient.

If the overnutrition problem in adolescents is unsolved, the impact will continue into adulthood, and the elderly (8). Overnutrition in adolescents will have a significant impact on physical and psychosocial health. Many factors cause overnutrition in adolescents, including genetic, environmental, psychological, health, developmental, and drugs (9). Environmental factors have a big influence, which includes lifestyle behavior (10). According to the World Health Organization (WHO) report, the increasing prevalence of overnutrition in adolescents comes from lifestyle changes leading to energy imbalance (11). Lifestyle changes such as excessive internet use and inactive school transport (using motorized transport) can increase the risk of overnutrition (12,13).

Nowadays, the internet has become an important tool for finding information and communicating with each other, but some people have become addicted to the internet, especially teenagers. Excessive internet use can have a

negative impact on teenagers' psychological, physical, academic and social aspects (14). Internet use is associated with several negative changes in body fat distribution and body weight (12). The serious impact of internet addiction is that it makes a person lazy to move actively, thereby increasing the risk of being overweight. Individuals with internet addiction have a high risk of irregular eating patterns because they often lose their appetite, often skip dinner, and choose snack foods that tend to have high calories, which will increase the prevalence of overnutrition in teenagers (15).

Active school transport (AST), which is active commuting to and from school by involving physical activity such as walking to school, benefits physical and psychosocial well-being (16). Adolescents' dependence on motorized vehicles as transportation to school has increased in the last few decades, while the percentage of adolescents walking to school has decreased significantly (17). The reduction in active school transport among teenagers is thought to be due to parental factors and the long distance from home to school. In addition, the convenience of practical technology, such as online motorbike ordering applications, also influences teenagers to walk or cycle when commuting to school. Teenagers who use passive modes of transportation to school (for example, motorbikes, cars, and school buses) have a higher risk of experiencing overnutrition compared to teenagers who walk or cycle to school (18,19). AST can be obstructed by intrapersonal, interpersonal, environmental, and policy factors, defined as perceived barriers (16).

Therefore, the study aims to analyze the relationship between internet addiction, active school transport barriers, and the incidence of overnutrition in adolescents at a public school in Surabaya, Indonesia. This research will promote obesity and overweight prevention, help develop comprehensive interventions, and improve the physical well-being of adolescents.

METHOD

This study's research design is correlational research with a cross-sectional approach. Data were collected from teenagers in classes X and XI at SMA Negeri 1 Surabaya in June 2023.

The population in this study was 547 adolescents and the sample size was 231 adolescents in senior high school. This research used probability sampling techniques with proportional stratified random sampling techniques. This type of sampling was used because the population of students in classes X and XI at SMA Negeri 1 Surabaya was stratified, so the researchers took samples from classes X, XI MIPA, and XI IPS, and representatives from each class were taken as samples. All participants in this study were required to meet the following inclusion criteria: 1) having active status as students; 2) 15-17 years of age; 3) having a gadget (smartphone/tablet/laptop) that can access the internet due to completing the questionnaire online. The exclusion criterion was teenagers who were on a weight loss diet.

The independent variables in this research are internet addiction and active school transport barriers. The dependent variable is overnutrition. Internet addiction was measured by the Internet Addiction Test (IAT), which is a questionnaire used to assess problems resulting from excessive Internet use (20). The IAT consists of 20 questions that measure aspects of internet addiction, namely salience, excessive use, anticipation, neglect of work, lack of control, and neglect of social life. Internet addiction is classified into four categories - normal, mild internet addiction, moderate internet addiction, and heavy internet addiction. The Perceived Barriers to Active School Transport instruments were used in this study to identify the estimated level of individual barriers to using active transportation from home to school related to physical environmental factors, safety, social, and individual or family preferences (16). The nutritional status of respondents was assessed using anthropometric standards from the Regulation of the Minister of Health of the Republic of Indonesia Number 2, the year 2020, which is an anthropometric indicator of age 5-18 years body mass index according to age (BMI/Age). Measurements were carried out using an analog weight scale for measuring body weight and a microtoise for measuring body height. The demographic characteristics (name, gender, date of birth, age, class, living together), characteristics of nutritional status,

characteristics of internet use, and characteristics of transportation use from home to school were also collected in this study.

The Deputy Principal and Student Affairs determined the time for collecting data. Because the participants were still in the child age group, all samples in this study required informed consent approval from their parents or guardians. Participants in this study were gathered to have their weight and height measured to determine the incidence of overnutrition, assisted by staff of the school head unit. Afterward, they were given a G-form link to access the Internet Addiction Test (IAT) questionnaire, the Food Frequency Questionnaire (FFQ), and the Perceived Barriers to Walking and Cycling to and from School questionnaire. This research has been ethically tested at the Health Research Ethics Commission, Faculty of Nursing, Airlangga University, and received a certificate No. 2885-KEPK.

Univariate analysis presented as number (n) and percentage (%) was conducted to describe characteristics of demographic data, nutritional status, internet use, transportation to school, and barriers to active school transport. Bivariate analysis in this study used the Spearman Rank (Rho) test (α=0.05) to identify the relationship between internet addiction and nutritional status and also active school transport barrier with nutritional status. p-value <0.05 was used to determine statistical significance. All data analysis was computerized using Statistical Product and Service Solutions (SPSS).

RESULTS

Table 1 shows that 66 adolescents (28.6 %) were male, and 165 adolescents (71.4 %) were female. Most adolescents were 17 years old, as many as 136 (58.9 %), while three adolescents were 15 years old (1.3 %). 197 adolescents (85.3 %) did not have and 34 adolescents (14.7 %) had a family history of overweight or obesity. Most adolescents (46.3 %) use the internet more than four hours a day, and only a few (3 %) use the internet for less than one hour per day. Most adolescents (82.3 %) used motorized vehicles, like motorbikes, as transportation to school, while only a few adolescents used active transportation to school, such as walking (1.3 %) or cycling (1.3 %). Most adolescents (47.6 %) have a home not far from school, around 1-3 km, while only a small number of adolescents (15.2 %) have a home quite far from school with a distance of more than 7 km. 123 adolescents (53.2 %) took 10-20 minutes to get from home to school, and only 13 adolescents (5.6 %) took more than 30 minutes to get to school.

Table 1

Demographic Characteristics of Adolescents

Characteristics	**n**	**%**
Gender		
Male	66.0	165.0
Female	28.6	71.4
Age		
15 years	3	1.3
16 years	92	39.8
17 years	136	58.9
Having a family history of overweight or obesity		
Yes	34	14.7
No	197	85.3
Duration of internet use		
< 1 hour	7	3.0
1 hour – 2 hours	54	23.4
3 hours – 4 hours	63	27.3
> 4 hours	107	46.3
The transportation used to go to school		
Walk	3	1.3
Bicycle	3	1.3
Motorcycle	190	82.3
Private car	25	10.8
Public transportation (bus)	10	4.3
Distance from home to school		
< 1 Km	24	10.4
1 Km - 3 Km	110	47.6
4 Km - 7 Km	62	26.8
>7 Km	35	15.2
Time required to go from home to school		
<10 minutes	69	29.9
10 - 20 minutes	123	53.2
20 - 30 minutes	26	11.3
>30 minutes	13	5.6

Table 2 shows the level of internet addiction in adolescents. A total of 116 adolescents (50.2 %) have mild internet addiction, while only 18 adolescents have moderate internet addiction (7.8 %). The rest do not have an addiction to the internet (42 %).

Table 2

Levels of Internet Addiction in Adolescents

Internet Addiction	**n**	**%**
No internet addiction	97	42.0
Mild internet addiction	116	50.2
Moderate internet addiction	18	7.8
Total	231	100.0

Table 3 shows that most respondents, including 136 adolescents (58.9 %), experienced high school active transport barriers. Meanwhile, 95 adolescents (41.1 %) had low active school transport barriers.

Table 3

Active School Transport Barriers in Adolescents

Active School Transport Barriers	n	%
Low	95	41.1
High	136	58.9
Total	231	100

Table 4 shows that most adolescents didn't experience overnutrition; 163 (70.6 %) had good nutritional status. The number of adolescents who have overnight surgery is 27 adolescents (11.7 %) who are overweight and 13 adolescents (5.6 %) who are obese. From a total of 231 respondents, 17.3 % of adolescents experienced overnutrition.

Table 4

Nutritional Status in Adolescents

Nutritional status	**n**	**%**
Not Overnutrition		
Bad	4	1.7
Not enough	24	10.4
Good	163	70.6
Total	191	82.7
Overnutrition		
Overweight	27	11.7
Obesity	13	5.6
Total	40	17.3

Table 5 shows the relationship between internet addiction and overnutrition status among teenagers. Most adolescents with mild internet addiction did not experience overnutrition (41.6 %). The number of adolescents with normal internet addiction, mild internet addiction, and moderate internet addiction who experienced overnutrition was 16 (6.9 %), 20 (8.7 %), and four (1.7 %) adolescents, respectively. Spearman Rho's statistical test results showed a p-value >0.05, which means there is no relationship between internet addiction and nutritional status in adolescents at SMAN 1 Surabaya.

One hundred four adolescents (45 %) with high barriers in active school transport did not experience overnutrition (Table 5). Of adolescents who had high active school transport barriers with overnutrition, 32 adolescents (13.9 %), while adolescents who had low active school transport barriers and experienced overnutrition were eight people (3.5 %). The Spearmen Rho test showed a p-value <0.05, which means a significant relationship exists between active school transport barriers and the incidence of overnutrition in adolescents. The correlation coefficient number is r = 0.145, which is positive, so the two variables are in the same direction and very weak in strength. Thus, it can be interpreted that the higher the barriers in active school transport, the more nutritional status adolescents have.

Table 5

Relationship between Internet Addiction, Active School Transport Barriers and Nutritional Status in Adolescents

Variables	Nutritional status				Total		Uji Spearman s Rho	
	Not Overnutrition		Overnutrition					
	n	%	n	%	N	%	p	r
Internet Addiction								
No internet addiction	81	35.1	16	6.9	97	42		
Mild internet addiction	96	41.6	20	8.7	116	50.2	0.727	0.023
Moderate internet addiction	14	6.1	4	1.7	18	7.8		
Active School Transport Barriers								
Low	87	37.7	8	3.5	95	41.1	0.028	0.145
High	104	45	32	13.9	136	58.9		

DISCUSSION

The results of the research show that there is no relationship between internet addiction and overnutrition status. This data are supported by a study which states that there is no relationship between internet addiction and overnutrition status (15). However, it is not in line with research which states that there is a relationship between internet addiction and overnutrition status (21).

Teenagers are the main internet users and are most vulnerable to excessive internet use. Generally, teenagers use the internet to search for information, use social media, chat, play online games, listen to music, and watch entertainment such as videos or films. High school teenagers have an increased risk of problems with excessive internet use due to free-to-use internet facilities and the lack of monitoring from parents. The increase in time spent in front of device screens and unlimited internet access causes time that should be used for physical activity to decrease or disappear (22). The serious impact of internet addiction is that it makes a person lazy about moving (sedentary behavior), which can decrease energy expenditure. This energy is stored as fat deposits, ultimately increasing the risk of being overweight.

The results of this research do not yet show severe addiction, but most of it is still in the normal and mild categories. This could be because teenagers had previously received health education from a school health unit (UKS) regarding the impact of internet addiction. Internet addiction is a variable that does not directly affect nutritional status, but this variable influences changes in activity and eating patterns/ consumption, both of which can trigger changes in nutritional status. This is the reason why internet addiction has not been able to show a relationship with overnutrition.

The results show a positive relationship between active school transport barriers and overnutrition status. This means that the higher the barriers to active school transport, the higher the nutritional status will be (experiencing overnutrition). This data aligns with a previous study, which found a relationship between travel patterns to school and overnutrition status. Almost all teenagers depend on using vehicles to travel to and from school, while the number of teenagers who actively travel (for example, walking or cycling) to and from school is very small (23).

Vehicle modes of transportation are known to have a negative impact on health and are not considered active modes of transportation. Long periods spent sitting in vehicles have been linked to a higher risk of weight gain. One of the ways to increase physical activity and reduce the risk of weight gain is to travel actively. Physical activity plays a fundamental role in the health and well-being of adolescents. Active transport to school is a form of daily physical activity in teenagers' lives, which can be utilized for healthy growth and development. The advantage of active transport to school is that it can reduce

the risk of cardiovascular disease, improve the metabolic profile, and have many other health benefits (24). In addition, replacing passive travel (using vehicles) with active travel also brings many additional benefits, such as reduced traffic congestion, reduced traffic deaths, improved air quality, and reduced air pollution (16).

Our results show that most respondents have high barriers to active school transport. This is supported by the reality in the research location that many teenagers still bring motorcycles and pick up and drop off using vehicles. Adolescents living in urban environments are significantly less likely to walk or cycle on their way to school compared to adolescents living in suburban environments (25).

Barriers to active school transport can include the physical environment, safety, social, and individual/family preferences. The more positive the perception of these four domains, the higher the likelihood of adolescents walking or cycling to school (16). One of the main barriers adolescents perceive to prevent active travel is the distance between home and school (26). Living too far from school can result in teenagers choosing to travel passively to go to school (27). In effect, most teenagers take 10-20 minutes to get from home to school. This time may be perceived as long enough by teenagers, coupled with the phenomenon of quite hot air in Surabaya. Because Indonesia is a tropical country, most teenagers prefer motorcycles rather than travel actively to school. Barriers from the aspect of family preferences are because parents may feel uncomfortable when allowing their children to walk or cycle alone (24). When parents are not sure that there are friends that their children can walk with (e.g. peers), they may drive their children to school and not allow their children to walk or cycle to school (16). The data show that private cars, which parents may drive to take adolescents to school, were the second most common mode of transportation used by the participants in this study. These findings suggest that the physical environment and family preferences may hinder active school transport in adolescents.

Adolescence is a key period for forming active living habits. Active travel is a good opportunity to increase physical activity and reduce sedentary behavior. Therefore, the government needs to improve the quality of short-distance transportation infrastructure, such as bicycle paths and pedestrian paths. Apart from that, the government needs to provide school safety zones to provide a sense of security to pedestrians and cyclists so that they can prevent accidents and ensure the safety of students when going to and from school. Thus, active commuting to school may be an important focus of interventions to increase physical activity and reduce levels of overweight.

The limitation of this study is the reduced research time because the respondents were taking school exams and then continued with the semester break. Future studies can accommodate other variables that can affect the incidence of overnutrition in adolescents.

CONCLUSIONS

It could be inferred that high barriers to active transportation to school lead to overnutrition in adolescents. This suggests that regular physical activity, such as walking to school, can prevent this risk.

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Conflict of Interest

All authors in this article declared no potential conflict of interest.

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Relationship between knowledge and attitude about human papillomavirus infection and vaccination in female nursing students

Relación entre el conocimiento y la actitud sobre la infección por el virus del papiloma humano y la vacunación en las estudiantes de enfermería

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SUMMARY

Introduction: *Human papillomavirus (HPV) infection is the primary cause of cervical cancer, which is the second-leading cause of women's death in Indonesia, and that is why a national HPV vaccination program is required to address this issue. A preliminary survey of 20 female nursing students revealed that 70 % were unaware of the HPV virus, 80 % were unaware of cervical cancer, and 80 % were unaware that HPV could lead to cervical cancer. This study aimed to determine the relationship between knowledge and attitude about human papillomavirus infection and vaccination in female nursing students.* **Methods:** *This descriptive-quantitative study used a cross-sectional design and univariate and bivariate analysis. The purposive sampling method was used to select 199 first-year female nursing students who were willing to participate in the research and had no history of HPV infection, HPV vaccination, or cervical cancer. The study was conducted from February to April 2024.* **Results:** *The study showed that 29.14 % had moderate knowledge and a positive attitude about HPV infection, with p = 0.261 (p > 0.05), indicating no significant relationship. A positive attitude does not always affect knowledge. 43.72 % had good knowledge and a positive attitude about HPV vaccination, with p=0.021 (p < 0.05), indicating a significant relationship. Good knowledge produces a positive attitude.* **Conclusion:** *Despite not having studied maternity, individuals can still gain valuable knowledge from their sources of information. This study will reach people to prevent HPV infection and implement vaccination programs, and future researchers can conduct multivariate analyses of variables.*

Keywords: *Nursing students, papillomavirus infections, vaccination.*

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RESUMEN

Introducción: *La infección por el virus del papiloma humano (VPH) es la causa principal del cáncer de cuello uterino, que es la segunda causa de muerte de mujeres en Indonesia, y por eso es necesario un programa nacional de vacunación contra el VPH para abordar este problema. Una encuesta preliminar realizada a 20 estudiantes de enfermería reveló que el 70 % desconocía el VPH, el 80 % desconocía la*

existencia del cáncer de cuello de útero y el 80 % ignoraba que el VPH podía provocar cáncer de cuello de útero. El objetivo de este estudio fue determinar la relación entre los conocimientos y la actitud acerca de la infección por el virus del papiloma humano y la vacunación en las estudiantes de enfermería. **Métodos:** *Descriptivo-cuantitativo con un diseño transversal, con análisis univariado y bivariado. Se utilizó el método de muestreo intencional para seleccionar una muestra de 199 estudiantes de enfermería de primer curso que estuvieran dispuestas a participar en la investigación y no tuvieran antecedentes de infección por el VPH, vacunación contra el VPH o cáncer de cuello uterino. Esta investigación se llevó a cabo en febrero-abril de 2024.* **Resultados:** *El estudio mostró que el 29,14 % tenía un conocimiento moderado y una actitud positiva sobre la infección por VPH, con p = 0,261 (p > 0,05), lo que indica que no existe una relación significativa. Una actitud positiva no siempre afecta los conocimientos. El 43,72 % tiene buenos conocimientos y una actitud positiva sobre la vacunación contra el VPH, con p = 0,021 (p < 0,05), lo que indica una relación significativa. Un buen conocimiento produce una actitud positiva.* **Conclusión:** *A pesar de no haber estudiado maternidad, las personas pueden adquirir conocimientos valiosos de sus fuentes de información. Este estudio llegará a las personas para prevenir la infección por el VPH e implementar programas de vacunación, y futuros investigadores podrán realizar análisis multivariados de las variables.*

Palabras clave: Estudiantes de enfermería, infecciones por papilomavirus, vacunación.

INTRODUCTION

Cervical cancer is a disease in which malignant (cancer) cells form in the tissues of the cervix (1). Cervical cancer ranked fourth as the killer cancer in women in the world in 2020 (2), which previously ranked fifth in 2010 (3) and estimated that 342 000 of 604 000 women with cervical cancer have died. In Indonesia, cervical cancer ranks second as the female killer disease, where 21 003 of 36 633 women with cervical cancer have died (2). Cervical cancer is caused by several factors, of which 90 % is caused by human papillomavirus infection (4).

Human papillomavirus (HPV) infection is a sexually transmitted disease that can cause warts around the genital area (5). Human papillomavirus infection commonly affects women aged <25 years, and it takes decades for human papillomavirus infection to develop into cervical cancer (6). Data from the Centers for Disease Control show that approximately 43 million late adolescent-aged people in the world were infected with human papillomavirus in 2018 (5), and by 2023, it is estimated that 4.0 % of women in Indonesia will have a human papillomavirus 16/18 infection (7). Therefore, human papillomavirus infection must be avoided before the risk factor grows through vaccination before sexual contact. Unfortunately, only 1 in 10 girls aged 9-14 years in Indonesia have received the human papillomavirus vaccine until the last dose in 2020. In 2030, the WHO targets that 90 % of women in Indonesia will have gotten their previous dose of vaccine by age 15 (8).

Knowledge is a factor that plays an important role in shaping a person's attitude (8). According to a survey, 62 % of women in Indonesia experience infections in the pubic area; one of them is HPV infection because of their lack of knowledge about maintaining the hygiene of their reproductive organs (9). People who had heard about HPV infection during their degree program were more likely to know the risk factors of HPV infection and were willing to do HPV vaccination (10). Fitri and Akbar (11) have a different opinion; even if someone has not learned about maternity yet, they can still learn about HPV infection and vaccination through experience or other sources of information.

A preliminary survey of 20 female nursing students revealed that 70 % were unaware of the HPV virus, 80 % were unaware of cervical cancer, and 80 % were unaware that HPV could lead to cervical cancer. One of the 20 female nursing students has a cervical cancer history in her family. As future healthcare providers who will provide health education to patients or the community, nursing students must be more sensitive to this issue (12), given that cervical cancer remains a significant concern for women in Indonesia and around the world. This lack of knowledge can also determine the attitude about HPV infection and vaccination, especially among female nursing students, to be negative, so the risk of cervical cancer could be difficult to avoid. Fitri and Elvian (13) demonstrated that most respondents had low knowledge, which resulted in a negative attitude about HPV infection.

This study aimed to determine the relationship between knowledge and attitude about human papillomavirus infection and vaccination in female nursing students as the institution is beginning to increase the understanding of female nursing students about the importance of the HPV vaccine and facilitate the HPV vaccine program.

METHODS

Study Design

This study used a quantitative descriptive method with a cross-sectional design. This design is used to collect data about knowledge and attitude simultaneously.

Population, Samples, and Sampling

Of the 396 first-year female nursing students at one of the private universities in Banten, 199 were chosen as samples using the purposive sampling technique with the Slovin formula. The inclusions were first-year female nursing students who were enrolled, willing to become respondents, aged 18 years old and above, and Indonesian. The exclusions were a history of HPV infection, vaccination, and cervical cancer. There are two variables: knowledge, which is independent, and attitude, which is dependent.

Instrument

The questionnaire used in this study was taken from Fitri and Akbar's research (11), which has been tested for validity and reliability. The knowledge questionnaire scores each question as 1 = true and 0 = false for positive statements and as 1 = false and 0 = true for negative statements. This variable uses an ordinal scale, with good measurement results: 76 %-100 %, sufficient 56 %-75 %, and low: <56 % (14). Each question from the attitude questionnaire is scored four = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree for positive statements, and 1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree for negative statements. This variable uses a nominal scale, with positive measurement results if the total score ≥ median and negative if the total score < median (15). The questionnaire has been tested for validity; each question has an r count > r table (0.306). The previous author has also tested it for reliability, and the instrument is reliable if Cronbach's alpha reliability coefficient is greater than 0.70 (ri >0.70).

Procedure

This research was conducted from February to April 2024. The authors created the questionnaire into a Google Forms page. Data collection occurred using the Google Forms link by applying two instruments: a questionnaire written by the researchers themselves and a questionnaire regarding knowledge and attitude about HPV infection and vaccination. The first questionnaire asked about the respondents' characteristics, age, educational background of students, mother, father, and source of information. The second questionnaire has 40 questions, ten for each variable.

Data Analysis

This study used univariate and bivariate data analysis techniques. Univariate analysis explained the frequency of the characteristics of respondents, as well as their knowledge and attitude about HPV infection and vaccination. This study also conducted a bivariate analysis to cross the knowledge and attitudes about HPV infection and vaccination using the Chi-Square test. This statistical method measures the level of dependence between two variables.

Ethical Clearance

This study has complied with the ethical aspects of this research and was approved by the Research Ethics Committee of Faculty Nursing with a number of 018/KEPFON/I/202. All participants agreed with the informed consent in the Google Form, where they clicked on the option "I accept to participate in the study".

RESULTS

Table 1 shows that there are 199 female nursing students. 94 (47.2 %) respondents were 18 years old, and the education background of 182 (91.5 %) was non-health vocational high school. In this study, most of the educational backgrounds of the father (48.7 %) and mother (45.7 %) of the respondents were senior high school students. This study revealed that 131 (65.8 %) respondents had never heard about human papillomavirus, and 44 (22.1 %) had never heard of HPV from the internet or social media.

Table 1

Distribution of Characteristics of Respondents

Respondent Characteristic	n	%
Age		
18 years old	94	47.2
19 years old	78	39.2
20 years old	21	10.6
21 years old	6	3.0
Education Background		
Health Vocational High School	17	8.5
Nonhealth vocational high school	182	91.5
Father's Education		
Not in school	4	2.0
Elementary school	15	7.5
Junior high school	14	7.0
Senior high school	97	48.7
College degree	69	34.7
Mother's Education		
Not in school	2	1.0
Elementary school	17	8.5
Junior high school	91	45.7
College degree	66	33.2
Source of Information		
Never	131	65.8
Family member	2	1.0
Health worker	4	2.0
Teacher	6	3.0
Newspaper/Magazine	1	0.5
Friends	3	1.5
Internet/social media	44	22.1
School	7	3.5
Television/Radio	1	0.5

Table 2

Knowledge about HPV Infection

Category	n	%
Low	34	17.1
Moderate	86	43.2
Good	79	39.7

Table 3

Frequency Distribution of Knowledge about HPV Infection

Question	True	False
1. HPV infection is the main cause of cervical cancer	96.0	6
2. Sexual contact can transmit HPV infection	91.5	8.5
3. If you married more than once, HPV infection can occur	66.8	33.2
4. HPV infection can occur in dolescence	95.0	5.0
5. If you have family a family history of uterine cancer, HPV infection may occur	29.1	70.9
6. HPV infection can occur in someone who has never had sexual intercourse	52.3	47.7
7. Blood cannot transmit HPV infection	47.7	52.3
8. HPV infection can affect men	77.9	22.1
9. Mouth contact transmits HPV virus infection	57.8	42.2
10. The transmission period for HPV infection is 2-8 months	93.0	7,0

Table 4

Attitude about HPV Infection

Category	n	%
Negative	77	38.7
Positive	122	61.3

Table 5

Relationship between Knowledge and Attitude about HPV Infection

Knowledge	Attitude				Total		p-value
	Positive		Negative				
	n	%	n	%	n	%	
Low	18	9.05	16	8.04	34	17.09	
Moderate	58	29.14	28	14.07	86	43.22	0.261
Good	46	23.16	33	16.58	79	39.07	

Table 6

Knowledge about HPV Vaccination

Category	n	%
Low	7	3.5
Moderate	46	23.1
Good	146	73.4

Table 7

Frequency Distribution of Knowledge about HPV Vaccination

Question	True	False
1. The recommended immunization program in Indonesia includes HPV vaccination	89.9	10.1
2. HPV vaccination is one of the secondary preventative measures against uterine cancer	3.5	96.5
3. HPV vaccination can protect against cervical cancer and genital warts	99.0	1.0
4. HPV vaccination is important for women who have more than one sex partner	93.0	7.0
5. Both males and females can receive vaccinations	94.5	5.5
6. HPV vaccination in Indonesia is mandatory for ages 10-13 years old	63.3	36.7
7. Two types of HPV vaccines are currently on the market	90.5	9.5
8. HPV vaccination is done in the upper arm area	93.0	7.0
9. The HPV vaccination is given from 9 to 26 years of age	86.9	13.1
10. There are three doses of the HPV vaccinatio	92.0	8.0

Table 8

Attitude about HPV Vaccination

Category	n	%
Negative	92	46.2
Positive	107	53.8

Table 9

Relationship between Knowledge and Attitude about HPV Vaccination

Knowledge	Attitude				Total		p-value
	Positive		Negative				
	n	%	n	%	n	%	
Low	2	1.01	5	2.51	7	3.52	
Moderate	28	9.05	28	14.07	46	23.12	0.021
Good	87	43.72	59	29.65	146	73.37	

Table 2 shows that 43.2 % of female nursing students knew moderately about HPV infection. Table 3 shows that the majority (96 %) of female nursing students can answer correctly the question about HPV infection as the main cause of cancer cervix, but 70.9 % answered wrong on the question about the history of cancer cervix as the support factor of HPV infection. Table 4 shows that 61.3 % of female nursing students had a positive attitude about HPV infection. Table 5 shows that 29.14 % of female nursing students had moderate knowledge and positive attitudes. The results of this study were analyzed using the Chi-Square test and tested bivariate analysis. The result indicated a $p = 0.261$ ($p > 0.05$), which means there is no significant relationship between knowledge and attitude about human papillomavirus infection in nursing students.

Table 6 shows that 73.4 % of female nursing students had good knowledge about HPV vaccination. Table 7 shows that the majority of 99 % of female nursing students answered correctly on the question about HPV vaccination as protection from cervical cancer and genital warts, but 96.5 % answered wrong on the question about HPV vaccination as the secondary prevention of cervical cancer. Table 8 shows that 53.8 % of female nursing students had a positive attitude about HPV, and Table 9 shows that the majority of 87 (43.72 %) female nursing students had good knowledge and a positive attitude. The results of this study were analyzed using a Chi-Square test and bivariate analysis. They showed that $p = 0.021$ ($p<0.05$), which means there is a significant relationship between knowledge and attitude about human papillomavirus vaccination in nursing students.

DISCUSSION

Our findings revealed that approximately 47.2 % of respondents were 18 years old. This result aligns with research conducted by Fajarini (17), where 82 % of respondents were between 18 and 19 years old. This is not in line with Simanjuntak and Sugiharto (18), who reported that 70 respondents were 16 years old (18). Age influences a person's capture power and mindset, suggesting that the older an individual, the greater the knowledge they may acquire (19).

The study shows 182 respondents (91.5 %) were from non-health vocational high schools, contrary to the report by Setyaningrum et al. (20), where 105 (87.5 %) respondents were students studying medicine, pharmacy, and midwifery. Students with a health education background have greater access to health-related information through lectures, seminars, and other print and electronic media.

Our study found that the majority of the educational background of the father (48.7 %) and mother (45.7 %) of the respondents was senior high school. This is consistent with Saragih et al. (21), who found that the educational background of 96 (51.9 %) respondents' parents was senior high school. According to Tang et al. (22), high school students' understanding of HPV is influenced by the educational background of their parents. This does not support the findings of Zakina (23), where the educational background of the mother of 29 (53.7 %) respondents was a bachelor's degree.

Our findings showed that 131 (65.8 %) respondents never received information about HPV and 44 (22.1 %) respondents received information from the internet or social media. This is supported by Fentia (24) who indicated that 55 (60.4 %) respondents never received information about HPV because most respondents were housewives, so they did not recognize HPV. This is not aligned with Hurst's (25), who demonstrated that 21 (65.5 %) respondents received information from electronic and digital media. Health information that has been read, heard, or seen by the community can affect knowledge and impact decision-making. Fuadah et al. (12) found that 77 (81.1 %) respondents had heard about cervical cancer and its prevention from university lectures because they were undergraduate nursing students who had received the material.

Our study's findings show that 86 (43.2 %) respondents had moderate knowledge about HPV infection. This is consistent with Fitri and Akbar (11), who reported that 77 (51.7 %) respondents had moderate knowledge because they were still in junior and senior high school.

However, it is still possible that some respondents may have learned about HPV infection from personal experience or the media (11). This is not in line with Galvão et al. (26), who showed that 72.2 % of respondents had low knowledge because the respondents were only 15 years old and may not have received information about HPV infection. Older age can affect the level of ability and maturity in thinking and receiving better information compared to a younger age (27).

Our study showed that 122 (61.3 %) respondents were positive about HPV infection. This is in line with Fitri and Akbar study (11), in which 122 (81.3 %) respondents showed a good attitude about HPV infection because respondents had good knowledge about HPV infection and 43.3 % of respondents were 18-19 years old. Furthermore, age plays a significant role in shaping an individual's capture power and mindset. This is not in line with research conducted by Fitri and Elviany (13), where the majority of 51 (53.0 %) respondents had a negative attitude about HPV infection due to low knowledge, a lower education level, and the majority of respondents did not work, so they received limited information or even did not receive any information from health workers or non-health workers about HPV infection (28). According to Nurbaiti (29), the higher a person's knowledge, the easier it is for that person to receive information, where knowledge can determine attitudes or actions to be taken. Our study concludes that parents' age and education level and sources of information can affect attitudes. One thing that distinguishes the results of this study is that they have a positive attitude. In Fitri and Elviany (13), respondents had a low level of education, and some did not work, so they received limited information or did not get information from health workers or non-health workers about infections, so respondents had a negative attitude.

Our study found that the majority of 58 (29.14.%) respondents had moderate knowledge and a positive attitude, where $p=0.261$ ($p>0.05$), meaning there is no significant relationship between knowledge and attitude about HPV infection in female nursing students. This is in line with Villanueva et al. (30), who show that most respondents have moderate knowledge (54.34 ± 0.9 %) and a positive attitude (2.34 ± 0.03 %) because they still do not know about HPV infection in terms of etiology, people at risk, diagnosis, and treatment. Winarto et al. (31) conclude that several factors can affect attitude, such as a high level of father's education, which tends to make respondents have high concerns if the family or closest people will get cervical cancer, the influence of the mother's education level when receiving rumor related to HPV from the family, and the age of respondents less than 25 years, which makes them easy to believe and look for sources of information. On the contrary, Fitri and Akbar (11) indicate that 77 (51.7 %) respondents had moderate knowledge and 122 (81.3 %) had a good attitude, with a p-value of 0.047 ($p < 0.05$) because students get information from the media and experience, even though they have not studied maternity. Attitude is influenced by three components, namely cognitive, affective, and conative (32). Our study concludes that affective and cognitive components affect the positive attitude of the respondents, where parents' age and educational background can influence both.

Our study's findings demonstrated that 146 (73.4 %) respondents had good knowledge about HPV vaccination. This study is consistent with Mulia et al. (33), who found that approximately 41 (50.0 %) nursing students had a good knowledge of the HPV vaccine because 65/8 % came from second- and third-year nursing students who have learned about maternity. This contradicts study findings by Dethan and Suariyani (34), showing that 50 % of respondents had moderate knowledge about HPV vaccination because the respondents were first-grade senior high school students who were not exposed to health information, which can affect the students' low knowledge. The questionnaire showed that most respondents could answer most of the questions correctly, except about the HPV vaccine as a secondary prevention, whereas vaccination is the primary prevention. Our study concludes that the source of information and parents' educational background impact the respondents' knowledge.

Our study showed 107 (53.8 %) students were positive about HPV vaccination. This is in line with Mulia et al. (33), where 78 (99.1 %)

respondents had a positive attitude about HPV vaccination because respondents had good knowledge about HPV vaccination (33). This research does not align with Rahmayanti et al. (35), where 51 (51 %) respondents had a negative attitude because of sufficient knowledge and was not maximized in obtaining information about HPV vaccination. Our study concludes that the positive attitude about HPV vaccination can be affected by good knowledge.

Our study found that 87 (43.72 %) respondents had good knowledge and a positive attitude about HPV vaccination, with $p = 0.021$ ($p < 0.05$), which means there is a significant relationship between knowledge and attitude about HPV vaccination. This is in line with Mulia et al. (33), where 78 (95.1 %) female students had good and moderate knowledge as well as a positive attitude about the HPV vaccination, with $p = 0.0001$ ($p < 0.05$), which shows a significant relationship because the majority of respondents were in their second and third years of nursing college, which already includes maternity classes (33). This is not in line with Lubeya et al. (36), where the p-value is 0.670 ($p > 0.05$), which indicates that there is no significant relationship because most respondents come from *Joint Research Management Office (*JRMO) and registrars, whose experience handling cases related to HPV is less than that of consultants. Our study concludes that the higher the female students' knowledge of HPV vaccination, the more positive their attitude is. This shows that, although almost all respondents have not learned more about maternity science because they are still first-year students, some respondents may have received information about HPV vaccination through media or experiences, such as social media. Therefore, it is expected that educational institutions can increase the dissemination of information about HPV infection and vaccination through social media.

This study has some limitations. First, reaching the target number of respondents in a month is difficult, so the authors collaborated with representatives of small groups to distribute questionnaires. Second, finding research journals with the same respondents as ours wasn't easy, so the authors added journals with health students as respondents.

CONCLUSION

Even though they have never learned about maternity, individuals can still gain knowledge from information sources where the information can increase knowledge so that it will affect individual attitudes. This study will encourage people to prevent HPV infection and implement vaccination programs. To achieve this, it is recommended that HPV vaccine providers be approached, education related to HPV infection and vaccines should be increased, and families and community leaders should be approached. Future researchers can also conduct multivariate analysis to examine the relationship of other factors such as age, respondents' educational background, parents' educational background, and information sources to attitudes about HPV infection and vaccines.

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Use of cucumber as a complementary intervention for preventing complications in hypertension

Uso del pepino como intervención complementaria para la prevención de complicaciones en la hipertensión

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SUMMARY

Introduction: *Most people use herbal medicine as a complementary treatment for chronic diseases. However, the need for optimal services for individuals with chronic diseases is paramount to help them maintain a healthy lifestyle consistently. This study aims to evaluate the effectiveness of the use of cucumber as a complementary intervention to prevent complications in patients with hypertension in Surabaya.* **Methods:** *The research design is a quasi-experimental pre-post test with a control group. The sample size in this study was 50 respondents in accordance with the criteria set by the researcher, that is, those who were not below 50 years old and suffered from hypertension for more than one year. And exclusion if there are complications from hypertension. The 50 samples were divided into two groups, with 25 receiving complementary cucumber treatment and 25 as control samples receiving regular drug administration.* **Results:** *The results showed that cucumber intervention significantly impacted the systolic and diastolic variables with p-values of 0.0001 and 0.001, respectively. This suggests a significant difference between pre-and post-intervention in the intervention group.* **Conclusion:** *A complementary-based nursing module intervention using effective herbal medicine like cucumber can help prevent hypertension complications. This approach represents a novel model in health literature and can serve as a valuable reference for medical education and nursing practice.*

Keywords: *Complementary nursing intervention, hypertension, cucumber.*

RESUMEN

Introducción: *La mayoría de las personas utilizan la medicina herbaria como tratamiento complementario para las enfermedades crónicas. Las personas con enfermedades crónicas necesitan recibir servicios óptimos que les ayuden a mantener un estilo de vida saludable de manera constante. Este estudio tiene como objetivo evaluar la efectividad del uso del pepino como una intervención complementaria para prevenir complicaciones en pacientes con hipertensión, en Surabaya.* **Métodos:** *El diseño de la investigación es un pre-post test cuasi-experimental con un grupo control. El tamaño de la muestra fue de 50 encuestados de acuerdo con los criterios establecidos, es decir, edad no inferior a 50 años, con hipertensión arterial desde hace más de un año. Y exclusión si hay complicaciones*

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de la hipertensión. Las 50 muestras se dividieron en 2 grupos, de los cuales 25 recibieron tratamiento complementario con pepino y 25 como muestras de control que recibieron administración regular del fármaco. **Resultados:** *Los resultados mostraron que la intervención con pepino tuvo un impacto significativo en las variables sistólica y diastólica con valores de p de 0.0001 y 0.001, respectivamente. Esto sugiere una diferencia significativa entre el pre y el post-intervención en el grupo de intervención.* **Conclusión:** *Proporcionar una intervención en el módulo de Enfermería utilizando hierbas medicinales complementaria como el pepino puede ayudar a prevenir las complicaciones de la hipertensión. Este enfoque representa un modelo novedoso en la literatura en salud y puede servir como una referencia valiosa para la educación médica y la práctica de enfermería.*

Palabras clave: *Intervención complementaria de enfermería, hipertensión arterial, pepino.*

INTRODUCTION

Indonesian Heart Association established that the goal of managing hypertension in patients with cardiovascular disease is to improve symptoms and signs, lower the frequency and duration of myocardial ischemia, and avoid death, myocardial infarction, and stroke. The blood pressure target recommended by various studies for hypertensive patients with cardiovascular disease is systolic blood pressure < 140 mmHg and/or diastolic blood pressure < 90 mmHg (1). Surabaya is one of the cities with the highest prevalence of hypertension in Indonesia, with 45 015 sufferers. The prevalence of hypertension based on measurements in the population aged 18 years is 34.1 %. From this prevalence, it is known that 8.8 % were diagnosed with hypertension (2).

As a health education institution, the Surabaya Ministry of Health Polytechnic strives to implement the tri-dharma of higher education, promoting healthy living and facilitating its staff to seek breakthroughs to support the community toward a healthy Indonesia. The concept of the tri-dharma of higher education in Indonesia establishes that the roles that academics must take in a creative economy ecosystem are: 1. Research, innovation, and product downstream. Academics have an important role in conducting research and innovation that can be applied in industry and society. Academics can conduct solution-oriented research on problems faced by industry and society. 2. Education and training. Academics can help improve the quality of human resources by providing education and training to students and the workforce. Academics can also help develop curricula and training programs that suit the needs of industry and society (https://www.researchgate.net/figure/The-concept-of-the-tri-dharma-of-higher-education-in-Indonesia-That-way-some-of-the_fig3_380237471).

It is acknowledged that many people use herbal medicine as a complementary treatment for chronic diseases. Hypertension treatment is lifelong and can be managed through non-pharmacological and pharmacological therapy (2). In patients with cardiovascular diseases, the goal of managing hypertension is to lower the frequency and duration of myocardial ischemia, alleviate symptoms, and avoid death and consequences such as myocardial infarction and stroke. Hypertensive patients, as chronic disease sufferers, require ideal services to help them maintain a healthy lifestyle consistently. This lifestyle must be followed regularly to prevent acute and long-term complications, necessitating service integration (3).

Thus, this study aimed to assess the effect of cucumber as a complementary nursing intervention to prevent complications in hypertension patients at the Pucang Sewu Community Health Center in Surabaya. A complementary approach in hypertension management means normal hypertension management is accompanied by herbal medicine (4). There is evidence that cucumbers have a hypotensive effect on blood pressure and a diuretic effect that lowers the amount of fluid circulating in the bloodstream, which can ultimately reduce the heart's workload. It can be said that therapy with cucumber extract works like blood pressure-lowering antihypertensive diuretic drugs (5). In addition, cucumber was chosen because it is easy to get, cheap, and commonly consumed by everyone in Indonesia.

METHODS

Study Design

This research uses a quasi-experimental design with a pre-post-test group design. It aims to analyze the effectiveness of implementing complementary nursing intervention with cucumbers to prevent complications in hypertension patients.

Participants

The population in this phase 2 study was hypertensive patients who visited the Pucang Sewu Community Health Center in Surabaya. The sample size was 50 respondents in accordance with the criteria set by the researcher, that is, those who were not below 50 years old and suffered from hypertension for more than one year. And exclusion if there are complications from hypertension. The 50 samples were divided into two groups, with 25 receiving complementary cucumber treatment and 25 as control samples (receiving regular drug administration).

Data Collection

The intervention group was given 50 grams of cucumber daily for three weeks. Respondents were asked not to consume other herbal products besides cucumber during this time. Anything consumed by respondents was noted daily, and there was also a reminder to eat cucumber daily. The cucumber given is of the *Cucumis sativus* kind, which is grated and extracted for the juice.

Ethical Consideration

This research has been ethically approved with ethical number EA/1532/KEPK-Poltekkes_Sby/V/2023.

Data Analysis

Data was analyzed through descriptive analysis using IBM SPSS.

RESULTS

This study examined gender, age, body weight, TB, duration of hypertension, history of taking antihypertensive drugs, and use of herbs (Table 1). Descriptive characteristics analyzed the data.

The distribution of characteristics for male gender in the cucumber group was four (8 %), and in the control group was eight (6 %), while

Table 1. Distribution of Characteristics of Hypertensive Patients in the Treatment and Control Groups

Demographic Characteristics	Group Cucumber (n=25)	Control (n=25)	Total (n=50)
Sex			
Man	4 (8 %)	8 (16 %)	12 (24 %)
Woman	21 (46 %)	17 (34 %)	38 (76 %)
Age (years)	52.28 ± 13.43	53.41 ± 10.61	55.18 ± 10.88
BW (kg)	66.12 ± 13.24	61.85 ± 11.11	61.79 ± 11.93
TB (cm)	158.28 ± 5.41	158.71 ± 5.37	158.09 ± 5.04
Duration of hypertension			
< 10 Years	21 (42 %)	22 (44 %)	43 (86 %)
>= 10 Years	4 (8 %)	3 (6 %)	7 (14 %)
Have you ever taken antihypertensive drugs?			
Once	12 (24 %)	4 (8 %)	16 (32 %)
No	13 (26 %)	21 (42 %)	34 (68 %)
Ever consumed herbs			
Once	2 (4 %)	2 (4 %)	4 (8 %)
No	23 (46 %)	23 (46 %)	46 (92 %)

BW: Body weight. TB:Body height.

the distribution of female gender in the cucumber group was 21 (42 %), and in the control group was 17 (34 %). Judging from the distribution of percentages of gender characteristics, it can be concluded that the majority or dominant gender in each group is female.

Based on the description in the age characteristics distribution, the mean ± SD value for the age of the cucumber group was 52.28 ± 13.43, and for the control group, it was 53.41 ± 10.61. It can be concluded that the age distribution for each group is, on average, 52 to 53 years. In the distribution of BW characteristics, BW in the cucumber group was 66.12 ± 13.24; in the control group, 61.85 ± 11.11, it can be concluded that the BW distribution for each group averages between 61 to 66 kg. The mean ± SD value for TB in the cucumber group was 158.28 ± 5.41; in the control group, it was 158.71 ± 5.37; it can be concluded that the TB distribution for each group averages around 158 cm. Duration of hypertension < 10 years in the cucumber group, there were 21 participants (42 %), and in the control group, there were 22 participants (44 %). For the duration of hypertension >=10 years, there were four participants (8 %) in the cucumber group and three participants (6 %) in the control group. Thus, the duration of hypertension < 10 years is the most common or dominant in the sample of this study.

In the distribution of people who have consumed hypertension medication, the cucumber group had 12 participants (24 %), compared to four participants (8 %) in the control group. In the group that never consumed hypertension medication, there were 13 participants (26 %), while the control group had 21 participants (42 %). The majority or dominant group in each group is those who never consumed hypertension medication in this research sample. Regarding the distribution of herbal consumption, the group that consumed cucumber had two participants (4 %), and the control group had two participants (4 %). In the group that never consumed herbs, there were 23 participants (46 %), and the control group had 23 participants (46 %). The majority or dominant group in each group is those who never consumed herbs in this research sample.

Table 2. Description of blood pressure of hypertensive patients in the treatment group and control group

Variable	Descriptive	Cucumber			Control		
		Pretest	Posttest	Δ	Pretest	Posttest	Δ
SBP							
(mmHg)	Minimum	110	110	-30	80	100	-30
	Maximum	160	140	0	160	155	50
	Mean	139.20	124.88	-14.32	126.47	126.40	-0.07
		14.48	8.61	10.58	17.93	10.80	16.98
DBP							
(mmHg)	Minimum	70	65	-20	50	70	-20
	Maximum	100	91	11	100	90	30
	Mean	83.00	77.84	-5.16	80.27	79.13	-1.13
		5.95	6.22	6.63	8.50	5.29	9.36

As shown in Table 2, for the pre-and post-systolic blood pressure variables, the mean ± SD score for the cucumber group was 139.20 ± 14.48 (mmHg) and 124.88 ± 8.61(mmHg), with a range of 110-160 and 110-140, respectively. The cucumber control group's scores were 126.47 ± 17.93 (mmHg) and 126.40 ± 10.80 (mmHg), ranging between 80-160 (mmHg) and 100-155 (mmHg). Based on the change or delta value for the cucumber group, the mean ± SD score was -14.32 ± 10.58; for the control group, it was -0.07 ± 16.98. The intervention group, both cucumber

groups, tended to experience a higher decrease in systolic blood pressure than the control group.

The mean ± SD in descriptive diastolic blood pressure for the cucumber group was 83.00 ± 5.95 (mmHg) and 77.84 ± 6.22 (mmHg), with a score range of 70-100 (mmHg) and 65-91 (mmHg), respectively. The cucumber control group's scores were 80.27 ± 8.50 and 79.13 ± 5.29, ranging from 50-100 and 70-90. Based on the change or delta value for the cucumber group, the mean ± SD score was -5.16 ± 6.63; for the control group, it was -1.13 ± 9.36. The cucumber intervention group tended to experience a higher decrease in diastolic blood pressure than the control group (Table 2).

The cholesterol (mg/dL) variable at pre and post shows that the mean ± SD score for the cucumber group was 219.88 ± 22.52 and 207.44 ± 38.35, with a score range of 177-267 and 122-292. The control group's scores were 215.47 ± 32.27 and 204.40 ± 35.25, with a range of 138-294 and 138-312. Based on the change or delta value for the cucumber group, the mean ± SD score was -12.44 ± 34.99, and for the control group, it was -11.07 ± 34.81. The data on changes in delta cholesterol in the intervention group indicate that the cucumber group tended to experience a higher decrease than the control group (Table 3).

Table. 3. Description of cholesterol levels of hypertensive patients in the treatment group and control group

Variable	Descriptive	Cucumber			Control		
		Pretest	Posttest	Δ	Pretest	Posttest	Δ
Cholesterol (mg/dL)	Minimum	177	122	-70	138	138	-91
	Maximum	267	292	46	294	312	123
	Mean	219.88 ± 22.52	207.44 ± 38.35	-12.44 ± 34.99	215.47 ± 32.27	207.44 ± 38.35	-11.07 ± 34.81

The comparison between the cucumber intervention and the control for the systole and diastole variables during the pre-stage obtained p-values of 0.0001 and 0.0001, respectively, indicating a significant difference between the cucumber intervention groups and the control during the pre-data. Based on the mean values, it can be observed that the systole and diastole values of the cucumber intervention group during the pre-stage were higher than those of the control. Similarly, the systole and diastole values of the cucumber intervention group at the post-stage were higher than those of the control.

The comparison between the cucumber intervention and the control for the systole and diastole variables at delta or change showed p-values of 0.0001 and 0.0001, respectively, indicating a significant difference between the cucumber intervention group and the control at the time of the delta data. Based on the mean values, the systole and diastole delta values in the cucumber intervention group were lower than in the control.

The comparison between the cucumber intervention and the control for the cholesterol variable in the pre, post, and delta data showed p-values of 0.146, 0.285, and 0.768, respectively, indicating no significant difference between the cucumber intervention groups and the control in the pre, post, and delta data.

Based on the test results in Table 4, the comparison between pre- and post-treatment in the cucumber intervention group for the systole variable showed p-values of 0.0001 and 0.001, respectively, indicating a significant difference between pre- and post-treatment. However, for the control group, the p-values were 0.150 and 0.840, respectively, indicating no significant difference between pre- and post-treatment.

Table 4. Comparative test results on systolic and diastolic blood pressure, and cholesterol

Variable	Group	Pretest Mean ± SD	Posttest Mean ± SD	Δ Mean ± SD	p-value
SBP					
(mmHg)	Intervention	139.20 ± 14.48	124.88 ± 8.61	-14.32 ± 10.58	0.0001
	Control	126.47 ± 17.93	126.40 ± 10.80	-0.07 ± 16.98	0.840
	p-value	0.0001	0.0001	0.0001	
DBP	Intervention	83.00 ± 5.95	77.84 ± 6.22	-5.16 ± 6.63	0.006
(mmHg)	Control	80.27 ± 8.50	79.13 ± 5.29	-1.13 ± 9.36	0.304
	p-value	0.0001	0.0001	0.037	
Cholesterol	Intervention	219.88 ± 22.52	207.44 ± 38.35	-12.44 ± 34.99	0.088
(mg/dL)	Control	215.47 ± 32.27	204.40 ± 35.25	-11.07 ± 34.81	0.001
	p-value	0.146	0.285	0.768	

SBP: systolic blood pressure; DBP: diastolic blood pressure.
*It is significantly different if the p-value is <0.05

Similarly, the comparison between the pre- and post-in-the-cucumber intervention groups for the diastole variable showed p-values of 0.006, 0.023, and 0.005, indicating a significant difference. For the control group, the p-value was 0.304, indicating no significant difference between the pre- and post-in-the-cucumber intervention groups.

The comparison between the pre- and post-in-the-cucumber intervention groups for the cholesterol variable showed p-values of 0.088 and 0.616, indicating no significant difference between the two groups. However, for the control intervention group, the p-values were 0.040 and 0.001, indicating a significant difference between the pre- and post-in-the-control group.

DISCUSSION

Most hypertensive patients who have had hypertension for a long time and have taken medication have also consumed herbal medicine, namely around 16 %. In the cucumber herbal group, it was found that there were differences in systolic and diastolic blood pressure during pre-treatment. Our results indicate that the cucumber intervention group's systolic and diastolic blood pressure values during pre-treatment were greater than the control. However, in the cucumber group, the mean systolic and diastolic blood pressure values at post-treatment were lower than in the control group. This study found that hypertensive patients in the cucumber group had a significant reduction in systolic and diastolic blood pressure values during pre- and post-treatment (2).

Research on outpatient hypertensive patients found no difference between the treatment and control groups between initial systolic ($p=0.528$) and initial diastolic ($p = 0.184$) blood pressure. There was a difference between systolic and diastolic blood pressure in the treatment group before and after treatment. Meanwhile, in the control group, there was no significant difference in systolic blood pressure; however, there was a difference in diastolic blood pressure (5). A p-value of 0.304 was obtained in the control group, indicating that there was no difference in diastolic blood pressure between the pre- and post-intervention control groups.

Cucumbers have various nutritional contents, including potassium, calcium, and magnesium. The sodium/potassium ratio is also related to blood pressure. Reducing sodium intake by 100 mmol per day and potassium consumption by up to 70 mmol per day is predicted to decrease systolic blood pressure by 3.4 mmHg (6). Potassium intake affects blood vessels. It reduces peripheral vascular resistance, which can directly dilate arteries, increase water and sodium excretion from the body, suppress renin-angiotensin secretion, and stimulate sodium-potassium pump activity.

Cucumbers are diuretic because of their high-water content, which contributes to lower blood pressure. The elements phosphorus, folic acid, and vitamin C in cucumbers are useful for relieving tension or stress (7). This suggests that in hypertensive patients, blood pressure can be lowered with non-pharmacological therapy, such as cucumber juice, which contains substances that contribute to reducing blood pressure. Our data are supported by Aisyah and Probosari, who showed a reduction in diastolic blood pressure of 6.67 mmHg (8). In addition, Elya et al. (9) strengthen this hypothesis, showing that there is an effect of reducing blood pressure in the elderly with non-pharmacological treatment by administering cucumber juice (9). Meanwhile, Hermawan and Novariana (10) found that ethanol extract from cucumber skin could have the potential as an anti-cholesterol. However, our present results do not support these results since the complementary cucumber treatment did not change significantly pre and post-cholesterol values (11).

In the present study, the control group was hypertensive patients who received only pharmacological treatment. Non-pharmacological treatment is an integral part of the management of hypertension. It includes lifestyle changes in the form of special diets and the reduction of salt, alcohol, and saturated fat. Weight reduction, exercise, salt intake restriction, not smoking, avoiding stress, increased physical activity, and time-restricted meals have also been effective (12). Meanwhile, pharmacological management of hypertension consists of several alternatives: diuretics, sympathetic blockers, beta-blockers, vasodilators, angiotensin-converting enzyme inhibitors, calcium antagonists, and angiotensin II receptor blockers (11).

Kandarini stated that some hypertensive sufferers think that hypertension can be cured, leading them to stop taking medication. While there is no cure for high blood pressure, patients must take steps that matter, such as making effective lifestyle changes and taking BP-lowering medications as their physicians prescribe (12-14). Medication does not always function to cure; instead, it has four functions: to prevent disease, control disease, eliminate symptoms/complaints, and cure the disease. Pharmacological therapy can be given alone or in combination with antihypertensives (15). The choice of antihypertensive medication can be based on the presence or absence of special conditions such as comorbidities or complications (16). There are many different types of antihypertensive agents, and they have different mechanisms of action to lower blood pressure. Some remove extra fluid and salt from the body, while others induce vasorelaxation or slow the heartbeat. The drugs widely used as antihypertensives are synthetic drugs whose active substances are derived from chemical compounds, posing a high risk of side effects with long-term use (13). Lifelong hypertension treatment is also relatively expensive due to its many side effects, leading sufferers to disobey therapy often and turn to other alternatives, such as herbal or non-pharmacological drug therapy (14).

Regarding gender, the majority of respondents in this study were predominantly female. This aligns with Aini (15), who showed that most respondents were female, specifically 30 people (75%) out of 40 respondents. These results are also similar to those reported by Yaghoobi et al. (17), showing that of 55 respondents, 31 were female. In younger age groups, men tend to suffer from hypertension more than women because women have estrogen as a protector against the risk of cardiovascular disease. However, as age increases and menopause sets in, the chances of women and men suffering from hypertension become equal. According to Anggraini et al., it was found that more than half of the hypertension sufferers were women, around 56.5%. The most common or dominant result of this study is that the duration of hypertension is less than 10 years (18).

Paramitha et al. showed that 70.9% of hypertensive patients use natural medicines as a complementary therapy (19). Several studies have demonstrated that natural medicine lowers blood pressure (20,21). Medicinal herbs have several active substances with pharmacological and prophylactic properties that can be used to treat hypertension and are used as a complementary therapy (16). Traditional herbs for the management of hypertension include turmeric (rhizome), water gourd (flesh and fruit juice), watercress (all parts), ceplukan (all parts), alang-alang (root), noni/pace (fruit), orange lime (fruit juice), cat's whiskers (leaves) and bay leaves (22).

Complementary and alternative healthcare and medical practices are a group of diverse medical and healthcare systems, practices, and products that are not presently considered part of conventional medicine. Complementary medicine refers to therapies that complement traditional Western (or allopathic) medicine and are used together with conventional medicine, and alternative medicine is used instead of conventional medicine. Alternative medicine refers to therapeutic approaches taken in place of traditional medicine and used to treat or ameliorate disease. Evidence shows that alternative medicine, such as herbs to treat chronic illnesses, is part of everyday life for many people and appears to be increasing (23,24). Based on their experience and communities, people believe alternative medicine is effective with fewer side effects than prescription drugs (25,26). Considering that many hypertensive patients are elderly, therapy using herbal medicine is the most effective because it is easily accessible, cheap, and can even be obtained for free in the surrounding area (24,27,28).

CONCLUSION

The results showed that cucumber intervention for the systole-diastole variable obtained a p-value of 0.0001 and 0.001, where the value was <0.05, which means there was a significant difference between pre and post-in the intervention group. Providing complementary nursing module interventions based on using herbal medicine is effective in preventing hypertension and its complications. This has become one of the newest models in health literature. It can be used as a medical reference in education and implementation of nursing actions.

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The effect of mindfulness interventions on blood pressure and stress in hypertensive patients: A Literature Review

El efecto de las intervenciones de mindfulness sobre la presión arterial y el estrés en pacientes hipertensos: una revisión de la literatura

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SUMMARY

Introduction*: Hypertensive patients have received appropriate treatment, but some still show uncontrolled blood pressure. One way to control blood pressure is to adopt a healthy lifestyle and manage stress, with or without drug therapy. This study aimed to review the literature on the effectiveness of mindfulness interventions on hypertensive patients' blood pressure and stress, providing a focused and comprehensive understanding of the topic.* **Methods***: A comprehensive literature review of randomized control trials reporting the effectiveness of mindfulness programs on blood pressure and stress in hypertensive patients served as the method. Relevant articles published from January 2019 to December 2023 are in English and open access. We conducted article searches in four databases: Scopus, ScienceDirect, ProQuest, and CINAHL, ensuring a thorough and exhaustive search.* **Results:** *There were 14 articles reviewed. The number of participants was 906. Five studies used mindfulness-based stress reduction (MBSR). One study used the MBSR intervention program and samavittri pranayama (Sama Vritti is Sanskrit for equal breathing, is a pranayama technique). Most articles found that the mindfulness intervention significantly reduced the average systolic and diastolic blood pressure in the intervention group compared to the initial value. The systolic blood pressure of the control group significantly decreased (p = 0.001). Four studies were conducted in the clinic to measure blood pressure. Two studies used clinical and ambulatory measurements. Three studies used ambulatory blood pressure measurements. Eight articles show the effectiveness of mindfulness in reducing stress. The study showed significant differences between the experimental and control groups in the mean scores of positive stresses (p = 0.001) and negative stress (p = 0.001).* **Conclusion:** *The thoroughness of our research process and the validity of the findings underscore the significant role of mindfulness in reducing stress levels and blood pressure, including systolic and diastolic measurements, in individuals with hypertension.*

Keywords: *Blood pressure, hypertension, mindfulness, stress.*

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RESUMEN

Introducción: *Los pacientes hipertensos han recibido el tratamiento adecuado, pero algunos aún presentan presión arterial no controlada. Una forma de controlar la presión arterial es adoptar un estilo de vida saludable y manejar el estrés, con o sin terapia farmacológica. El objetivo de este estudio fue revisar la literatura sobre la efectividad de las intervenciones de mindfulness en la presión arterial y el estrés de los pacientes hipertensos.* **Métodos:** *Una revisión de la literatura de ensayos controlados aleatorios que informan sobre la efectividad de los programas de mindfulness en la presión arterial y el estrés en pacientes hipertensos sirvió como método. Los artículos relevantes publicados desde enero de 2019 hasta diciembre de 2023 están en inglés y son de acceso abierto. Se realizaron búsquedas de artículos en cuatro bases de datos: Scopus, Science Direct, Proquest y CINAHL* **Resultados:** *Los resultados arrojaron un total de 14 artículos que fueron revisados. Hubo un total de 906 participantes. Cinco estudios utilizaron la reducción de estrés basada en la atención plena. (MBSR). Un estudio incluyó el programa terapéutico MBSR con la respiración cuadrada o samavritti pranayama. La mayoría de las publicaciones indicaron que la intervención de mindfulness tuvo un impacto considerable en la reducción tanto de la presión arterial sistólica como diastólico promedio en el grupo de intervención, en comparación con la medición inicial. La presión arterial sistólica del grupo de control mostró una caída considerable (p = 0,001). Se llevaron a cabo cuatro investigaciones clínicas para evaluar la presión arterial. Dos investigaciones utilizaron tanto medidas clínicas como ambulatorias. Tres estudios utilizaron lecturas de presión arterial ambulatoria. Hay un total de ocho artículos que proporcionan evidencia de la eficacia del mindfulness en la reducción del estrés. La investigación reveló disparidades sustanciales entre los grupos experimental y de control en las calificaciones promedio de estrés positivo (p = 0,001) y estrés negativo (p = 0,001).* **Conclusión:** *En pacientes con hipertensión, se ha demostrado que el mindfulness es beneficioso para reducir los niveles de estrés y la presión arterial, tanto sistólica como diastólica.*

Palabras clave: *Mindfulness, estrés, hipertensión, presión arterial.*

INTRODUCTION

Hypertension is a major risk factor for cardiovascular disease, the deadliest non-communicable disease. Hypertension is the leading cause of cardiovascular disease and premature death worldwide, impacting around 1.2 billion individuals globally (1,2). According to the World Health Organization (WHO) (2011), the global prevalence of hypertension is estimated to be one billion individuals. The incidence of hypertension is expected to rise significantly, with a projected 29 % of individuals globally experiencing hypertension by 2025. Hypertension is responsible for around 8 million fatalities annually (2). According to the Indonesian Ministry of Health, the prevalence of hypertension among Indonesians is 1 in 3, and this rate is consistently rising annually (3). The data from the Regional Health Research (Riskesdas) conducted in 2018 indicate a rise in hypertension from 25.8 % in 2013 to 34.1 % in 2018. In 2018, the prevalence of hypertension in Indonesia was 34.1 %, with the highest prevalence in South Kalimantan at 44.3 % and the lowest in Papua Province at 22.2 % (4).

Hypertension is commonly known as the silent killer due to the absence of symptoms in individuals with high blood pressure. Most patients report feeling healthy and not experiencing any symptoms of illness. This condition significantly elevates the likelihood of developing heart disease, stroke, kidney failure, and other fatal conditions, resulting in substantial healthcare expenses (4). The primary determinants contributing to reducing blood pressure are environmental influences and behavioral choices (6). One method of managing high blood pressure in hypertensive patients is by the adoption of a healthy lifestyle and the implementation of disease control measures, with or without the use of medication (4).

This leads to heightened emotional and behavioral alterations and interferes with cognitive and biological processes. Contemporary modifications in lifestyle contribute to a multitude of mental health issues. The WHO reports that around 250 million individuals are impacted by mental illness (7). Stress is a prevalent occurrence in human life, including among individuals with hypertension. Any internal or external factor that disturbs the homeostasis balance will trigger a stress response and subsequent adaptation. According to the Roy Adaptation Model (RAM),

which are (a) stimuli, (b) coping processes, and (c) adaptive responses used to guide interdisciplinary education, knowledge development, practice, and research, a stimulus will regulate the body's coping processes through regulators and cognators. The cognator subsystem is related more to attention, memory, learning, problem-solving, decision-making, excitement, and defense status. The four modes of adaptation defined in Roy Adaptation Model are physiologic, self-concept, role function and interdependence modes (8). Nurses can play a role in initiating and supporting efforts that address the health and social needs of the community, particularly among groups such as hypertension patients who face stress. They can do this by offering mindfulness therapies. Despite receiving sufficient medication, multiple research findings indicate that hypertension patients continue to exhibit suboptimal blood pressure levels. Less than 25 % and 10 % of hypertension individuals in industrialized and developing nations, respectively, can attain blood pressure management. Hence, there is a requirement for further therapies to decrease blood pressure and alleviate stress.

Prior studies have thoroughly examined the efficacy of mindfulness therapies in reducing stress and blood pressure (9-21). These studies have documented a reduction in blood pressure and stress levels among participants in the mindfulness intervention group compared to those in the control group. This literature review aims to present data on the efficacy of mindfulness therapies in lowering blood pressure and stress levels.

METHODS

Search Strategy and Selection Criteria

The search was conducted on pertinent publications published between January 2019 and December 2023, utilizing English, open access, full-text resources from four databases: Scopus, ScienceDirect, ProQuest, and CINAHL. The search was conducted using the PICO framework, which involved the following components: Population (individuals afflicted with hypertension), Intervention (attention and prayer or dhikr or spirituality), Comparison alone between the intervention and control groups, and Outcome (blood pressure and stress). Searches employed the Boolean operators "AND" and "OR" in conjunction with the terms "mindfulness," "Stress," "Blood pressure," and "Hypertension."

Selection of Studies

The literature review was performed and documented following the PRISMA and Rayyan flowchart criteria. The initial step was utilizing Rayyan to identify duplicate entries and conducting an abstract selection process to ensure alignment with the specified inclusion and exclusion criteria. Subsequently, the articles were conducted.

Eligibility Criteria

1) Patients with high blood pressure who are 18 years or older, regardless of whether they receive therapy.
2) Interventions: Mindfulness interventions such as Mindfulness-Based Stress Reduction (MBSR) or similar approaches.
3) Comparator: The intervention group received mindfulness, while the control group received treatment as normal.
4) Results: The findings indicate the measurement of blood pressure and the value of pound currency.
5) The research design includes a randomized clinical trial, cross-sectional survey, prospective clinical trial, associative analytic, quasi-experimental, cluster randomized controlled trial, experimental study, two-group single-site clinical trial design, retrospective study, cross-sectional design, descriptive study, and a two-site randomized clinical trial.
6) The English language.
7) Timeframe of Publication: January 1, 2019, to December 1, 2023.
8) Article category: Open access and full text.

Exclusion Criteria

Hypertensive individuals who are currently breastfeeding, pregnant, or have already undergone mindfulness therapy

RESULTS

The remaining 38 publications were evaluated for eligibility based on their entire text using the title, abstract, publication type, and language. Ultimately, 12 papers were included in the systematic observation.

The author found a total of 1,326 publications by utilizing four different databases. Specifically, Scopus yielded 128 articles, CINAHL provided 308 articles, ScienceDirect contributed 284 articles, and ProQuest yielded 606 articles. After eliminating duplicate articles in eight sources and excluding articles that did not meet the PICO criteria, 367 articles were included in the screening procedure. The article writing process involved utilizing the Rayyan tool to filter articles based on their title and abstracts. This resulted in a total of 251 articles, with the remaining 116 articles specifically focusing on mindfulness. An eligibility selection was conducted based on the publication type and language, followed by an assessment of suitability using the full text. Subsequently, 29 articles were obtained for further selection, with 14 articles meeting the inclusion criteria and 15 being excluded due to insufficient study quality.

Additional search results can be observed by referring to the flow diagram in Figure 1, which represents the literature search process.

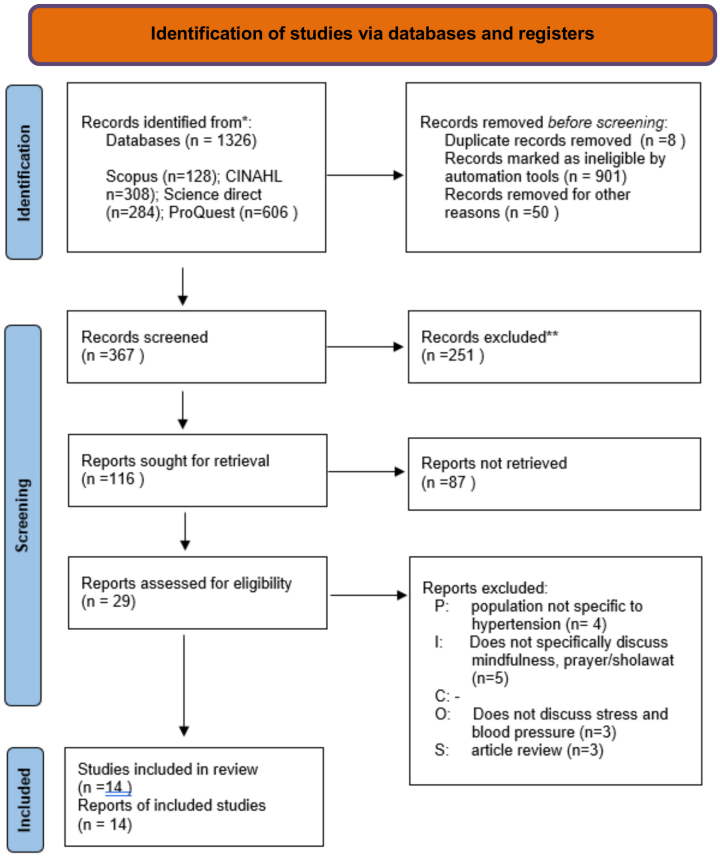

Figure 1 PRISMA flowchart
The final outcomes consist of 14 publications that align with the research

Table 1

Characteristics of Reviewed Studies

No	Title, Author, Year of publication	Method	Results
1	Effects of Mindfulness-Based Stress Reduction on Blood Pressure, Mental Health, and Quality of Life in Hypertensive Adult Women: Randomized Clinical Pilot Study (5)	Design: Randomized clinical trial Subjects: The study included 80 women with hypertension selected from the Imam Ali Healthcare Center in Iran. These participants were divided into two groups: an intervention group consisting of 40 women and a control group consisting of another 40 women. Variable Independent: mindfulness-based stress reduction (MBSR) Dependent: blood pressure, stress, depression, anxiety, and quality of life Instrument: Depression, Anxiety, and Stress Scale-21 (DASS-21) and 36-Item Short Form Survey questionnaire (SF-36) Analysis: Independent t-test, paired t-test, and MANCOVA test	Following the implementation of the mindfulness intervention, the intervention group's average systolic and diastolic blood pressure decreased significantly compared to the baseline measurement. The control group had a systolic blood pressure of 140.18 ± 14.27 mmHg compared to 142.15 ± 10.23 mmHg and a diastolic blood pressure of 84.62 ± 9.22 mmHg compared to 88.51 ± 8.54 mmHg (P = 0.001). The intervention group saw a noteworthy improvement in quality of life and decreased stress, anxiety, and depression levels (P<0.05).
2	The Effect of Adapted Mindfulness Training on Participants With High Offices Blood Pressure: MB-BP Study: Randomized Clinical Trial (6)	Design: Randomized clinical trial (RCT) Subject: The study included 201 individuals diagnosed with hypertension. 101 were assigned to the intervention group, and 100 were assigned to the control group. Variables: Independent: Mindfulness training Dependent: Blood pressure and stress Instrument: 10 Felt items Stress Scale; Five-Faceted Mindfulness Questionnaire. Analysis t-test results	The study revealed a noteworthy decrease in systolic blood pressure in the mindfulness group (n=100) compared to the control group. The main result was the difference in unmonitored clinic systolic blood pressure after 6 months. The study demonstrated a decrease in systolic blood pressure of 5.9 mm Hg (95% CI, –9.1 to –2.8 mm Hg) compared to the control group's decrease of 4.5 mm Hg at 6 months (95% CI, –9.0 to –0.1 mm Hg) from the initial measurement. The DASH (Dietary Approaches to Stop Hypertension) diet score was 0.32 (95% CI, –0.04 to 0.67), while the mindfulness score was 7.3 (95%).
3	Mindfulness-Based Exercise to Reduce Blood Pressure and Stress Priest (7)	Design: Cross section Subjects: A total of 11 priests, ranging in age from 27 to 95 years old, Variable Dependent: Blood pressure, stress Independent:	Evidence of the efficacy of mindfulness-based therapies has been shown through decreased stress levels and lowered blood pressure after applying mindfulness practices. The average systolic blood pressure

Continued in pag. S271…

…continuation Table 1. Characteristics of Reviewed Studies.

No	Title, Author, Year of publication	Method	Results
		Mindfulness-Based Practice Instrument: Perceived Stress Scale (PSS), blood pressure observation sheet Analysis: t test; repeated measures analysis of variance (RM-ANOVA)	e (SBP) of 121.06 mm Hg and diastolic blood pressure (DBP) of 76.72 mm Hg are within the target blood pressure range below 150/80 mm Hg. Practicing mindfulness has the potential to reduce blood pressure levels.
4	Mindfulness-Based Meditation Sessions May Result in Reduction of Cardiovascular Risk in Hypertension Patients: A Pilot Study (9)	Design: Clinical trials prospective, Subjects: 60 individuals Variable Independent: Single Mindfulness-Based Meditation Dependent Variable: Blood Pressure Instrument The International Physical Activity Questionnaire (IPAQ-6) is a standardized survey used to assess levels of physical activity The one-way analysis of variance (ANOVA) is used to analyze ABPM data, whereas the two-way ANOVA is used to analyze blood pressure	As determined by statistical analysis, hemodynamic measures between the treatment group and the control group did not significantly change. However, the morning systolic BP exhibited a statistically significant decrease following the practice of meditation. The systolic blood pressure (SBP) during the morning surge was found to be significantly lower after the meditation session ($t=3.497, P<0.05$). Furthermore, a significant trend was observed in the mean blood pressure (MBP) readings between sessions after meditation, with a t-value of -2.648 and $p< 0.05$. The findings of our investigation revealed a reduction in morning systolic blood pressure. There was a noticeable decrease in median blood pressure (MBP) measurements throughout the day ($p = 0.057$). Nevertheless, the MBSR intervention did not result in any significant alteration in clinical blood pressure. Thus, a single application of MBSR has the potential to be a significant strategy in reducing cardiovascular risk in sedentary hypertensive women.
5	Benefits of Mindfulness Meditation in Lowering Blood Pressure and Stress in Arterial Hypertension Sufferers (10)	Design: Randomized controlled trial Subjects: 24 individuals with normal high blood pressure and 18 individuals with grade I hypertension. Variable Meditation technique: mindfulness meditation blood pressure, anxiety, stress and depression Instruments:	Initially, the intervention group had slightly higher blood pressure levels that were not statistically significant, while the second group had similar values when assessed by ambulatory blood pressure monitoring (ABPM). By week 8, the intervention group had significantly lower ambulatory blood pressure monitoring scores the three

Continued in pag. S272„

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No	Title, Author, Year of publication	Method	Results
		The Perceived Stress Scale, Depression, Anxiety and Stress Scale (DASS-21), and Five-Sided Mindfulness Questionnaire (FFMQ) are all measures used to assess levels of stress, depression, anxiety, and mindfulness Analysis: Comparative descriptive	the control group. The intervention group had average blood pressure readings of 124/77 mmHg, whereas the control group had 126/80 mmHg ($p < 0.05$). Additionally, the intervention group had average readings of 108/65 mmHg, whereas the control group had 114/69 mmHg ($p < 0.05$). The overnight systolic blood pressure was associated with lower clinically observed systolic pressure levels (130 mmHg vs 133 mmHg; $p = 0.02$). During the eighth week, the mindfulness group exhibited reduced diastolic blood pressure levels measured by clinical assessments.
6	Effectiveness of Mindfulness-Based Group Therapy on Stress Perception, Cognitive Emotional Regulation, and Self-Care Behavior in Hypertension Sufferers (11)	Design: The study utilized a quasi-experimental design that included a pre-test, post-test, follow-up, and control group Subjects: All individuals diagnosed with hypertension were referred to health centers on Kish Island, Iran, between March and June 2010. The research sample had 32 candidates selected based on meeting the requirements using the purposive selection method. Subsequently, the participants were randomized to experimental and control groups in a random manner Variables: Stress Mindfulness-Based Group Therapy, Stress Perception, Cognitive Emotional Regulation, and Self-Care Behavior Instrument: Perceived Stress Scale Analysis: Utilizing the repeated measures analysis of variance function in SPSS version 22. The test's significance threshold is 0.05	The results showed significant differences between the experimental and control groups in the mean scores of positive stresses ($p=0.001$), negative stress ($p=0.001$), positive emotions ($p=0.001$), negative emotions ($p=0.001$), treatment regimen ($p=0.003$), diet ($p=0.011$), and disease management ($p=0.026$) at post-test and follow-up. However, there was no significant difference between the food label mean scores ($p=0.195$).
7	Dhikr and Prayer Guidance Regarding Peace of Mind and Controlling Blood Pressure (12)	Design: quasi-experimental with a pretest-post-posttest approach Subject: 24 older individuals with hypertension Variables:	The study's findings indicated that the p-value was 0.036, less than the significance level of 0.05. This suggests that the intervention of dhikr and prayer direction did not have a meaningful impact on the mental calm

Continued in pag. S273…

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No	Title, Author, Year of publication	Method	Results
		Independent: Instructions for Dhikr and Prayer to Attain Inner Tranquility. Individuals who rely on someone else for financial support or care Dependent: Regulation of Blood Pressure Instrument: observation form Analysis: Wilcoxon Signed-Rank Test and T-test	tof older individuals with hypertension in the intervention group. The examination of blood pressure before and after in the intervention group yielded a p-value of 0.0001 <0.05, indicating a significant impact of the intervention group variable (systole) on blood pressure.
8	Effects of the Mindfulness-Based Blood Pressure Reduction (MB-BP) program on depression and neural structural connectivity (13)	Design: Randomized clinical trials (RCT) Subjects: The study included 36 individuals, with 14 groups assigned to the MBBP intervention and 22 groups assigned to the control condition. The inclusion criteria for the entire randomized controlled trial (RCT) were limited to those with hypertension. High blood pressure is defined as having a systolic blood pressure (SBP) of 120 mm Hg or higher or a diastolic blood pressure (DBP) of 80 mm Hg or higher. To participate in the study, individuals must be able to communicate effectively in English, including speaking, reading, and writing. The study included adults who were 18 years of age or older, regardless of their gender or racial/ethnic background Variables: Independent: Mindfulness-Based Blood Pressure Reduction Program (MB-BP) Dependent: Reduction in arterial blood pressure Instrument: Guidelines set out by the American Heart Association Analysis: Repeated measures ANOVA (RM ANOVA), standard linear regression	DTI data analysis identified notable group disparities in various white matter brain pathways associated with the limbic system and/or blood pressure. Measures of interoception and depression were substantially linked to specific alterations in brain structural connectivity. The study concludes that MB-BP causes alterations in the structural connections inside the brain, which may facilitate positive improvements in depression and the ability to perceive internal bodily sensations in persons with hypertension.
9	Comparing the effectiveness of mindfulness-based stress reduction therapy and Islamic spirituality therapy on the quality	Design: Empirical investigation employs an experimental approach, utilizing a pretest-post-test design with a control	After the intervention, the MBSR and spiritual therapy group substantially improved their overall quality of life score (p<0.001). However, the control

Continued in pag. S274…

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No	Title, Author, Year of publication	Method	Results
	of life of hypertensive heart patients (14)	group. Subject: A total of 75 participants were chosen and allocated into two experimental groups and one control group by a random selection process, ensuring that each group comprised 25 individuals. Variable Independent: MBSR spiritual therapy with an Islamic perspective. Dependent: Quality of life Instrument: The McNew quality of life questionnaire and John Kabbat's MBSR Protocol are two assessment tools used to measure different aspects of well-being Analysis: ANOVA and paired t-test	group's overall quality of life score did not change after the intervention ($p = 0.10$). There was a notable disparity among the three groups in terms of the overall quality of life score. Specifically, the average difference in the quality-of-life score between the spiritual therapy group before and after the intervention was larger than the other groups. The statistical significance of the result is extremely high, with a p-value less than 0.001.
10	Effects of mindfulness on lifestyle behavior and blood pressure: A randomized controlled trial (15)	Design: A single-site clinical trial with two arms was designed. Subjects: A total of 52 female subjects were included in the study. There are 20 participants in the study. HPP, with a sample size of 16. The inclusion criteria encompassed individuals with hypertension, regardless of whether they were taking prescribed antihypertensive medication. The exclusion criteria encompassed current pregnancy or nursing, substance misuse, and chemotherapy. Additional exclusions encompassed people engaged in meditation or yoga, adhering to a weight loss regimen or other behavioral intervention, or unable to fully commit to the study's duration. Furthermore, individuals with untreated mental issues and an inability to speak or read English were also excluded Variables: Independent: Caution Dependent: Lifestyle behaviors that reduce blood pressure Instrument:	The greater decrease in blood pressure observed in the MAP group provides further evidence that the mindful meditation technique is a safe and effective method for reducing blood pressure in persons with hypertension. A notable correlation was seen between systolic blood pressure (SBP, $p = 0.005$) and diastolic blood pressure (DBP, $p = 0.003$) in relation to the time difference between mean arterial pressure (MAP) and high pulse pressure (HPP). The average reduction in systolic blood pressure (SBP) from the beginning of the study to week 13 was 19 mm Hg (from 138 ± 15 mmHg to 119 ± 6 mm Hg) for the MAP group, while it was 7 mmHg (from 134 ± 18 mm Hg to 127 ± 22 mm Hg) for the HPP group. Comparatively, the MAP group had significantly larger reductions in DBP compared to the HPP group, with a fall of 12 mm Hg (from 89 mm Hg ± 11 to 77 ± 7 mm Hg) and a decrease of 1 mm Hg (from 81 ± 16 mm Hg to 80 ± 18 mm Hg), respectively. The mean systolic blood pressure (SBP) was consistently lower that

Continued in pag. S275…

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No	Title, Author, Year of publication	Method	Results
		Rapid Eating and Activity Assessment for Patients (REAP) is a tool for quickly evaluating and measuring a patient's eating habits and physical activity levels. The Exercise Behavior Questionnaire (EB) comprises six items, while the Brief Treatment Questionnaire 1 (BMQ) is also included. Analysis: T-test	week in the MAP group compared to the HPP group, even though two participants in the MAP group had discontinued their antihypertensive medication. A similar pattern was noticed in DBP, although the disparities between the two groups were less pronounced. The MAP group generally exhibited a more pronounced downward trend in blood pressure (BP) than the HPP group, particularly in systolic blood pressure (SBP).
11	Attention to stress and anxiety management in nursing students in clinical simulation: A quasi-experimental study (16)	Design: Quasi-experimental research with a non-equivalent control group design Subject: There is a total of 42 nursing students, including 21 students in the experimental group (EG) and 21 students in the control group (CG) Variables: Dependent: Blood pressure, heart rate, stress Independent: Attention Instrument: VAS refers to the self-administered stress analog scale, while STAI stands for the State-Trait Anxiety Inventory The FFMQ, which stands for Five-Faced Mindfulness Questionnaire, is a questionnaire used to assess mindfulness. Analysis: Descriptive statistics and inferential statistics Mann-Whitney and Wilcoxon tests	During the prebriefing phase, the physiological measures showed improvement. However, these indicators remained considerably lower in the experimental group, with a diastolic blood pressure p-value of 0.032 and a heart rate p-value of 0.048. The management of stress levels ($p = 0.029$) and anxiety ($p = 0.016$) were improved. Both groups in the debriefing session exhibited statistically significant decreases in multiple physiological indicators and reductions in stress and anxiety. There were no apparent alterations in attention. A statistically significant difference in stress was seen only during the preadministration phase ($p = 0.029$), with a medium effect size ($r = 0.33$). At the beginning of the study, no statistically significant differences were seen between the groups in terms of global scores or domain scores.
12	The Influence of Mindfulness Level on Drug Adherence in Hypertension sufferers (17)	Design: This is a cross-sectional, descriptive study. Subjects: 68 individuals diagnosed with hypertension Variables: Independent:	There were no notable disparities across groups in terms of medication adherence when analyzed according to gender, education level, employment situation, and marital status.

Continued in pag. S276…

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No	Title, Author, Year of publication	Method	Results
		Attention Dependent: Adherence to drug regimen Instrument. The user refers to the Socio-demographic data form, the Mindful Attention Awareness scale (MAAS), and the Modified Morisky Adherence scale (MMAS). Analysis: Chi-square, Student t-test, Mann-Whitney U test, and multivariate logistic regression are statistical methods	Among those with a familial predisposition to hypertension, there was a notable increase in the frequency of low medication adherence in comparison to those who exhibited moderate to high levels of medication compliance. There was no statistically significant disparity in medication adherence scores based on the duration of hypertension. Participants with moderate to high medication adherence demonstrated significantly higher Mean MAAS scores. There was no statistically significant variation in medication adherence scores based on the duration of hypertension (p=0.665). The average MAAS scores were considerably greater among individuals who demonstrated moderate to high levels of drug adherence (p=0.004).
13	The effectiveness of mindfulness-based stress reduction and sama vritti pranayama on reducing blood pressure, improving sleep quality, and reducing stress levels in elderly people with hypertension (18)	Design: Cross-sectional model Subject: Thirty individuals are afflicted with hypertension. Variables: Dependent: Sleep quality, blood pressure, stress level Independent: Programs for Mindfulness-Based Stress Reduction (MBSR) and sama vittri pranayama. Intervention: The Indonesian version of the Pittsburgh Sleep Quality Index (PSQI) and the Mindfulness scale (Kentucky Inventory of Mindfulness Skills (KIMS) scale) are available Analysis: Student's T-test and Chi-square test	In summary, these results demonstrate that the integration of Mindfulness-Based Stress Reduction (MBSR) with sama vritti pranayama effectively lowers blood pressure in older individuals diagnosed with hypertension. The average systolic blood pressure in the intervention group exhibited a significant difference ($p < 0.001$). The mean systolic blood pressure was 155.00 mmHg before and 130.00 mmHg after. The control group had an average systolic blood pressure of 164.00 mmHg before the intervention, which decreased to 157.00 mmHg after the intervention. The intervention group exhibited a statistically significant difference in

Continued in pag. S277…

…continuation Table 1. Characteristics of Reviewed Studies.

No	Title, Author, Year of publication	Method	Results
			mean diastolic blood pressure ($p < 0.001$). The average diastolic blood pressure was 102.5 mmHg before and 90.00 mmHg after. The control group had an average diastolic blood pressure of 107.00 mmHg before the intervention, which decreased to 96.00 mmHg afterward. There was a significant disparity in stress levels among elderly individuals with hypertension between the intervention group and the control group ($p=0.000$). The intervention group had a smaller decrease in stress levels (7.5-2.2) compared to the control group (10.5-2.4). The mediation program primarily alleviates emotional and physiological difficulties in elderly individuals with hypertension. More precisely, this study discovered that utilizing MBSR meditation and sama vritti pranayama over 8 weeks effectively decreased hypertension, lowered anxiety ratings, and enhanced sleep quality in older individuals.
14	Does Dispositional Mindfulness Predict Cardiovascular Reactivity to Emotional Stress in Prehypertension? Latent Growth Curve Analysis of the Serenity Study (19)	Design: A randomized clinical trial conducted at two separate sites Subject: The study included 153 participants with an average age of 50 Variables: Independent: Full attention with slow breathing. Dependent: The values of blood pressure (BP) and heart rate (HR) Instrument: The self-report questionnaires used in this study include the Five-Facet Mindfulness Questionnaire (FFMQ) and the Experience Questionnaire (EQ) Analysis: The main model and LGCM were evaluated for their adequacy. The	Thus, it may be necessary to implement mindfulness-based therapies to explore the positive effects of mindfulness on stress physiology, which is believed to be a biological mechanism that can lower cardiovascular risk and enhance overall health. The average peak reaction at time points two for raw SPB reactivity was 134.95 mmHg (standard error = 0.90). The average linear change showed a rise of 1.95 mmHg per minute (standard error = 0.35; $p< 0.001$), while the average quadratic change indicated a decrease of -1.67 mmHg (standard error = 0.24; $p< 0.001$). The combined latent growth parameters indicated a considerable

Continued in pag. S278…

…continuation Table 1. Characteristics of Reviewed Studies.

No	Title, Author, Year of publication	Method	Results
		influence of predictors of trait conscientiousness in each latent growth curve model was adjusted using familial alpha adjustment (p = 0.05 split)	increase in systolic blood pressure (SBP) during the initial three minutes of the anger recall task. Subsequently, the rate of increase slowed down and reached a plateau during the final three minutes of the stressor. The average peak intercept for raw DBP reactivity was 83.01 mmHg (SE =0.69) at the second time point. There was an average linear change of 1.85 per minute (SE = 0.31; p < 0.001), and the average squared change was -1.08 (SE = 0.21; p < 0.001). These findings suggest that the reactivity curves for DBP during stressors were similar. The average peak intercept for raw HR reactivity at the second time point was 73.87 bpm (standard error = 0.91). There was an average linear increase of 1.72 bpm (standard error = 0.14; p < 0.001) and a mean quadratic decrease of -0.75 (standard error = 0.06; p < 0.001), suggesting that HR also increased in a quadratic manner during the stressor.

Study Characteristics

The randomized control trial (RCT) research design had four publications, while the cluster randomized design had one article (20). Four quasi-experimental articles (11,12,14,16) and three used a cross-sectional design (17,17,21). One paper has a prospective clinical trial design, specifically (9). The user's text mentions one publication that describes a two-group, one-site clinical experiment conducted by An et al. (15) and another paper that describes a two-site randomized clinical trial referenced as one article two-site randomized clinical trial.

A total of five randomized controlled trials (RCTs) were conducted in the United States (7,13,15,19,22). Two studies were carried out in Spain (16,23). Additionally, two articles were conducted in Iran (5,14). Furthermore, two articles were conducted in Indonesia (12,18). One article was located in Brazil (9) and one article was conducted in Turkey (19).

Eleven studies recruited participants from clinics and communities. All trials included patient demographic information and baseline blood pressure measurements, evenly distributed between the treatment and control groups. All research subjects were of mixed gender, except the studies conducted by Babak et al. (5) which

consisted entirely of female individuals. The participants' ages ranged from 45.8 to 60.3 years (9).

One study included 13 clergy members, while another included 18 students studying homicide (7,16). Two investigations included geriatric individuals diagnosed with hypertension (12,18). The overall research sample comprised 906, with varied sample sizes ranging from 11 to 201, including 30, 60, 75, and 80.

Participant Characteristics

The total number of participants across all papers was 906 individuals. Individuals who are 18 years of age or older and have hypertension are defined as having a systolic blood pressure of 180 mmHg or higher and/or a diastolic blood pressure of 80 mmHg or higher, with or without treatment for hypertension. The average age in the intervention group was 48.67 ± 1.42 years, while in the control group was 49.32 ± 2.31 years ($p = 0.343$) (5) (age 45.8 ± 4.15 years) (9).

Characteristics of the Intervention

Five research studies employed mindfulness therapies, specifically Mindfulness-Based Stress Reduction (MBSR), following the theoretical framework developed by John Kabbat's MBSR Protocol (14). A mindfulness intervention was administered two hours weekly for eight weeks (7,23). Additionally, a follow-up visit was conducted after 20 weeks (5,6,10,11,13,19). Participants were provided with preliminary instruction, including a collective introduction session, followed by eight consecutive weekly group sessions of 2.5 hours each, with a total of 7.5 hours per group session daily. The suggested home mindfulness practice consists of a minimum of 45 minutes daily for six days each week. Psychiatric doctors were responsible for training, while psychologists are responsible for conducting research Babak et al. (5). A study conducted in Indonesia utilized the Mindfulness-Based Stress Reduction (MBSR) and sama vittri pranayama intervention regimens (18). The study uses mindfulness to expand awareness within a confined environment for 30 minutes. The Mindbody session includes a concise introduction to meditation and proper posture (5 minutes), a body scan utilizing the body scan treatment technique (15 minutes), instruction on breathing techniques (5 minutes), and a brief discussion on the experience (5 minutes) (9).

A study from An et al. (15) used the MAP (Mindfulness Awareness Program) approach developed by the Mindfulness Awareness Research Center (MARC) of the University of California Los Angeles (UCLA). Certified instructors teach MAP classes. All MAP participants receive a practice guidebook and an audio recording of instructions for implementing 5–20-minute mindfulness sessions to listen to at home. MAP instructors encourage daily mindfulness practice, starting with five minutes and increasing to 20 minutes by week 5 (23). The exercise was carried out daily, starting with five minutes and increasing to 20 minutes in week 5 (15).

Four studies used the Five Facet Mindfulness Questionnaire (FFMQ) measuring tool (6,10,16,19). One study used the Kentucky Inventory of Mindfulness Skills (KIMS) scale (18). The Mindful Attention Awareness Scale (MAAS) was used by Vara-García et al. (25) and the Modified Morisky Compliance Scale (MMAS) (17).

Blood Pressure Measuring Instrument

All studies provide the impact of mindfulness on systolic and diastolic blood pressure. There are two methods for assessing blood pressure: clinical blood pressure and ambulatory blood pressure. Four studies carried out blood pressure measurements in clinics (5,10,12-14). Two studies used clinical and ambulatory measurements (9,10). Three studies used ambulatory blood pressure measurements (6,14,15,18,19).

Six studies assessed blood pressure using Omron automated blood pressure monitors (6,10,13,15,19). Others have no reports. Before providing intervention, participants received training on measuring blood pressure and monitoring at home. Participants measured their blood pressure after taking a five-

minute break after completing the mindfulness exercise, recorded in a book that was collected every week during the six-week training session and six weeks later online at follow-up (15).

Systolic and Diastolic Blood Pressure

Fourteen articles showed reduced blood pressure in the group that received the mindfulness intervention. Research (6) showed a clinically significant reduction in systolic blood pressure in the mindfulness group (n=101) compared to the control group (n=100). Changes in unmonitored clinic systolic blood pressure at six months showed a decrease in systolic blood pressure of 5.9 mm Hg (95 % CI, –9.1 to –2.8 mmHg) from baseline greater than the control group's 4.5 mm Hg at six months (95 % CI, –9.0 to –0.1 mm Hg).

In the study conducted by Ponte Márquez et al. (10) in the eighth week, the intervention group exhibited significantly lower scores in ambulatory blood pressure monitoring than the control group. The intervention group had 124/77 mmHg blood pressure readings, while the control group had 126/80 mmHg ($p < 0.05$). The intervention group had 108/65 mmHg readings, whereas the control group had 114/69 mmHg ($p < 0.05$). Clinical measurements of nocturnal systolic blood pressure similarly showed reduced values for systolic pressure (130 mmHg vs. 133 mmHg; $p = 0.02$). There was a decrease in clinically determined diastolic blood pressure values among eight mindfulness groups.

The study conducted by Babak et al. (5) exclusively included female participants. It revealed a substantial decrease in both systolic and diastolic blood pressure among the intervention group as compared to the initial measurements. The control group had a systolic blood pressure of 140.18 ± 14.27 mmHg compared to 142.15 ± 10.23 mmHg and a diastolic blood pressure of 84.62 ± 9.22 mmHg compared to 88.51 ± 8.54 mmHg ($p = 0.001$).

Stress Measurement

There are seven articles out of 14 that examine the impact of mindfulness on stress (10,11,17–19,21,26). Stress measuring device used Perceived Stress Scale (PSS) (10,11,18,20,21,24). One article used a visual analog scale (VAS) to measure stress levels (16). Three articles used the Depression, Anxiety and Stress Scales (DASS-21) (5,10). Eight articles show the effectiveness of mindfulness in reducing stress (5,6,7,10,11,16,18,19). Research shows significant differences between experimental and control groups in mean scores of positive stress ($p=0.001$), negative stress ($p=0.001$) (7,11).

There were differences in the stress levels of elderly hypertensive patients between the intervention group compared to the control group. The stress level measured using the perception stress scale (SPSS) score in the intervention group was initially 11.3-3.1 after the intervention decreased to 7.5 -22 ($p=0.001$). In the control group, the initial score was 11.2-2.7; afterward, it was 10.5-2.4 ($p=0.175$) (18).

DISCUSSION

Hypertension is the leading preventable risk factor for cardiovascular disease, such as heart disease and stroke, which are the leading causes of death. Prevention is by modifying risk factors that can be changed. Hypertension prevention interventions based on arterial management guidelines from the European Renal Association (ERA) and the International Society of Hypertension (ESH) include: 1) changes relevant lifestyle, weight loss, excess sodium intake, increased potassium intake from food, increased physical activity and exercise, reduce alcohol intake, stop smoking, diet, improve stress management (26). Implementing a heart-healthy lifestyle is a very important approach to preventing or preventing the emergence of hypertensive heart disease, reducing increases in blood pressure values and reducing increases in cardiovascular risk (26). Hypertension is closely related to lifestyle, mental health and quality of life. If not controlled properly it can cause various problems, including losses, decreased productivity, and ultimately poor health. The quality of life of hypertensive patients is also influenced by stress. Stress increases emotional and behavioral changes and disrupts cognition and biological mechanisms (5).

The WHO states that mental illness affects around 250 million people (5). Increased risk of hypertension and cardiovascular events have been associated with stress and anxiety. When patients' emotional distress subsides, their blood pressure may spike briefly before returning to normal. Increased risk is also associated with exposure to highly traumatic life experiences. The European Renal Association (ERA) and the International Society of Hypertension (ESH) 2023 stated that the expected blood pressure target in hypertensive patients is a systolic pressure of 140 mmHg or a diastolic pressure of 90 mmHg (26). The literature review results show mindfulness-based stress release (MBSR) therapy effectively reduces stress, mood changes, and systolic and diastolic blood pressure (SBP and DBP).

The An et al. research Center (MARC) at UCLA defines mindfulness as "the process of actively and openly moment-by-moment observation of one's physical, mental, and emotional experiences" (15). Mindfulness is very easy, cheap and effective as an intervention to maintain blood pressure and reduce stress (7,27). Environmental and behavioral factors are the greatest risk of increasing blood pressure. Therefore, the main intervention is to modify lifestyle and reduce stress among both through mindfulness (28). Mindbody treatment approaches include mantra, mindfulness, spiritual, guided imagery, progressive relaxation, yoga, tai chi, and qi gong (28). Individuals with hypertension most often used spiritual meditation (10.6 %), yoga (5.7 %), mindfulness meditation (3.2 %), progressive relaxation (3.1 %), mantra meditation (2.4 %), guided imagery (1.9 %), tai chi (1.5 %), and qi gong (0.4 %) (28). The results of the literature review prove that the mindfulness intervention carried out for 45 minutes every day for eight weeks was able to reduce systolic blood pressure and diastolic blood pressure and stress according to WHO targets, namely systolic blood pressure ≤ 130 mmHg and diastolic blood pressure ≤ 80 mmHg. Monitoring and measuring blood pressure at home is carried out three times daily in the morning, afternoon and evening.

CONCLUSION

Interventions to reduce blood pressure and stress are very necessary for hypertensive patients to prevent complications. Mindfulness is an easy and cheap way to reduce blood pressure and stress for hypertension patients.

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Partograph adherence trends in various healthcare services: A Systematic Review

Tendencias de adherencia al partograma en diversos servicios de salud: una revisión sistemática

Widya Maya Ningrum[1], Soetrisno[2], Sri Mulyani[3], Lia Nurcahyani[4]

SUMMARY

A partograph is a tool used to monitor the progress of labor and identify potential complications. However, evidence shows that many countries still need to improve partograph adherence. This study aims to review the adherence to using partographs in health services. Literature is identified through PubMed, Scopus, and Google Scholar with the keywords "Partograph," "Adherence," AND "Health Care." In total, 12 studies were identified and analyzed. The results showed that partograph adherence in developing countries ranged from 20 % to 80 %. Factors associated with low adherence include a lack of training and knowledge of partographs among healthcare workers, lack of resources, and traditional childbirth culture. Compliance with partographs still needs to improve in health services. Factors influencing compliance include staff shortages, heavy workloads, lack of training, and inadequate monitoring. Recommendations to improve compliance include on-the-job training, routine monitoring, and supportive supervision. Proper partograph use in improving maternal and neonatal outcomes is emphasized. The findings of this systematic review can be used to inform policies and programs aimed at improving compliance with the use of partographs in developing countries. Further research is needed to identify effective interventions to improve compliance in various contexts.

Keywords: *Partograph, adherence, health care.*

RESUMEN

Un partograma es una herramienta que se utiliza para monitorear el progreso del trabajo de parto e identificar posibles complicaciones. Sin embargo, la evidencia muestra que muchos países aún necesitan mejorar la adherencia al partograma. Este estudio tiene como

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objetivo revisar la adherencia al uso de partogramas en los servicios de salud. La literatura se identifica a través de PubMed, Scopus y Google Scholar con las palabras clave "Partógrafo", "Adherencia" Y "Atención médica". Se identificaron y analizaron un total de 12 estudios. Los resultados mostraron que la adherencia al partograma en los países en desarrollo osciló entre el 20 % y el 80 %. Los factores asociados a la baja adherencia incluyen la falta de formación y conocimiento de los partogramas entre los trabajadores sanitarios, la falta de recursos y la cultura tradicional del parto. El cumplimiento de los partogramas aún debe mejorar en los servicios de salud. Los factores que influyen en el cumplimiento incluyen la escasez de personal, la gran carga de trabajo, la falta de capacitación y el monitoreo inadecuado. Las recomendaciones para mejorar el cumplimiento incluyen capacitación en el trabajo, monitoreo de rutina y supervisión de apoyo. Se hace hincapié en el uso adecuado del partograma para mejorar los resultados maternos y neonatales. Los hallazgos de esta revisión sistemática se pueden utilizar para informar las políticas y programas destinados a mejorar el cumplimiento del uso de partogramas en los países en desarrollo. Es necesario realizar más investigaciones para identificar intervenciones eficaces que mejoren el cumplimiento en diversos contextos.

Palabras clave: *Partigrama, adherencia, cuidado de la salud.*

INTRODUCTION

The death of mothers and babies is still a problem that needs to be considered in the world. Based on World Health Organization (WHO) data, every day in 2020, nearly 800 women died from preventable causes related to pregnancy and childbirth. Maternal deaths occurred almost every two minutes in 2020. The high burden of direct obstetric causes (such as postpartum hemorrhage, pre-eclampsia and hypertensive disorders, pregnancy-related infections, and complications of unsafe abortion) and indirect causes (infectious and non-communicable diseases) are proximate causes in many low-resource settings. Other factors that contribute to maternal mortality include 1. health system shortcomings, which result in (i) patients waiting longer to seek care or receiving it after arriving at a facility; (ii) subpar care; (iii) shortages of necessary medical supplies; and (iv) a lack of accountability in health systems; 2. social determinants, such as income, educational attainment, race, and ethnicity, which place specific populations at higher risk; 3. detrimental gender norms, biases, and inequalities that lead to a low priority of women and girls' rights, including their right to safe and quality care (1). Between 2000 and 2020, the maternal mortality ratio (MMR), the number of maternal deaths per 100 000 live births, fell by about 34 % worldwide. Nearly 95 % of all maternal deaths occurred in low- and lower-middle-income countries in 2020. Care by health professionals before, during, and after childbirth can save the lives of mothers and newborns (1). One of the efforts that can be made to reduce maternal and infant mortality during childbirth is monitoring using a partograph (2).

A partograph, a simple but vital tool, is crucial in reducing maternal and infant mortality. Various studies have shown a positive relationship between using partographs and decreasing maternal and infant mortality rates. A study in Indonesia found that consistent use of partographs was associated with a 60 % decrease in maternal mortality and a 52 % decrease in infant mortality. Another study in Tanzania showed that correctly using a partograph can reduce the risk of maternal mortality by up to 28 % (3,4). According to the World Health Organization, only 50 % of deliveries worldwide use a partograph. This causes concern because the partograph is a vital tool that can help reduce maternal and infant mortality rates. A factor that causes the low use of partographs is poor adherence to the use of partographs during labor (5). The problem of non-compliance in using partographs is a critical issue in maternal health services and can affect the quality of care and health outcomes of mothers and babies.

Several studies have been conducted in different countries to provide evidence regarding utilization and challenges associated with adherence to partographs. However, further research on interventions can improve the training and motivation of health workers, especially in areas with limited resources. The analysis found an inadequate gap in monitoring the workforce's progress due to documentation problems (6). Professional adherence to the use of partograms is

not sufficient for obstetric care (7). The findings of this study reveal that most healthcare providers still need to increase the use of partographs. The factors influencing compliance in using partographs included the location of the health facility, the level of Emergency Obstetric and Newborn Care (EmONC), the experience of the service provider, the type of facility, the managing authority, and the level of education of the service provider. In addition, factors such as knowledge, availability of partographs, staff shortages, level of facilities, qualifications, professional differences, managerial support, staff motivation, training, and experience of healthcare providers were also identified as factors associated with the use of partographs (8). This systematic review aims to address these gaps by critically analyzing existing research and identifying strategies that have proven effective in various contexts. Thus, this study can provide stronger, evidence-based recommendations to improve adherence to using partographs in health services, which is ultimately expected to reduce maternal and infant mortality rates.

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METHOD

This systematic review follows the guidelines of the Statement of Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) (6). This systematic review was conducted to answer specific, relevant, and focused questions and assess WHO policies related to monitoring during childbirth using a partograph that health workers could use.

The inclusion criteria of this systematic review are articles written only in English, discussing aspects of compliance with the use of partographs in health services, and written between 1 January 2015 and 31 December 2023. This systematic review's eligibility criteria are PICOS (Population, Intervention, Comparators, Outcomes, and Study Design). Where the population in this systematic review is health workers (doctors, midwives, nurses, and other health workers) who carry out childbirth monitoring. The intervention of this study is the use of partographs; in this study, there are comparators, namely not using partographs, and the outcome of this systematic review is compliance in the use of partographs, with the study design used being quantitative and qualitative.

Article searches were performed by browsing PubMed, ScienceDirect, and Google Scholar databases. This search was complemented by manual searches on Google's search engine and Research Gate's online repository for other articles that met the selection criteria. The literature search used the keywords "Partograph," "Adherence," and "Health Care" to ensure a comprehensive search.

After collecting the results of article identification through electronic search, the data-based articles were exported to a Microsoft Excel spreadsheet. Three authors independently extracted data and reviewed the filtered and qualified articles with PICOS eligibility criteria. Any reviewer disagreement was carried out by consensus between the three authors through discussion, considering that scores are still above 50 %. The methodological quality of each study (sampling strategy, response rate, and representativeness of the study), comparability, and results are examined using the Joanna Briggs Institute (JBI) critical appraisal tool, which assists in assessing the trustworthiness, relevance, and results of published papers, and allows to evaluate the methodological quality of a study and to determine the extent to which a study has addressed possible bias in its design and analysis. All articles with a JBI score of 50 % or more were considered "good" studies with low risk.

RESULTS

The comprehensive literature search meticulously filtered 479 articles using the specified keywords. These articles were then meticulously identified based on the PICOS, resulting in a substantial pool of 382 articles for the article screening process. At the article screening stage, 174 articles were deemed suitable based on their abstracts. A meticulous feasibility selection was then carried out, considering the essence and scope of the discussion in each article. This thorough process led to the selection of 12 articles for inclusion and the exclusion of one article (Figure 1).

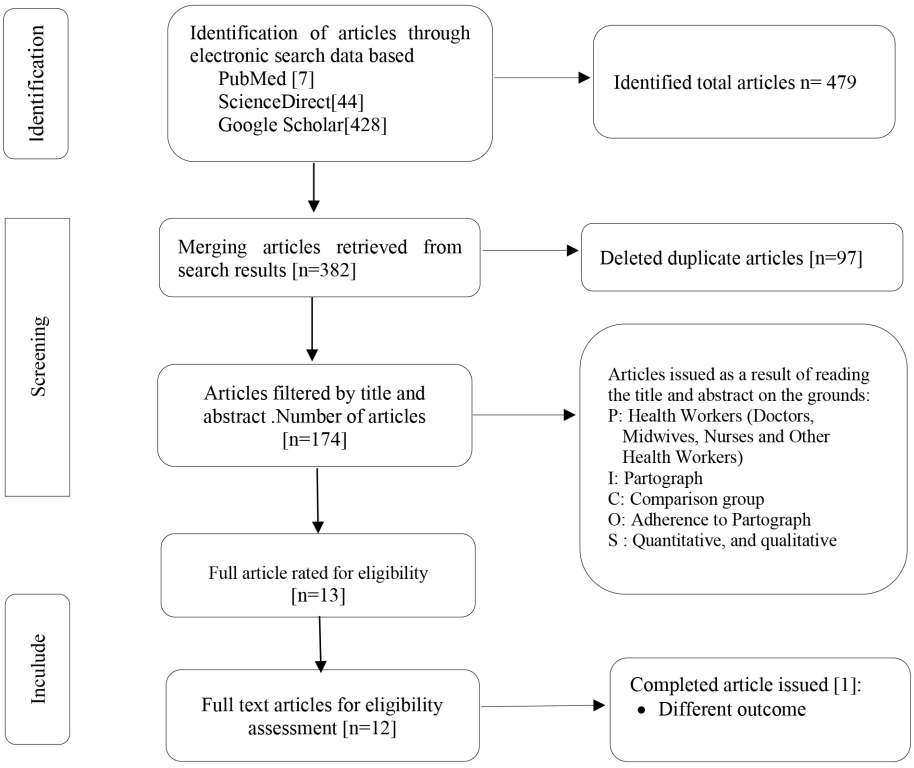

Figure 1. Steps for selecting articles are illustrated in the PRISMA flowchart.

The characteristics of the study analyzed in this systematic review included a wide range of health facilities in six countries: India, Ethiopia, Kenya, Tanzania, the United States of America, and Malawi. The health facilities studied include the public and private sectors. Most study participants were doctors, nurses, midwives, and other health workers. These studies had varying sample sizes, with a minimum of seven participants and a maximum of 7 248 individuals observed through healthcare workers and the number of deliveries (Table 1).

Twelve articles assessed healthcare providers' compliance regarding the use of partographs. It is observed from Table 2 that factors influencing compliance in using a partograph include labor shortage and heavy workload (5), the complexity of the partograph chart (8,9), knowledge and skills gap among healthcare providers on how to use a partograph (7), limited knowledge about the importance of a partograph tool (7), location of health facilities, EmONC (Emergency Obstetric and Newborn Care) levels, healthcare provider experience (8), healthcare provider education level (10), staff competency in using photographs, practice environment, and organizational culture (11), lack of guidance at the healthcare facility level (14), limited availability of partographs in healthcare facilities (14), managerial support, staff motivation, training, and experience of healthcare providers (10,11,13,15,16).

DISCUSION

Of the 12 articles assessed, it was stated that the use of partographs was still low regarding influencing individual, organizational, and system factors. However, the research conducted in India revealed a potential for significant improvement in using partographs in labor monitoring. At the

Table 1. Characteristics of the study

Author	Article Title	Research Venue	Year	Study Participants	Methods	Sample Size
Devina Bajpayee et al.(5)	Strengthening the Use of Partograph in High Caseload Public Health Facilities in India through an Integrated Quality Improvement Approach	India	2020	Nurse	Integrated quality improvement approach to enhance partograph usage	194
Solomon Weldemariam Gebrehiwot et al. (7)	Health care professionals' adherence partograph use in Ethiopia: analysis of 2016 national emergency obstetric and newborn care survey	Ethiopia	2020	Midwives, nurses, and health workers	Quantitative with logistic regression	2 610
Nirmalya Manna et al. (8)	Partograph Adherence and its Barriers in a Tertiary Care Hospital: A Mixed-Method Study	India	2022	Nurse	Cross-sectional study comprises quantitative and qualitative methods	131
Subrata Kumar Palo et al. (9)	Intrapartum monitoring using partograph at secondary level public health facilities—A cross-sectional study in Odisha, India	India	2019	Nurse, doctor	A cross-sectional study with quantitative and qualitative data	1 552 Maternity
Doris Kibiwott et al. (10)	Partograph use among skilled birth attendants in selected counties in Western Kenya	Kenya	2021	Nurse	Cross-sectional study with multivariable logistic regression	149
Dedius E. Peter et al. (11)	Levels of Practices and Influencing Factors on the Use of Partograph on Provision of Health Care among Nurses in Singida Municipality	Tanzania	2022	Nurse	Analytical cross-sectional study with multinomial logistic regression	150
Polite Dube et al. (12)	Impact of Performance-Based Financing (PBF) Program on Utilization and Completeness of Partographs in Jimma	Ethiopia	2022	Obstetric health workers	A quasi-experimental design with a control zone for comparison	7 248 maternity mothers
Tâmara Silva de Lucena et al. (13)	Analysis of partogram completion as good obstetric practåice in the monitoring of labor	Vale do São Francisco	2019	Nurse Doctor	Retrospective and transversal study with a quantitative approach	191 medical records
Sarika Chaturvedi et al. (14)	Implementation of the partograph in India's JSY cash transfer program for facility births: a mixed methods study in Madhya Pradesh province	India	2015	Nurses, midwives	A mixed methods study using Carroll's framework for implementation fidelity	233
Chrispin Mandiwa et al. (15)	Documentation of the partograph in assessing the progress of labor by healthcare providers in Malawi's South-West zone	South-West Malawi	2017	Midwife, clinician	A descriptive study involving retrospective review	1 070 partographs
Ritu Singh et al. (16)	Modified WHO Partograph in Labour Room: A Quality Improvement Initiative to Find Out Concerns, Challenges, and Solutions	East India	2022	Nurse Doctor	Quasi-experimental study with mixed methods design	7
Polite Dube et al. (17)	Factors Associated with Partograph Utilization in Jimma and Bedele Zones, Oromia Regional State, Ethiopia	Ethiopia	2022	Healthcare workers	Cross-sectional with control site for comparison using logistic regression	239

Table 2. Partograph Adherence Trends in Various Healthcare Services

Author	Partograph Adherence	Factors Influencing Categories	Result
Devina Bajpayee et al. (5)	1. Tool Complexity 2. Limited Competence of Service Providers 3. Limitations of Organizational Commitment 4. Lack of Guidance at the Facility Level 5. Limited Availability. 6. Distance to Birth Center and Difficulties in Referral 7. High Burden of Childbirth Cases	- Individual - Organizational	This study highlights the importance of implementing evidence-based practices to improve maternal and newborn health outcomes.
Solomon Weldemariam Gebrehiwot et al. (7)	1. Service providers 2. Type of facility 3. Managing Authority 4. The level of education of the service provider. 5. Knowledge 6. Availability of partographs 7. Staff shortages 8. Facility level 9. Qualification 10. Professional differences 11. Managerial support 12. Staff motivation 13. Training, and 14. Healthcare provider experience.	- Individual - Organizational - System	The results of this study show that compliance with the use of partographs in Ethiopia is low, with the recording of parameters such as molding, maternal temperature, and degradation being the least recorded. This indicates the poor quality of intrapartum care in health facilities, which may be partly the reason for the high maternal and perinatal morbidity and mortality in Ethiopia. In addition, this study also found that health facilities located in rural areas are more compliant with the use of partographs compared to facilities in urban areas.
Nirmalya Manna et al. (8)	1. Labor Shortage and Heavy Workload 2. Presentation in the Advanced Stage of Childbirth: 3. Lack of Training and Supervision: 4. Lack of Knowledge and Skills: 5. Institutional Policies: 6. Motivation and Commitment: 7. Incomplete Clinical Documentation by Physicians.	- Individual - Organizational - System	The study found that only 61.07% of deliveries had partograph plotting, and only 5.00 % were completed.
Subrata Kumar Palo et al. (9)	1. Shortage of health workers 2. Increased workload 3. Inadequate training 4. Lack of monitoring and supervision 5. Unavailability of partograph records 6. Lack of interest in filling the partograph 7. Staff personality issues	- Organizational - System	The results showed that the use and completeness of partographs in public health facilities in Odisha, India, was still low. The partograph was plotted in 48.7 % of deliveries, but the completeness was only 1.03 %. Factors such as shortage of healthcare workers, inadequate training, increased workload, and lack of monitoring contribute to low compliance. Recommendations to improve compliance and completeness include on-the-job training, regular monitoring, and supportive supervision.
Doris Kibiwott et al. (10)	1. Gender 2. Knowledge of Partograph. 3. Age 4. Profession	- Individual - Organizational	The study highlights the need for better workplace training for nurse-midwives on using partographs and the possible use of electronic partographs to improve

Continued in pag. S289…

…continuation Table 2. Partograph Adherence Trends in Various Healthcare Services

Author	Partograph Adherence	Factors Influencing Categories	Result
	6. Work Experience 7. BEmONC Training		
Dedius E. Peter et al. (11)	1. Education Level 2. Professional Qualifications 3. Age These factors suggest that education and professional qualifications are the main elements influencing the use of partographs during the delivery of healthcare	- Individual	The results showed that the practice level of partograph use in Singida Municipality, Tanzania, was low. Only 38.7% of nurses have a high level of practice in using partographs. Factors such as education level and professional qualifications were found to affect the level of practice. Nurses with higher education and professional qualifications tend to have better practice. The study recommends on-the-job training and workshops to improve the use of partographs and reduce maternal complications and mortality.
Polite Dube et al. (12)	1. Training and Mentoring: 2. Financial Incentives: 3. Institutional Supervision and Policy	- Organizational - System	This study highlights the importance of quality maternity care and the role of PBF in improving health service outcomes for pregnant women. However, studies in different countries showed mixed results, with some positively impacting the quality of care and health outcomes. In contrast, others highlighted the unintended consequences and challenges faced.
Tâmara Silva de Lucena et al. (13)	1. Lack of Professional Knowledge 2. Low Adoption in Maternity Hospitals 3. Interventional Obstetric Care Model 4. Lack of Continuous Evaluation 5. Inconsistencies in Item Filling	- Individual - System	Based on the information provided, the results of the study show that: 1. Only 40.6% of the partograms were filled during hospitalization at a Vale do São Francisco maternity school. 2. Most partograms include the identification of parturient but lack information about parity and gestational age. 3. Cervical dilation is noted correctly in 99.5% of cases, but other items, such as presentation height and warning lines, are filled in smaller proportions. 4. Most of the partograms are opened at the right time, but only 4.7% include a variety of positions. 5. There is inconsistency in recording cervical dilatation and presentation height.
Sarika Chaturvedi et al. (14)	1. Uses of Partograph 2. Staff Competencies 3. Practice Environment 4. Training and Supervision	- Individual - System	This study highlights the importance of proper partogram filling to ensure safe and effective obstetric care. Overall,

Continued in pag. S290…

…continuation Table 2. Partograph Adherence Trends in Various Healthcare Services

Author	Partograph Adherence	Factors Influencing Categories	Result
	5. Participant Responsiveness		highlights the need for improvements in training, supervision, and the work environment to improve the use of partographs and the quality of care in JSY programs.
Chrispin Mandiwa et al. (15)	1. Shortage of health workers 2. Complexity of a partograph chart 3. Knowledge and skills gaps among healthcare providers on how to use partographs 4. Limited knowledge of the importance of the partograph tool.	- Individual - Organizational	The study also found poor documentation of vital parameters in the partograph, indicating inadequate labor monitoring by healthcare providers.
Ritu Singh et al. (16)	1. Availability or supply of partographs 2. Time 3. Staff shortages 4. Limited knowledge and understanding 5. Lack of training 6. Confusion about roles and responsibilities	- Individual - System	Based on the information provided, the results of this study show that the quality improvement initiative successfully increased the use of modified partographs from WHO in the delivery room from 25% to 92% within six months
Polite Dube et al. (17)	1. Knowledge of the partograph 2. Availability of partographs 3. Training on partographs 4. Professional qualifications (Midwife, Nurse, Public Health Officer, Doctor) 5. Exposure to Performance-Based Financing (PBF)	- Individual - System	This study emphasizes the importance of continuous training and mentorship to ensure health workers consistently use partographs.

beginning of the study, the use of partographs was still low, with significant variation between states. For example, in Delhi, only 0.1 % of deliveries use a partograph, while in Haryana, the practice is more established, with almost 80 % of deliveries monitored using the device. In addition, it was found that, at baseline, the percentage of completed partographs in all aspects was very low (overall 32 % of the 949 samples) with variation between states, such as only 10 % of the completed partographs in Delhi and 49 % in Haryana. It was also found that the print format of the partograph was not available in 30 % of the facilities, and the maternity ward staff found it difficult to plot the partograph for each woman. However, at the end of the study period, there was a significant increase in the filling of complete partographs; for example, in Delhi, it increased to 59 % (5). In line with research conducted in Ethiopia, compliance with the use of partographs is low, with the recording of parameters such as molding, maternal temperature, and degradation being the least recorded. This indicates the poor quality of intrapartum care in health facilities, which may be partly the reason for the high maternal and perinatal morbidity and mortality in Ethiopia. In addition, this study also found that health facilities located in rural areas are more compliant with the use of partographs compared to facilities in urban areas.

Significant improvement was found in the use and completeness of the partograph, with an increase in the service provider's competence. Proper utilization of the partograph is crucial for early identification of complications during labor, which can help in timely intervention to prevent maternal and perinatal morbidity and mortality. Clinical leadership involvement is

critical to promoting the correct and regular use of the partograph. This study emphasizes the importance of a tailored implementation approach and the need for ongoing support and guidance to increase the use of critical tools in healthcare settings. In addition, the results showed an improvement in the practice of using partographs and an increase in the competence of staff in filling them (5). According to Dube (12), the issue of compliance with the use of partographs in this study includes several main factors, including lack of knowledge and training. Lack of knowledge about partographs and lack of training on their use are significant reasons affecting compliance. The availability of partographs in health facilities is also an important factor. When partographs are not available, healthcare workers cannot use them. Regarding workload and supervision, high workload and lack of oversight are also the main reasons why partographs are not used routinely. With regard to institutional policies and procedures, the absence of policies requiring the use of partographs in some healthcare facilities also affects compliance levels. Performance-Based Financing (PBF) improves compliance with partographs (12). In line with Dube et al., it is shown that the PBF program significantly impacts the increase in the use and completeness of the partograph in the Jimma zone compared to Buno-Bedelle in Ethiopia. This increase is attributed to the training, mentoring, and financial incentives provided through the PBF program (12,17). Adequate training coupled with the availability of partographs can mitigate the impact of high workload on compliance. However, achieving optimal compliance may be challenging without addressing all these factors collectively.

Various strategies are implemented to improve compliance with partographs, such as training for residents, engaging interns and nurses, creating written policies, and attaching partographs to patient files. The use of partographs has increased gradually through several Plan-Do-Study-Act cycles, demonstrating the effectiveness of quality improvement approaches in addressing problems and challenges in labor monitoring. Solutions such as training to identify common barriers to using partographs, policy implementation, and division of responsibilities should be implemented. Similar studies in Uganda and India have also shown success with similar interventions. This study highlights the importance of regular audits to maintain results and the need for more extensive studies to confirm the effectiveness of quality improvement methodologies in improving the use of partographs (16,18). In one of the articles, better documentation of vital parameters in the partograph indicated adequate healthcare providers' childbirth monitoring. Reasons for poor documentation could include a shortage of healthcare workers, the complexity of the charts, knowledge and skills gaps among providers, and a limited understanding of the importance of the tool. Recommendations include in-service training on the use of partographs, ongoing supportive supervision, and monitoring of the use of partographs. Further research is needed to understand the reasons for non-compliance and provide evidence-based recommendations (15).

CONCLUSION

The research highlights the low compliance in using partographs during childbirth in healthcare facilities in countries like India and Ethiopia. It underscores the crucial role of healthcare professionals, policymakers, and researchers in addressing this issue. Factors influencing compliance include staff shortages, heavy workloads, lack of training, and inadequate monitoring. Recommendations to improve compliance include on-the-job training, routine monitoring, and supportive supervision. The importance of healthcare providers' role in implementing these recommendations is emphasized. Proper partograph use in improving maternal and neonatal outcomes is also highlighted. Challenges in implementing partograph use during childbirth, such as staff shortages, time constraints, and inadequate training, are also discussed. Recommendations include better training, supportive supervision, and conducive work environments. Factors affecting compliance with partograph use must be addressed to achieve positive health outcomes. The significance of regular audits and continuous training to enhance partograph use by healthcare providers is highlighted. The research also indicates that partograph use in monitoring childbirth remains low in various countries, with factors like gender, education, professional

qualifications, training, and supervision influencing compliance. The effectiveness of PBF programs in increasing partograph use in some regions is noted. The importance of accurate partograph completion to ensure safe and effective obstetric care is also underscored in the studies. Further research needs to identify effective interventions to improve compliance in various contexts.

Abbreviations

WHO: World Health Organization; MMR: Maternal Mortality Ratio; PICOS: Population, intervention, comparators, outcomes, and study design; JBI: Joanna Brigg Institute; PBF: Performance-Based Financing

Ethics Approval and Consent to Participate

The authors have diligently adhered to all ethical considerations, including plagiarism, misconduct, data fabrication and falsification, double publication and submission, redundancy, and more.

Competing Interest

The authors have no conflict of interest to declare, financial, professional, or personal interest that might have affected the performance.

Availability of Data and Materials

The data presented in this study are available in this article.

Authors' Contribution

Conceptualization: WMN, data curation: WMN, S, SM, and LN; formal analysis: WMN, S, SM; data collection: WMN, S, SM; Validation: WMN, S,SM, and LN, writing— original draft: WMN; writing—review and editing: WMN, S, SM, and LN. All authors have reviewed and approved the manuscript.

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Impact of Mindfulness-Based Stress Reduction on Diabetes Mellitus Psychological Well-Being and Glycemic Control: A Systematic Review

Impacto de la reducción del estrés basada en atención plena en el bienestar psicológico y el control glucémico en la diabetes mellitus: Una revisión sistemática

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SUMMARY

Introduction: *It is a well-established fact that many diabetes mellitus patients grapple with psychological issues, which can often lead to depression if not properly managed. This systematic review was conducted to explore the impact of mindfulness therapies on the psychological well-being and blood glucose levels of those with diabetes mellitus.* **Methods:** *The systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) criteria. The keywords were type 2 diabetes mellitus, mindfulness-based stress reduction, glycemic control, blood glucose, glycated hemoglobin, and psychological well-being. Data sources were from Scopus, Web of Science, ScienceDirect, and Google Scholar. The articles used were published in English full text between 2014-2023 and were research articles.* **Results:** *Fifteen papers were found that addressed mindfulness therapy, with the majority focusing on Mindfulness-Based Stress Reduction (MBSR). Eight meetings were held where MBSR was presented directly by professionals or through communication. In patients with type 2 diabetes, mindfulness significantly lowers HbA1c and fasting blood sugar levels. Mindfulness improves psychological well-being by reducing depression and anxiety and increasing resilience and emotional health in patients with diabetes.* **Conclusion:** *The review concludes that MBSR therapy has the potential to significantly enhance psychological well-being and regulate blood sugar levels in diabetic patients. This*

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therapy can help patients become more aware of and accept their condition, and healthcare professionals play a crucial role in supporting them to manage self-manage through mindfulness, empowering both patients and professionals in the process.

Keywords: *Mindfulness-based stress reduction, glycemic control, psychological well-being, diabetes mellitus type 2, systematic review*

RESUMEN

Introducción: *La mayoría de los pacientes con diabetes mellitus tienen problemas psicológicos. Los pacientes que reciben un tratamiento inadecuado para los problemas psicológicos pueden ser más susceptibles a la depresión. El propósito de esta revisión sistemática fue determinar cómo las terapias de atención plena afectan el bienestar psicológico y los niveles de glucosa en sangre de los pacientes con diabetes mellitus.* **Métodos:** *Durante la revisión sistemática realizada en esta investigación se siguieron los criterios de los elementos de informe preferidos para revisiones sistemáticas y metaanálisis (PRISMA). Utilizando las palabras clave diabetes mellitus tipo 2, reducción del estrés basada en la atención plena, control glucémico, glucosa en sangre, hemoglobina glucosilada y bienestar psicológico, las fuentes de datos se tomaron de Scopus, Web of Science, Science Direct y Google Scholar. Los artículos utilizados se publicaron en inglés de texto completo entre 2014-2023 y fueron artículos de investigación.* **Resultados:** *Se encontraron quince artículos que abordaron la terapia de atención plena, la mayoría centrados en la reducción del estrés basada en la atención plena (MBSR). Se celebraron ocho reuniones en las que se presentó MBSR directamente por profesionales o a través de medios de comunicación. En pacientes con diabetes tipo 2, la atención plena reduce significativamente la HbA1c y los niveles de azúcar en sangre en ayunas. La atención plena mejora el bienestar psicológico al reducir la depresión y la ansiedad y aumentar la resiliencia y la salud emocional en pacientes con diabetes.* **Conclusión:** *Se ha demostrado que la terapia MBSR mejora el bienestar psicológico y regula los niveles de azúcar en sangre en pacientes diabéticos. Con esta terapia, los pacientes pueden volverse más conscientes y aceptar su condición. Los profesionales de la salud pueden ayudar a los pacientes a autogestionarse mediante la práctica de la atención plena.*

Palabras clave: *Reducción del estrés basada en la atención plena, control glucémico, bienestar psicológico, diabetes mellitus tipo 2, revisión sistemática,*

INTRODUCTION

Diabetes mellitus (DM) is a long-term condition brought on by persistent endocrine, metabolic abnormalities that interfere with the secretion and/or function of insulin, raising blood sugar levels (hyperglycemia) (1). Diabetes is a complex and debilitating disease that, if not properly controlled, will have negative health impacts (2). Patients with diabetes mellitus typically struggle with stress, depression, or diabetes-related distress (3). Diabetes causes psychological issues for around 66 % of type 2 DM patients, who also have an increased risk of depression (4). These psychological issues have an adverse effect on treatment outcomes, blood glucose levels, and the course of the disease (2). The World Health Organization (WHO) projects that 422 million people worldwide will have diabetes mellitus by 2023. According to data from the International Diabetes Federation, Indonesia has 19.5 million DM patients as of 2021, placing it as the fifth-ranked nation (5). It is projected that by 2045, there will be 28.6 million DM patients worldwide. With 21 992 cases worldwide in 2020, diabetes was among the top 10 diseases (6).

Patients with type 2 diabetes have numerous facets of self-management, including lifestyle modifications, education, and treatment. Patients encounter various obstacles and issues, such as dietary and exercise modifications upon diagnosis, lack of social support, and awareness of the disease's symptoms (7). Educational materials, physical, psychological, and social hurdles, rigorous treatment plans, low motivation, a lack of understanding of self-management, and a lack of knowledge on the part of healthcare professionals toward patients are some obstacles to self-management (8). Psychological issues can lead to decreased quality of life, poor glycemic control, mortality, and functional limitations in patients. They also affect their self-regulation and psychological well-being (2,9,10). The majority of individuals with diabetes mellitus have trouble controlling their emotions, especially when it comes to taking care of their illness (11). Diabetes patients may experience distress if they are unable to manage their diabetes (12). The typical HbA1c score of diabetes mellitus patients

is high, and most of them nevertheless have moderate psychological well-being.

Diabetes distress is defined as anxiety and depressive feelings associated with managing diabetes, living with the condition, and its complications (13). Patients with female gender, younger age, shorter duration of diabetes, high HbA1c levels, insulin use, smoking, difficulty adhering to dietary and medication recommendations, inadequate physical activity, and inability to monitor blood glucose levels are more likely to experience diabetes distress (14). Distress can reduce creativity, cause a shorter attention span, and cause inadequate coping and self-management (9). Being distressed might make learning new things, developing new abilities, and solving difficulties more difficult. Patients under distress also tend to form false personal beliefs, self-defeating judgments, and unrealistic expectations and ambitions (12).

Mindfulness-Based Stress Reduction (MBSR) is a set of mindfulness exercises de-signed to teach attention control over the present moment without the addition of judgment (15). People with chronic illnesses such as fibromyalgia, coronary artery disease, back pain, and arthritis can benefit from MBSR in terms of pain, anxiety, and stress (16). Low to moderate dosages of MBSR affect the management of psychological and physical symptoms in a range of chronic somatic illnesses, such as arthritis, cancer, and cardiovascular problems, according to systematic reviews (17,18). Previous systematic research has explored the influence of mindfulness on reducing stress, anxiety, and depression in great detail; however, information about psychological well-being is still lacking. This review aims to determine how mindfulness programs affect individuals with diabetes mellitus's ability to control their blood sugar levels and enhance their psychological well-being.

METHODS

The Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines were followed during the study's systematic review (19). According to PICOS, the following were included as inclusion criteria: English-language articles published between 2014 and 2023; patients with type 2 diabetes mellitus (Population); mindfulness intervention (Intervention); fasting blood glucose, HbA1c, stress, psychological distress, and psychological well-being (O); experimental-type quantitative research (S). Study protocols, conference proceedings, editorials, review articles, case reports, case series, and qualitative research were excluded.

Search Strategy

Academic databases were searched in November 2023. Four databases were searched: Scopus, Web of Science, and ScienceDirect, and we added articles using both direct searches from Google Scholar and manual search tactics. Boolean operators in the form of AND/OR were utilized to conduct the literature search, namely "diabetes mellitus type 2," "mindfulness-based stress reduction," "AND/OR," "glycemic control," "blood glucose," "glycated hemoglobin," and "psychological well-being." The terminology is modified in accordance with the Medical Subject Heading (MeSH).

Study Selection

Mendeley was used to select the articles. Researchers evaluated and screened the remaining publications in two stages: first, full-text screening, then screening for titles and abstracts. The entire manuscript was then examined independently by the writers. All voting in the screening process has to be done unthinkingly, so my peers won't be able to see my vote until they've cast their own, and vice versa. Conflicts or differences amongst reviewers were then settled by consensus-building talks or the involvement of a third reviewer.

Researchers employed the PRISMA flowchart visual flow chart during the study selection process. This chart helps identify, select, and organize studies for inclusion in a systematic review or meta-analysis. The PRISMA flowchart guarantees that the process of choosing studies is visible and repeatable (Figure 1). We used the Joanna Briggs Institute, or JBI, to evaluate the quality of an article.

Data Analysis

Data extraction is the first step in data analysis. The inclusion criteria established in each paper were extracted using a Microsoft Excel sheet. Two separate researchers independently extracted the data. Two to three unbiased reviewers must oversee the extraction procedure. Text and PRISMA-based diagrams depict the search process and literature discoveries. A synopsis comprising the features of every investigation is provided as an overview of the evidence that will be utilized in the data synthesis. Both text and tables display descriptive data.

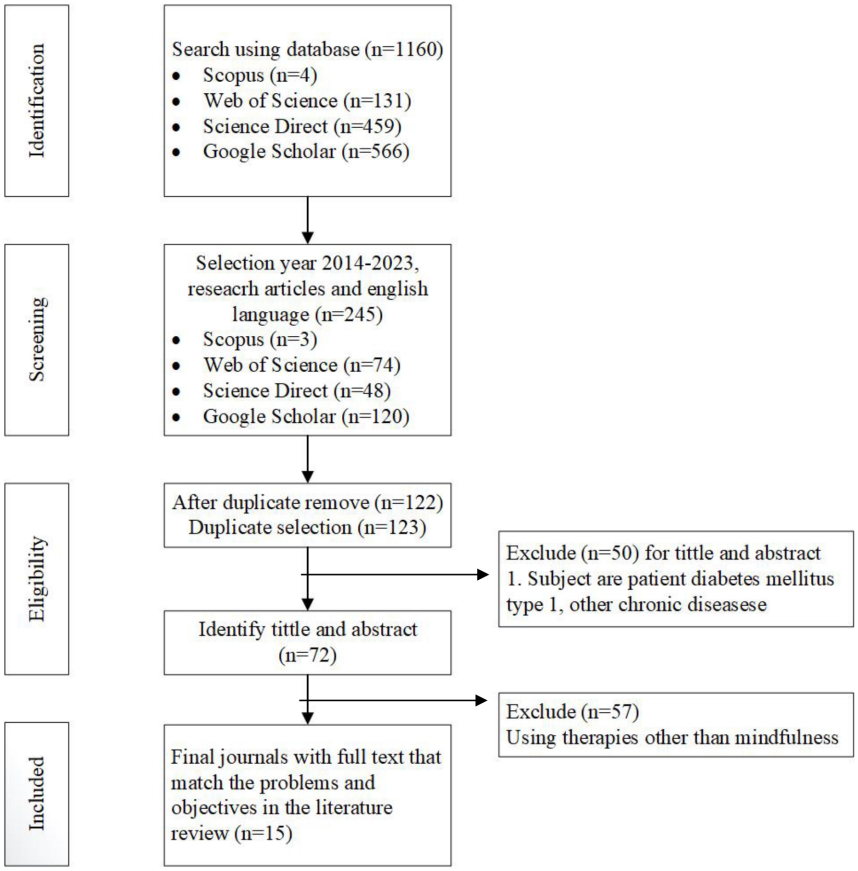

Figure 1. Flowchart with PRISMA Guidelines in the Research the Effect of Mindfulness-Based Stress Reduction on Glycemic Control and Psychological Well-being of Diabetes Mellitus Patients: A Review of Experimental Studies

RESULTS

Study Characteristics

A portion of the research on mindfulness was carried out in Asian nations, such as Saudi Arabia (20), Iran (21-26), India (27), and China (28,29). The United States (30-32), Canada (33) Australia (34) are among the nations that have studied mindfulness. Most researchers who study mindfulness utilize two groups: one for treatment (mindfulness alone or in conjunction with other therapies) and the other for control (education, routine care, physical activity, etc.) (20-23,28,30,34). Participants in the study had an average age range of 45.24 to 63.7 years old and were type 2 diabetic patients. Except for the study (20,23), which exclusively

included female respondents; the majority of respondents in this study were men and women. Based on a questionnaire with HbA1C values > 7 and at least six months of diabetes treatment, the study was done on type 2 DM patients who had previously been tested for psychological issues (diabetic discomfort, stress). According to Table 1, the study did not involve participants who had a medical diagnosis of mental illness.

Mindfulness Intervention

Mindfulness-Based Stress Reduction (MBSR) is the form of mindfulness intervention that has been employed in the majority of study (21,23,25,27-33). Four weeks (low dose) (31), eight weeks (21,29,30,32-34) and twelve weeks (23) have been allocated for MBSR. Trained specialists teach mindfulness, which is then reinforced through communication channels such as WhatsApp (25), CDs (32,34) or mobile application (30).

Glycemic Control in Type 2 DM Patients Treated with Mindfulness

HbA1c and fasting blood sugar levels were used to evaluate how well mindfulness controlled glycemic levels in Type 2 DM patients. Pre-intervention, mid-intervention, post-intervention, and many months after the intervention (3 months post-intervention) (21) (6 months post-intervention) (30) were all measured. Except for the study (24,27,34) where the HbA1c value was significant after measurements were made at week 12. The research results demonstrated a substantial benefit of mindfulness in managing blood sugar and HbA1c levels in type 2 DM patients.

The Effect of Mindfulness on Psychological Well-being

The patient's psychological issues, particularly those involving poor self-management, can be controlled by practicing mindfulness. The implementation of MBSR programs has been shown to improve the well-being of patients with type 2 diabetes (21), specifically through the reduction of depression (30,31), anxiety (HARS, and HDRS scores with $p< 0.05$), stress and depression (34), resilience and psychological well-being (22,28), and emotional health (33). Psychological effects are measured with instruments designed to measure psychological circumstances and laboratory data, namely cortisol levels. According to research (Table 1) (20), women's cortisol levels were significantly regulated by mindfulness.

DISCUSSION

Being mindful is being aware of how experiences unfold moment by minute while doing so consciously, in the present, and without passing judgment. The ability to pay attention to present experiences without passing judgment or making any assessments is referred to as mindfulness (35). A mindfulness-based intervention was created to help individuals with long-term medical issues manage their pain, depression, and anxiety connected to their health (36). To assist in overcoming emotional issues, Mindfulness-Based Stress Reduction (MBSR) is a systematic program that incorporates bodily awareness, non-judgmental acceptance, meditation practices, and emotional regulation tactics. Eight weekly group sessions (typically lasting 2.5 hours each) are part of a normal MBSR intervention, which lasts eight weeks, with an all-day retreat between weeks six and seven (31). With a focus on physical and emotional discomfort, mindfulness training aims to develop acceptance of various states of consciousness. It also teaches individuals to observe their emotional, bodily, and cognitive states without unintentionally reacting (22).

Mindfulness is awareness that is non-judgmental and cannot be expressed in words. It is based on an individual's experience within the limits of their attention at a particular moment. In addition, this concept includes acceptance of these experiences and increased mindfulness to improve psychological well-being. This is as explained in Kian et al. and Hosseini et al. research (21,22), where mindfulness therapy is effective in improving psychological well-being. Acknowledgment, comprehension, and personal development are useful elements that enable

Table 1. Literature Analysis

No	Title	Author, Year	Design	Participants and Settings	Type of intervention		Outcomes	Results
					Intervention group	Control Group		
1	Impact of Mindfulness-Based Stress Reduction on Emotional Well-Being and Glycemic Control in Type 2 Diabetes Mellitus Patients	Kian, 2018	Randomized controlled trial	T2DM patients with hemoglobin A1c higher than 7.	Eight sessions of MBSR	Ordinary care	Fasting blood sugar, HbA1c, mental health, depression and anxiety.	Reductions in Fasting Blood Glucose, HbA1C, HARS, and HDRS scores ($p < 0/05$).
2	Effectiveness of Mindfulness-Based Therapy on Resilience, Psychological Well-Being, and Blood Sugar Levels in Type II Diabetes Sufferers	Hoseini, 2021	Semi-experimental with a pre-posttest control group design.	All patients with type II diabetes were referred to a health center in Tehran in 2018.	Ten sessions of mindfulness treatment.	The control group remained on the waiting list.	Resilience, Psychological Well-Being, and Blood Sugar.	Improving resilience ($p<0.001$), psychological well-being ($p<0.001$), and blood sugar ($p<0.001$) in DMT2.
3	The Effect of Mindfulness on Psychological Distress and HbA1c in Diabetes Sufferers.	Pearson et al., 2018	Randomized controlled trial.	18 years or older, does not meet glycemic control targets, T2DM with vascular complications (diabetic nephropathy or microalbuminuria, eGFR < 60 ml/min/1.73 m2 regardless of HbA1c.	Mindfulness giving by CD, performed for 30 minutes daily by patients at home over 8 weeks.	Participants are given a CD that does not contain IMP (blank).	Psychological distress, HbA1c, systolic and diastolic blood pressure and diabetes self-management.	Reducing depression ($p = 0.02$) and stress ($p = 0.03$). There was an overall improvement in blood glucose monitoring; However, this was not significant ($p = 0.06$). HbA1c measurements decreased significantly over 12 weeks of follow-up by 0.48 units (time × group interaction: $p = 0.02$).
4	Evaluation of the Effect of Mindfulness-Based Stress Reduction for 12 Weeks on Glycemic Control and Mental Health Index in Women Suffering from Type 2 Diabetes Mellitus	Ravari, 2020	Randomized controlled trial, pre-post test	Adult women (age range 30–59 years) with DMT2, having DM at least 6 months, and hemoglobin A1C (HbA1c) between 7% and 9%.	MBSR (12-week MBSR program): The intervention group received eight sessions (2 hours each) of group mindfulness training by a certified instructor once a week and then practiced at home for 4 weeks. Weekly self-reports were presented on home practice.	Usual care (being treated regularly by a healthcare system according to national guidelines for diabetes care).	Depression, anxiety, stress score, fasting blood sugar (FBS) and hemoglobin A1C (HbA1C).	The mean HbA1C, FBS, and depression, anxiety, and stress scores improved significantly after the intervention.
5	Feasibility of Mindfulness-Based Interventions for Aboriginal Adults with Type 2 Diabetes.	Dreger, 2015	Quasi-experimental design.	Aged over 18 years, reported a diagnosis of Type 2 Diabetes, self-identified as Aboriginal, and did not report suicidal ideation, substance abuse, or active psychosis.	Intervention (mindfulness-based program for 8 weeks three times, modified MBSR program).		HbA1c levels, MAP, and self-report data (physical and emotional health, diabetes self-care behavior, and alertness) using repeated measures analysis of variance with 3 assessments.	Significant reduction in blood sugar (HbA1c reduced by 0.43%, $p = 0.02$; $d = 0.37$) and blood pressure (mean arterial pressure reduced by 7.91 mm Hg, $p = 0.05$; $d = 0.85$). They also reported significant improvements in emotional health.

Continued in pag. S300…

…continuation Table 1. Literature Analysis

No	Title	Author, Year	Design	Participants and Settings	Type of intervention		Outcomes	Results
					Intervention group	Control Group		
6	Effects of an integrated mindfulness intervention for veterans with diabetes distress: a randomized controlled trial	Dinardo, 2022	.Randomized controlled trial.	Veterans (N=132) with type 1 or 2 diabetes, diagnosed diabetes, positive DD screen, HbA1C >7%, and willing to be randomized.	(MindSTRIDE integrated with DSMES) a one-session mindfulness intervention integrated into an existing diabetes self-management education and support (DSMES) program plus one booster session and 24-week home practice supported by a mobile app.	DSMES (one 3-hour comprehensive DSMES group session).	Diabetes distress, self-care behavior, diabetes self-efficacy, posttraumatic stress disorder (PTSD), depression, alertness, hemoglobin A1C (HbA1C), body weight, and blood pressure.	.The HbA1C, PTSD, depression, and diabetes self-efficacy of both groups significantly improved without a significant effect from the intervention. The body weight and mindfulness did not alter in either group.
7	Effect of aerobic exercise, slow deep breathing, and mindful meditation on cortisol and glucose levels in women with type 2 diabetes mellitus: a randomized controlled trial	Obaya et al., 2023	Randomized controlled trial.	The study included adult female participants (≥18 years old) who had been diagnosed with type 2 diabetes (T2DM) for at least 5 years but were in a medically stable state at that point. When registering, they revealed a moderate to high level of stress.	The group engaged in mindfulness meditation instruction, aerobic exercise, and slow, deep diaphragmatic breathing. For a period of six weeks, three sessions a week were dedicated to each intervention technique.	The group that only did aerobic exercise.	Cortisol and fasting blood glucose.	Compared to the aerobic training group, the group that combined six weeks of aerobic exercise with deep, calm breathing and mindfulness meditation showed significantly lower levels of cortisol ($p = 0.01$) and fasting blood sugar ($p = 0.001$).
8	Reduces diabetes distress and improves mindful self-management.	White Bird, 2017.	Single-arm pilot study.	Type 2 diabetes and had two Hemoglobin (Hb)A1c values ≥ 8.0% in the previous 16 months, with the most recent HbA1c value > 8% in the last 3 months.	Teaches an 8-week course at MBSR that consists of light Hatha yoga and four types of meditation: sitting, standing, walking, and supine. The lecturer teaches the participants memory techniques, which they can then practice at home with the help of an audio series (CD/MP3)		Stress, mental health (general mental health, anxiety, depression), social support, diabetes-related stress and self-management, HbA1c and blood pressure	The study participants exhibited noteworthy enhancements in their psychosocial self-efficacy (Cohen's d.80, p <.001), glucose control (Cohen's d –.79, p < 001), and diabetes-related distress (Cohen's d –.71, p <.002). There were also notable gains in coping, self-compassion, sadness, anxiety, stress, and social support.
9	A feasibility study of a low-dose mindfulness-based stress reduction interven-	Xia, 2022	One-arm mixed method.	18 years of age or older, fluent in English, and receiving a diagnosis of prediabetes or	The low dose MBSR intervention was given in a group se-		Recruitment, adherence, dropout rates, participant satisfaction,	Eleven participants' qualitative data revealed that 90.9% of them had a good experience with low-dose

Continued in pag. S301…

…continuation Table 1. Literature Analysis

No	Title	Author, Year	Design	Participants and Settings	Type of intervention		Outcomes	Results
					Intervention group	Control Group		
	tion among prediabetes and diabetes patients.			diabetes. When an individual's HbA1c fell between 5.7% and 6.4% or fell below 6.5%, they were classified as prediabetic or diabetic.	tting in four waves, lasting eight to ten hours each and comprising eight sessions spread over six to eight weeks.		motivation, and barriers to low-dose MBSR. Psychological, behavioral, and physical actions.	MBSR. Depression scores significantly decreased (mean drop = 5.04, SD = 7.66, p = 0.02), attendance exercises were completed by a larger percentage of participants (42.86% vs. 85.71%, p = 0.01), and glycosylated hemoglobin (HbA1c) levels were significantly lower (mean decrease = 1.43%, SD = 2.54%, p = 0.03) at the post-intervention period.
10	Effectiveness of a nurse-led mindfulness stress reduction intervention on diabetes distress, diabetes self-management, and HbA1c levels among people with type 2 diabetes: A randomized controlled trial	Guo, 2021	Randomized controlled trial.	Patients with type 2 diabetes who are older than eighteen, have a DDS-17 score greater than three, can use a smartphone with the WeChat app, can read and write Chinese, and have been hospitalized for at least eight days.	Nurse-led MBSR therapy + regular. diabetes education.	Regular diabetes education.	Diabetes distress, self-efficacy, diabetes self-management, HbA1c.	In individuals with type II diabetes, the intervention dramatically lowers blood sugar (p<0.001), psychological well-being (p<0.001), and resilience (p<0.001).
11	Beneficial effects of mindfulness-based stress reduction (MBSR) on biophysiological and psychological parameters among type 2 diabetics.	Sasikumar, 2022	Randomized controlled trial.	This study was conducted on 138 type 2 diabetes mellitus patients living in a rural area of Bengaluru, India. Eligible samples were PSS ≥15 and CEDS ≤ 20 on the subscale, fasting blood glucose ≥ 110 mg/dL, systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg.	The intervention group received 20-30 minutes of MBSR practice weekly for 5 days over 8 weeks, including mindfulness breathing, body scan, sounds, and mindfulness of feelings and thoughts.	Ordinary care.	Stress, depression, mindfulness, blood glucose, HbA1C, blood pressure.	MBSR has a significant effect on HbA1C, blood pressure, BMI, stress, depression and mindfulness in diabetes mellitus patients.
12	The effect of mindfulness-based stress reduction in depression and blood sugar reduction diabetic patients with BIS type of personality	Shirmahaleh et al., 2017	Quasi-experimental study.	Thirty diabetes mellitus patients aged 20-50 years who experienced depression.	MBSR eight sessions of 120 minutes.	Ordinary care.	Personality, depression, fasting blood glucose, HbA1c.	Mindfulness-based training positively reduces stress and blood sugar in patients with type 2 diabetes.
13	The effect of mindfulness-based stress reduction (MBSR) training on serum cortisol levels, depression, stress, and anxiety in type 2 diabetic older adults during the COVID-19 outbreak	Sayadi et al., 2022	Randomized controlled trial.	The participants were 56 older adult patients with type 2 diabetes.	Eight MBSR online training sessions	Routine clinical care.	Anxiety, stress, depression, and cortisol levels.	There were significant differences in stress, anxiety and cortisol levels before and after the intervention. However, there were no significant differences between the treatment and control groups.

Continued in pag. S302…

...continuation Table 1. Literature Analysis

No	Title	Author, Year	Design	Participants and Settings	Type of intervention		Outcomes	Results
					Intervention group	Control Group		
14	The Effect of Mindfulness-Based Stress Reduction Counseling on Blood Glucose and Perceived Stress in Women with Gestational Diabetes	Zeinabeh et al.,	Quasi-experimental interventional study.	78 women with gestational diabetes (Being in the first half of pregnancy (< 20 weeks) and under treatment with a gestational diabetes diet).	The researcher conducted the MBSR counseling program in 8 sessions of 90 minutes twice a week.	Routine pregnancy care	Fasting blood glucose, two hours fasting blood sugar, stress.	There were significant differences in fasting blood sugar, two hours fasting blood sugar and stress levels between the treatment and control groups before and after the intervention.
15	The effects of mindfulness-based stress reduction therapy combined with intensive education on the effectiveness of the care and the awareness rate in patients with arthritis and diabetes	Chen et al., 2021	Randomized controlled trial.	Ninety-four patients with diabetes and arthritis.	BSR for 8 weeks and an intensive education program.	Eight-week-long intensive education program.	Anxiety, Depression, Coping Style, quality of life scale (DSQL), and cortisol levels.	The combination of MBSR and an intensive education program can improve patient symptoms, reduce anxiety/depression, increase coping levels, quality of life, and cortisol levels Quality of life and cortisol levels in the treatment group in weeks 2, 4, 6 and 8 were lower compared to the control ($p < 0.05$).

the person to react naturally and thoughtfully to situations without any reflection or analysis. In addition, they support individuals in identifying, handling, and resolving everyday issues. As well as lowering anxiety, sadness, and psychological symptoms, numerous research have demonstrated the positive effects of increased mindfulness on psychological well-being, life satisfaction, optimism, and self-esteem (37).

Mindfulness can help change behavior, especially if targeted at specific behaviors such as diet, physical activity, glucose monitoring, and medication management. According to certain research, focused interventions like portion control can lower energy and calorie intake (38). Mindfulness training may aid glucose regulation through its effects on emotional regulation and stress reduction. Hypothalamic-pituitary-adrenal (HPA) axis modulation and stress pathways are two possible mechanisms or pathways that could account for this HbA1c shift. Behavioral modifications and stress-reducing effects on the HPA axis are also possible explanations. A study (20) revealed that DM patients' cortisol levels were lowered by mindfulness training. A study (28,38) observed reduced HbA1c levels and improved patient capacity to handle stress, emotional stress, and quality of life. Consistent with other research, mindfulness has been shown to enhance diabetes patients' psychological coping mechanisms (39,40).

CONCLUSION

Mindfulness-Based Stress Reduction (MBSR) uses a set of mindfulness techniques to teach people to regulate their attention to the present moment without passing judgment on it. Mindfulness can also help with glycemic management and mitigate the impact of psychological issues. As a supportive therapy for DM patients, mindfulness can be employed.

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Challenges encountered during the process of obtaining informed consent in human subject research: A Scoping Review

Desafíos encontrados durante el proceso de obtención del consentimiento informado en la investigación con seres humanos: Una revisión del alcance

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SUMMARY

Introduction: *Informed consent is a procedure to encourage and invite participants by providing information when making research decisions. However, implementing informed consent is considered unfeasible and imposes constraints on the value of research inquiries. Obtaining informed consent is also seen as a potential bias in acquiring knowledge. In other words, research participants and researchers face many challenges in the process of informed consent. This comprehensive study aimed to map the challenges encountered while obtaining informed consent in human subject research.* **Methods:** *The electronic databases search using PubMed, MEDLINE (EBSCO), and ScienceDirect (Elsevier). Relevant studies were chosen using inclusion criteria, such as those published in 2014-2024 with "full text," English, human research subject, quantitative, qualitative, and mixed methods articles. JBI guidelines are a checklist used to assess eligibility. Data from studies described challenges encountered while obtaining informed consent in human subject research extracted and synthesized. Processes are supported by MeSH term, PCC worksheet, and convidence.org.* **Results:** *Twenty-one studies were identified to provide information about the challenges of obtaining informed consent in human subject research.* **Conclusion:** *This study categorizes three themes within eight subthemes related to challenges in obtaining informed consent: 1. Communication Issues, 2. Respondents' Issues, and 3. Ethical Considerations.*

Keywords: *Challenges, human subject, informed consent, research.*

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RESUMEN

Introducción: *El consentimiento informado es un procedimiento para animar e invitar al participante mediante la información a tomar decisiones en la investigación. Sin embargo, la aplicación del consentimiento informado se considera inviable e impone limitaciones al valor de las investigaciones. El proceso de obtención del consentimiento informado también se considera un sesgo potencial en la*

adquisición de conocimientos. En otras palabras, son muchos los retos a los que se enfrentan los participantes en la investigación y los investigadores en el proceso de obtención del consentimiento informado. El objetivo de este estudio es determinar los problemas que surgen durante el proceso de obtención del consentimiento informado en la investigación con seres humanos. **Métodos:** *Búsqueda en las bases de datos electrónicas PubMed, MEDLINE (EBSCO) y ScienceDirect (Elsevier). Los estudios pertinentes se eligieron utilizando criterios de inclusión, como publicados en 2014-2024 con «texto completo», en inglés, sujetos de investigación humanos, cuantitativos, cualitativos y artículos de métodos mixtos. Las directrices del JBI son la lista de comprobación utilizada para evaluar la elegibilidad. Se extrajeron y sintetizaron los datos de los estudios que describían los desafíos encontrados durante el proceso de obtención del consentimiento informado en la investigación con sujetos humanos. Procesos apoyados por el término MeSH, la hoja de trabajo PCC, convidence.org.* **Resultados:** *21 estudios fueron identificados para proporcionar información sobre los retos que plantea la obtención del consentimiento informado en la investigación con seres humanos.* **Conclusión:** *Este estudio categoriza tres temas dentro de ocho subtemas relacionados con las dificultades para obtener el consentimiento informado, a saber: 1. Problemas de comunicación, 2. Problemas de los encuestados, 3. Consideraciones éticas.*

Palabras clave: *Retos, sujeto humano, consentimiento informado, investigación.*

INTRODUCTION

Informed consent has been legally recognized since 1972. It includes explanations and effects connected to the procedure to be performed by the patient; the procedure requires permission from the patient as the research subject. Informed consent is when a healthcare provider educates a patient about a procedure or intervention's risks, benefits, and alternatives. The patient must be competent to make a voluntary decision about whether to undergo the procedure or intervention (1,2). Informed consent is both an ethical and legal obligation of medical practitioners. It preserves the individual's autonomy by telling them about the benefits, alternative methods, potential hazards, modes of operation, and reasons for planning (3). Informed consent not only fulfills moral requirements relating to individual human rights and individual responsibility for one's health, but it also preserves persons from being manipulated as objects of interest (4). Implicit in providing informed consent is assessing the patient's understanding, rendering an actual recommendation, and documenting the process. As a result, the study subject has the right to volunteer to provide informed consent without being coerced by anyone (5).

Society places a high priority on research involving human beings, and patient privacy is greatly valued. Important information about disease prevalence, risk factors, treatment outcomes, public health initiatives, functional skills, care patterns, expenditures, and healthcare service utilization is provided by existing research (6). The process will be successful if the objectives are carried out well: to respect and increase the patient's autonomy. Then, this research must also protect patients as research or human subjects from threatening dangers (7). Participants must receive an explanation of relevant information, such as conditions, objectives, risks, and potential benefits until alternatives are provided (5). However, participants usually need help understanding the subject information in the informed consent form. A study reported that informed consent had deficiencies in communicating the study, especially in explaining the risks (8). Preserving participants' independence and facilitating their decision-making ability is crucial. Nevertheless, considerable discussion remains regarding the methods for assessing and enhancing the informed consent procedure (9). Respecting potential participants' choice to decide whether or not to join in health research is essential to getting adequate informed consent (10). In fact, potential volunteers are given a lot of lengthy and detailed information, which might be confusing and cause anxiety (10). Even though the informed consent procedure in health research has been extensively studied, there still needs to be more understanding of the complexities of the procedure that impact marginalized people's capacity to make educated decisions about participating (10).

Getting informed consent can provide more challenges. In underdeveloped nations, participants may need help with study adherence, be unable to understand the hazards of clinical trials, be afraid of research procedures, or worry about them. The difficulties in gaining informed

consent might be more severe in developing nations when participants struggle with study adherence, are unable to weigh the risks of clinical trials, are afraid of research procedures, or worry about having less access to healthcare (11). It might be necessary for researchers, sponsors, and regulatory bodies to take deliberate action to address this issue, which could negatively impact research in underdeveloped nations that already struggle with inadequate infrastructure, resources, and illiteracy (11). In review research, Kadam addresses the challenges of the consent process and looks into creative ways to improve it (11). Further, it is claimed that individual educational limitations, demographic changes, and data technology advancements are the primary obstacles to acquiring informed consent. Educational limitations include research participant's literacy level and level of education, demographic changes including age and multiculturalism, data technology advancement's increased challenging ethical questions (12).

According to (13), several problems arise in the informed consent process, including language barriers, religious influence, incorrect expectations, individual perspectives, and the presence of vulnerable individuals. Although both papers present reasons concerning the difficulties associated with gaining informed consent, it is important to note that this research reviews articles that need more systematic steps. In contrast, systematic research demonstrated that obtaining informed consent could be more practical (14). Using "impractical" as the key search term, he found impracticality in obtaining informed consent forms. The impracticality involves an excessive burden in the procurement process for researchers, invalid results due to collecting the data right after the informed consent forms are signed, detrimental to participants as their privacy is infringed, and often irrelevant to the participants.

Based on the preceding discussion, implementing informed consent is vital on the one hand but also carries challenges on the other. Major challenges in obtaining informed consent forms have been said to be "impractical" as they introduce a potential bias in acquiring knowledge. In addition, from the participant's perspective, the term "impractical" refers to the fact that implementing informed consent would have negative consequences, such as compromising privacy and being insignificant. Therefore, researchers are responsible for creating a novel method to obtain informed consent and reduce potential harm to participants during the research process. A scoping review is required to identify further challenges in obtaining informed consent in human subject research. A scoping review will provide a broad understanding of the topic (15). Scoping reviews will identify and map the breadth of evidence available on a particular topic, field, concept, or issue, often irrespective of source (16). Scoping reviews define important terms and concepts and highlight important aspects of a concept, such as those pertaining to methodological research (16).

METHOD

A scoping review describes the available studies, provides an overview with a broad or detailed focus, and shows evidence if questions still need to be clarified or specific. This study used four ethical considerations such as transferability, reflexivity, validity, and transparency (17). Using "basic qualitative content analysis" (16), this process uses inductive and deductive reasoning. Inductive reasoning emerges themes and categorizes them from the data during extraction. Deductive reasoning generates concepts or variables from theory or previous studies. The steps of qualitative content analysis are as follows (18):

1) Developing the study's frame and operational definitions

Discovered the themes and subthemes in the theory or theories the researcher wants to find or validate. It also involved classifying those theories based on topics using a structured analysis matrix and the study's coding as a tool. Beyond that, the researchers need to read articles that include the established theories that intend to be investigated within the inclusion and exclusion criteria (Table 1). Furthermore, the researchers created an operational coding framework with definitions (Table 2)

2) Determining the unit of analysis and sampling materials to be analyzed.

The researcher chose what to analyze to achieve the study's objective after developing the framework based on the theory or theories to be tested and definitions of the key concept. Making this decision entails selecting the unit of analysis and the suitable subset of all data sources' populations or the sample of those units to be examined. As for the unit of analysis, it contains a complete text that is both large enough to be viewed as a whole and tiny enough to be remembered as a background for the meaning unit while the analysis is being conducted (Figure 1),

3) Getting a sense of the data.

In this phase, the researcher dug deeply into the gathered information. Next, they looked for the themes and subthemes classified in the previous step. The theme identification was from the data in each sampled piece of material. As a result, the researcher read the initial set of materials gathered to become familiar with the data and try to make sense of them. While reading a chosen article, the researcher gradually highlighted passages whose latent or manifest contents match, are close to, or are comparable to theory-based themes and/or sub-themes mentioned in the study's coding scheme.

4) Data coding and organizing.

The researchers made a reading summary form for every piece of material that had been read and recorded all the highlighted and coded passages in it. A few paragraphs of coded text from the text were shown in two new, designated columns. For reference reasons, one column provided the precise location of every coded passage in the content that has been read, and the other provided a general notion of the event's context.

5) Making connections, interpreting them, and drawing conclusions.

Next was creating meaning, concluding the scattered data, and looking deeper into the implications of the data, for example, by constructing a logical chain of evidence, contrasting and comparing text passages with theory-based themes and subthemes and the correlation between them at the levels of both manifest and latent content, and providing justifications in line with the contexts from which the data were gathered. Part of this step may involve identifying new themes or sub-themes from highlighted areas that don't fit into any designated category or sub-category. This process culminates in creating narratives using Compare Matrices of the meaning units in the themes (Appendix 2). The researcher then provided interpretations and understandings of the data displayed in the display and made connections to other sources, particularly to make latent content explicit and to make sense of the data in brief prose.

6) Verifying interpretation's plausibility and ensuring trustworthiness.

The researcher explained the study findings and provided details about the process that led to those findings, along with their limitations and strengths. Joanna Briggs Institute (JBI) critical appraisal supported this step. This appraisal aims to assess a study's methodological quality and determine the extent to which it has addressed the possibility of bias in its design, conduct, and analysis. The questions used in randomized control trials are 13, qualitative research is 10, case-control is 10, and cross-sectional is 8.

7) Making an appropriate outline for a detailed presentation.

Researchers presented the outline of coding schemes related to themes and sub-themes (Figure 2).

8) Thick description of the research history and findings.

This is a descriptive summary of the entire study. It embeds quotes where proof is required to support a topic, along with matrices containing the authors' details and year, country, objective/s, sample and its characteristics, material and methods, Joanna Briggs Institute (JBI) scores, and findings related to challenges encountered during the process of obtaining informed consent in human subjects that are provided in significant detail (Appendix 1).

RESULTS

Researchers started advanced searching on 13 February 2024. They used three databases: PubMed (23 articles), MedLine with EBSCO (16 articles), and Elsevier Direct (19 articles). In

Table 1. PCC worksheet to determine and develop keywords for the database

Population	Concept	Context
"Research subjects" OR human subjects OR research subject OR subject, research OR subjects, research OR human subjects OR human subjects). OR	"Consent forms" OR consent form OR (consent form OR informed consent documents OR consent documents, informed OR document, informed consent OR informed consent forms).	"Research" OR research OR (research activities OR activities, research OR activity, research, OR research activity).

Table 2. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Articles published in 2014-2024 Articles with "full text" Articles in English Articles with human research subject Articles used quantitative and qualitative methods	Articles with a literature review method Article about obtaining informed consent but not related to the challenges Books and documents

addition, researchers conducted hand searching (14 articles). On 16 April 2024, after reviewing the title, abstract, and full text, 21 articles were included in our topic.

According to the theme development using content analysis, as explained before, three themes support the research questions: communication issues, respondent issues, and ethical considerations issues. The results of the article mapping tables based on the research questions have shown that all articles have answered the research questions. Three themes out of eight sub-themes supporting the research questions have been obtained. The first theme consists of two sub-themes supported by nine reference articles. The second theme consists of four sub-themes supported by nineteen reference articles. The third theme consisted of two sub-themes supported by nine articles.

Theme 1: Communication Issues

There are various challenges to obtain informed consent, including communication issues. Nine studies supported this theme and have two sub-themes: information issues and language barriers. There are many challenges in information issues such as unexplained informed consent, incomplete information, risks/effects and further information/other studies that are reasons for participants not to register for research, the need for spaced or larger text in informed consent, complexity in research procedures, consent materials, too much and too little information, statements in informed consent that are lacking and informed consent that are too long (19-24). Moreover, language barriers are also a challenge that causes participants to refuse to enroll in research. Language barriers might occur between participants' daily language and the language used in informed consent. Three studies support this sub-theme (25-27).

Theme 2: Respondents' Issues

Respondents' issues, including lack of knowledge, unwillingness, individual' situational, and individual perspective, were also reported as challenges in obtaining informed consent. A total of 14 studies supported the respondents'

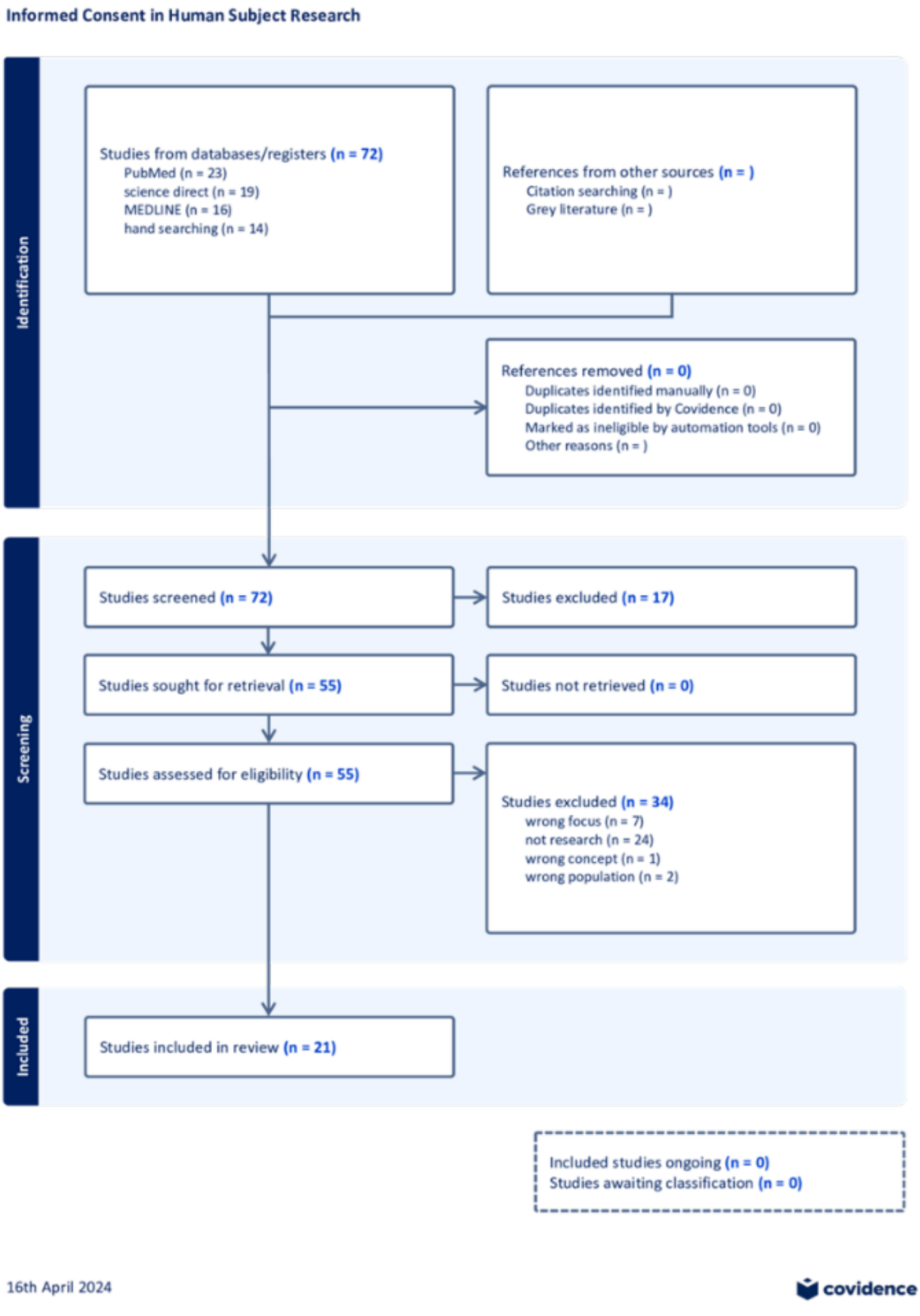

Figure 1. PRISMA ScR.

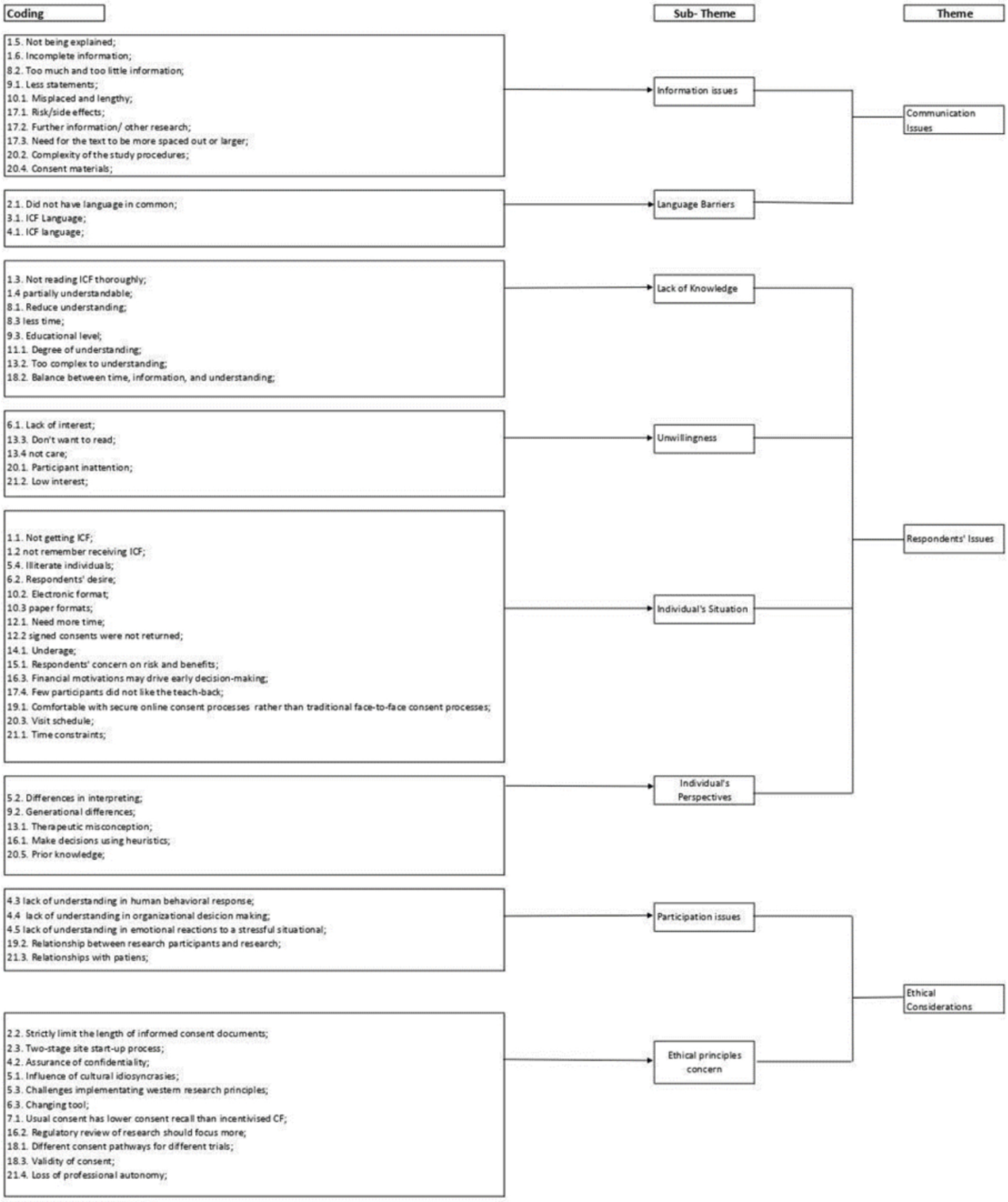

Figure 2. Themes, Sub-themes, and Codings.

issues. Contributing factors that appear in the lack of knowledge were the complexity of IC (28), educational level (21), not reading ICF thoroughly (19), degree of understanding (19, 20), and less time (20). To obtain informed consent, participants must be willing. Factors related to the unwillingness of the participants are lack of interest (29,30) and inattention, such as not wanting to read and not caring (24,28). In addition, individual's situational such as memory limitations (19), illiterate individuals (31), respondents' desire for methods of informed consent such as electronic or paper format, and teach-back (22,23,33), time constraints (30,33), underage (34), financial motivations (35), visit schedule (24), signed consents were not returned (33), respondents' concern about risk and benefits (21). It should also be considered when obtaining an IC. Five studies discuss an individual's perspective influenced by generational differences (21), prior knowledge (24), differences in interpreting (31), making decisions using heuristics (35), and therapeutic misconception (28).

Theme 3: Ethical Considerations Issues

Ethical considerations issues consisted of two sub-themes, i.e., participation issues and concerns about ethical principles. Participation issues can be concluded that challenges in obtaining informed consent are inseparable from the participants' trust in researchers. The relationship between research participants and researchers plays an important role in shaping preferences regarding the consent process (32). Another coding is a lack of understanding of human behavioral response, organizational decision-making, and emotional reactions to a stressful situational (27). The sub-theme of ethical principles concern explains that, in obtaining informed consent, a researcher must pay close attention to the informed consent document given to participants. Simplified informed consent and rules described in detail will help participants determine participation in research because each participant needs a guarantee of confidentiality so that their information data will not be misused in research (27). Ethical considerations issues in obtaining informed consent were also challenges, such as culturally sensitive approaches, participants' concerns about losing autonomy when choosing to participate in research, and the consent pathway used can vary depending on the trial being conducted, so these various things become obstacles for researchers in obtaining informed consent (30,31). The usual consent has lower consent recall than incentivized consent forms, and eight studies support this sub-theme (25,27,29-31,35-37).

DISCUSSION

This study focuses on the challenges of obtaining informed consent in human research. Based on the findings, this discussion elucidates important areas concerning respondents' communication issues and ethical considerations. In this study, communication issues consist of information and language barriers. It explains that every recipient of informed consent must understand communication with informed consent because it is how researchers convey all research-related information to respondents. This is supported by the concept that informed consent can only be achieved through effective communication between the researchers and the participants (38). Issues such as incomplete information, too much information, and too little misplaced, lengthy, and complex can make the participants unable to understand easily. Communication can be effective when the information is simplified and clear. In addition, language barriers in influencing obtaining informed consent are supported by previous research were several institutions also use interpreters to translate while obtaining informed consent for respondents who cannot speak English (22). Some of the respondents also don't have a common language with each other, even regarding the ICF, so the language in ICF must be easy to understand and clear (39). It is also discusses the impacts on the respondents, which, as the respondents cannot understand the aim and roles clearly, can affect the relationship between research participants and the researchers and the relationship with the patients. Moreover, miscommunication due to language barriers can affect misunderstandings in informed consent if the participants can't understand the idea of informed consent (40).

Lack of knowledge of respondents' issues related to IC complexity can be seen in the amount and chosen words. A study in congruence states that shorter and easier-to-understand consent forms do not adversely affect the quality of informed consent. Longer consent forms do not lead to better understanding, and concise forms do not increase satisfaction (41). Moreover, the degree of understanding is correlated to educational level. Studies supporting this statement show that those with low education have more difficulty understanding the voluntariness of studies, placebos, randomization, and freedom of withdrawal (5). Therefore, the delivery of the information of IC needs to be adjusted based on educational level (42). Besides, some participants claimed they needed more time to understand the IC. A similar finding was obtained indicating several reasons, such as the acute phase of the patient's condition, limited time to express important and necessary information, language barriers, and the patient's understanding of the information described (40). Lack of time is a challenge detrimental to IC quality and practice (40). Participants take notice of the risks and benefits of the research before signing the informed consent. Respondents sometimes have trouble understanding and have many questions about risks and benefits. Therefore, researchers need to prepare and learn how to convey the risks and benefits that respondents will experience (43). Participants' trust in professionals such as doctors should also be considered while obtaining IC or real researchers to obtain signed consent. A study states that the mediator or informant doesn't fully understand the procedure and recognizes that only professionals can convey consent information properly (43). In regard to individual situational it was shown that in less developed countries, misunderstandings are experienced more frequently, especially by respondents with low income, illiterate, and less exposed to the research (11). Besides, disease severity, age, and cognitive disability affect a respondent's decision-making. Respondents' willingness to receive the IC is influenced by the amount of information contained in the IC. A qualitative study revealed that the amount of information about gaps and risks that will occur increases the concern to participate (26). Although giving longer IC to respondents, it couldn't increase understanding and willingness (26). Research on pediatric zones revealed that decision-making needs to involve parental consent (44). Concern about possible discomforts, such as pain or embarrassment, and pro-social goals are powerful motivators encouraging teenagers to participate in research. To ensure that younger teenagers' consent is as authentic as possible, researchers assessing their consent should consider their vulnerability to advice from reliable sources (44). To reduce bias in an individual's perspective, researchers need to adjust the way of delivering informed consent information, such as media and simplified language, to increase the understanding and memory of participants (11).

Issues of ethical consideration can further occur when obtaining informed consent. Participation problems are inseparable from the participants' trust in the research. Researchers must be involved in their ability to gain participants' trust because confidentiality plays an important role in research involvement related to the consent process (27). This study explains that informed consent guarantees the rights and welfare of participants involved in a study. Researchers must provide all the information needed by participants clearly because it will affect patient involvement (45). After participants are given time to read and understand information about the nature, purpose, and consequences of the research, they have the right to decide on their involvement without any element of coercion (46). Simplified informed consent and detailed rules greatly influence the participation of participants who need assurance of confidentiality so that their data information is not disseminated. This is a challenge in obtaining informed consent on ethical issues. These results are consistent with studies that explain that assessing understanding and regulatory requirements is an important component of ethical principles (43). Our results suggest that preferences for the consent process are significantly shaped by how research participants and researchers are perceived to interact (32,47), provide support for the issue of the relationship between the participant/patient and the researcher who states that oncology clinical researchers note conflicts of interest occur during patient enrollment. Still, that relationship is also highly important in advising patients about whether to participate in the trial.

CONCLUSIONS

Informed consent is a tool to ask participants for consent to participate in research. However, in the process of obtaining informed consent, there are various challenges. This study categorizes three themes within eight related challenges while obtaining informed consent: communication issues, respondents' issues, and ethical considerations. In overcoming the challenges faced while obtaining informed consent, researchers must prepare strategies to attract attention, provide understanding, and consider the researcher's and participants' ethics.

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Appendix 1 Matrices Table

No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
1	Agozzino et al., 2019	Italy	We investigated whether they signed the consent form and whether they read and understood the information about the surgical intervention. We also investigated whether verbal communication between patients and physicians affected patient decision-making.	The study comprised adult postoperative patients admitted for general surgery and provided written consent to take part. Interviews were conducted by one of four suitably qualified physicians. They are all experts in the field of public health. The hospital and the surgical team were separate entities from epidemiology and hospital organization. Each patient was interviewed privately, and confidentiality was guaranteed for their responses.	Cross-sectional Study. The questionnaire was divided into four sections. Section 1: Descriptive characteristics of the study participants (n = 6 questions). Section 2: Information on the written IC form's delivery, signing, reading and comprehensibility (n = 6 questions). Section 3: Additional information (acquired orally) on explaining the consent and the effect of the written and oral information (n = 11 questions). Section 4: Information on the surgery outcome and post-surgical period (n = 4 questions).	Most respondents (84.5%) personally received a written IC form, or they reported that they delegated it to a parent or a relative; 1.6% declared that they did not get it, and the others (13.9%) did not recall receiving it. All patients who received the IC form signed it personally or through a relative or parent, but only 51.8% reported reading it thoroughly. Among those who read the IC, 90.9% judged it clear and 9.1% deemed it partially understandable. No one considered it incomprehensible. Approximately half of patients received the written IC form a day before surgery (at the earliest), while 41.1% received it within some hours or immediately before surgery. Forty-five percent of patients receiving the written forms were given them by the surgeon who performed the procedure (Table 2). Not all patients had written consent to explain to them; it was explained orally only to 65.6%; however, 93.9% of patients received further oral information; among these, 68.6% considered this information incomplete, and only 31.4% considered it complete. The information was provided progressively during pre-operative examinations (66.7%) and was understandable according to most (97.1%) recipients.	8/8
2	Denning et al., 2015	Africa, Asia, Europe, North America or South America/ Mexico, Australia	To enhance study participants in informed consent. A unique opportunity to investigate the impact of the length and complexity of informed consent forms on participant understanding and satisfaction among geographically varied participants is offered	154 locations participated in the substudy by gaining permission for at least one participant to engage in START, out of the 221 sites that registered to participate in START and 157 sites that opened to the substudy. Of the 64 START locations that were unavailable to the substudy, 23 could open due to a financing group policy decision at the policy level. 41 sites that were left out of the Informed Consent Substudy, about one-third (n = 14)	Cross Sectional Study. Participants in START Informed Consent and Substudy gave responses to questions regarding their satisfaction comprehension and voluntariness of the informed consent process. The questionnaire had 26 items addressing the participant's experience with the consent process, and assessing the participant's understanding	They did not have a language in common with another participating site (such as the single site in Nigeria, where the patient base speaks Hausa). The regulations strictly limit the length of informed consent documents to less than the length of the researchers' concise consent template. The START study's two-stage site start-up process (beginning enrolment at 101 pilot sites, then adding 120 new sites to complete the trial) was also a limiting factor as many of the sites that had not been part of the pilot did not want	7/8

Continued in pag. S317…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
			by the Strategic Timing of Antiretroviral Therapy (START) project.	did not take part because they did not share a language (e.g., the only site in Nigeria, where the patient base speaks Hausa) with another participating site.	of the information in the consent. The example questions are about the mechanism of randomization and the possible risks and benefits of participating.	the delay in enrolment that may have occurred with participation in substudies.	
3	Denning et al., 2015	United States	To assess whether the amount of information provided about legal protections could affect an individual's willingness to participate in the study and their concerns about discrimination and difficulty in deciding whether to join the study.	Using Qualtrics Research Services to recruit US residents aged 18 years or older, with quotas set to ensure that gender, age, race/ethnicity, educational attainment, and household income mirrored the general US population. The sample (n = 1,195) had a mean age of 45.9 (SD = 17.9) years, and 40% had a high school education. Participants were 51.3% female and 36.7% non-Hispanic White.	Randomised Controlled Trial. This research team used a literature study to develop an interdisciplinary survey. A hypothetical scenario asking participants to anticipate being requested to participate in a genetic research study and a brief excerpt of informed consent text regarding GINA were read to them near the beginning of the survey to fulfill study objectives.	- When making an actual decision about participation in a research study, the informed consent document language may have more or less impact on willingness to participate because individuals are also weighing other potential risks and benefits of the study. - On the other hand, we cannot presume clinicians and researchers know this information nor expect informed consent documents to list every possible specific risk of a study or clinical procedure, especially if some are likely to be very rare or unknown or if disclosure would require listing every omission in an anti-discrimination law. Too much detail about the limits of GINA's coverage could overwhelm individuals and heighten fears of discrimination when those risks may be quite low depending on the clinical or research testing being considered	12/13
4	Quigley et al., 2019	United States	To improve an understanding of the ethical challenges of field researchers with place-based communities in environmental studies/sciences and environmental health.	Approximately two thousand researchers were surveyed, but only those employed in place-based communities were eligible to participate. Interact with research participants from cultural groups in the US and foreign research institutions. In subjects such as conservation biology, ecology, sustainability sciences, environmental health, geography, natural resources, ecology, environmental studies, and related sciences, 75% of respondents said they were researchers and worked in environmental fields. Public health and community development were the primary fields of employment	Cross Sectional Study. This survey was put up electronically using the University Qualtrics Survey tool. Respondents were sent a link to complete the survey, consisting of all 45 questions. Question One of the surveys requires each responder to fill out an informed consent form. The "Four Principle Approach" to bioethics served as the framework for the survey questions, which we further refined by applying them to the protection of place-based communities and cultural groups.	-Provides researchers' recommendations for ensuring community training on informed consent logistics, with knowledge of confidentiality requirements and data access rules; ensures adequate knowledge of the informed consent document using native languages; and utilizes cultural norms to secure appropriate consent. Use Native-speaking translators and local languages, report results both in English and local languages, provide a consent copy to participants, do mapping exercises with names, and use visual images, mapping, and photographs to give voice to the community's own stories. It would be best if you were particularly cognizant of a place's context and/or her	8/8

Continued in pag. S318…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
				the remaining respondents.		social structural arrangements to really understand human behavioral response, organizational decision-making, or emotional reactions to a stressful situation. By working with elders in the consent process, a respondent remarked that their research team was informed about language barriers with different participants and how to allow the community to say when/who/how it was appropriate to work with individual community members. With some participants, we spent time meeting with them, getting to know them and B6:D6them know us, and when they were comfortable with participating in the study.	
5	Killawi et al., 2014	Qatar	To delineate procedures related to recruiting, obtaining informed consent, and compensating health research participants in Qatar's extremely high-density multicultural setting.	A total of 153 individuals were approached, and 84 were enrolled. The latter showed a diverse age range (18 to 75 years), varied language representation (Arabic (n = 24), English (n = 20), Hindi (n = 20), and Urdu (n = 20), and balanced gender distribution (women (n = 43) and men (n = 41).	Qualitative Research. The project instruments included a recruitment script, an interview guide, and a single sheet containing both information about the research and a waiver of written informed consent.	1. Influence of cultural idiosyncrasies on the level of disclosure and the informed consent process in clinical care. 2. Differences in interpreting ethical research principles 3. Challenges implementing Western research principles, particularly informed consent 4. Difficulty in obtaining informed consent from illiterate individuals	7/8
6	McCarty et al., 2015	United States	To evaluate long-term recall of elements of informed consent.	One hundred twenty-two men enrolling in the PMRP biobank were approached to participate in the consenting study; 71 (58%) agreed that 35 were randomized to the CBT and 36 to traditional consent.	Randomised Controlled Trial. The questionnaire comprised 24 statements on knowledge of the components of informed consent and 14 statements asking individuals to rate their degree of understanding on a 5-point scale. There was also a query regarding how much of the $20 used to cover enrolment-related costs would affect their choice to take part. Using Wilcoxon and Fisher's methods, comparisons were made between the computer-based and traditional methods and between the present and historical cohorts' precise examinations.	Most of the 52 men who participated in the biobank but declined participation in the consent study cited the reason as "not interested." Two people declined participation in the consent study because they did not want to be randomized to the kiosk; they preferred the face-to-face consent process. Two people withdrew from the computer-based consenting arm after they had started and changed to traditional consent; one changed his mind about being willing to use the computer, and one was unable to hear even when using headphones. They were not followed further for the consenting study. The men randomized to the computer-based consenting reported that the program was easy to use.	12/13

Continued in pag. S319…

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No	Authors details and Year		Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
7	Festinger et al., 2015	United States	This study examines a combined incentivized consent and CF procedure that simplifies the cognitive task and increases motivation to learn consent information.	Of the 254 clients approached, 104 (41%) indicated interest and consented to participate. Before the consent procedure, participants were randomly assigned to the ICF (n=52) or CAU condition (n=52)	Cross-Sectional Study. The 15-item consent quiz assessed all principal topics covered in the host study's consent form, including the study purpose, procedures, remuneration, human rights protections (e.g., confidentiality), and recourse in the event of harm (e.g., whom to contact with additional questions or concerns).	Quiz scores in the two conditions did not differ at the first administration (p=0.39, d=0.2); however, ICF scores were significantly higher at each subsequent administration (second: p=0.003, Cohen's d=0.6; third: p<0.0001, d=1.4; fourth: p<0.0001, d=1.6; fifth: p<0.0001, d=1.8); The ICF/Incentive Consent Form procedure increased consent recall from 72% to 83%, compared with the CAU/ consent as usual condition in which recall decreased from 69% to 59%. This supports the statistical and clinical utility of a combined remedial and motivational consent procedure for enhancing the recall of study information and human research protections	8/8
8	Roessler et al., 2015	United States	To report on an effort to study the development and usefulness of an extensive, broad-use, opt-in biorepository for genomic research, focusing on three ethical issues: providing appropriate understanding, recruiting in ways that do not comprise autonomous decisions, and assessing costs versus benefits. A second goal of this project was to learn more about factors that influence a subject's decision to contribute a sample to biorepository a	Research Volunteers. From the initial population of 6,498, 1,047 (16%) individuals responded, and 230 (4%) eventually enrolled—ambulatory care patients. An additional 250 subjects were recruited in two ambulatory care settings to study the impact of clinic workflow on recruiting times and rates.	Cross-sectional study. The understanding was validated using a 14-question quiz (first 30 subjects) structured (remaining 450 semi-interview subjects). Understanding was judged on a 5-point scale (1 = "doesn't make any sense at all" and 5 = "makes perfect sense"). The SC thoroughly explained any items rated less than five before subjects were enrolled.	- As biomedical research has become more complex, relying on long, complex consent forms has been shown to While too much information may be confusing, too little information could leave key questions unaddressed, putting researchers and review committees in the difficult position of weighing the importance of information, particularly presumed required regulatory language, against understanding. - As a result, even if adding words reduces understanding, IRBs must do so to meet HIPAA requirements. As an example, to meet HIPAA requirements, a newly established UMH Biorepository, which modeled its consent process and documents on the MICHR BioLibrary project, felt compelled to move away from our validated checklist IC to a longer (200 words longer) reorganized IC, which has not been validated (University of Michigan Medical School, n.d.). This change gives reassurance of compliance but not understanding, placing compliance above human protection They took the time to understand what	8/8

Continued in pag. S320…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
						we were asking and to make an informed decision about participation. When we approached them during clinic visits, they had less time and took less time to make decisions. For some, a general commitment to help others was enough to justify enrolment.	
9	Koonrungsesomboo n et al., 2015	Thailand	To evaluate the applicability of the principles and informed consent form (ICF) template proposed by the Strategic Initiative for Developing Capacity in Ethical Review (SIDCER) in a clinical pharmacokinetic study by comparing the volunteers' understanding of the enhanced ICF (developed based on the SIDCER methodology) and the conventional ICF (which was previously approved by local Ethics Committee and used in the clinical study).	Volunteers (age > 18) who can read and write Thai were recruited from universities, colleges, cafeterias, hospitals, and markets in Chiang Mai, Thailand.	Randomized controlled trial. This study was an open-label, randomized-controlled study of the two different ICF interventions (1:1), i.e., the enhanced ICF and the conventional ICF, using a post-test questionnaire as an assessment tool. The post-test questionnaire (in Thai) consisted of 21 short case studies were each case study was designed to illustrate a common practical situation of one element required, followed by a question with three possible answers.	Interestingly, two items were in the conventional ICF, but the proportions of the participants correctly answered between the two groups did not show a statistically significant difference. This could be due to a practicable drawback of the evaluation tool: a close-ended question with multiple answer choices gave an individual a chance to provide the correct answer inadvertently were sufficiently presented in both ICFs but the enhanced ICF group achieved a higher score. - Although there was a trend for baby boomers in the enhanced ICF group to do better, it was not statistically significant enough to conclude that the improved ICF was more effective in this generation than the conventional ICF (83.3% vs. 63.6%, p = 0.105). A possible reason for this result is the small number of subjects in the baby boomer generation in comparison to the other generations -Regarding the educational level, although the result indicates that the enhanced ICF increased the proportion of the participants with optimal understanding in the participants with educational levels 1 and 2, there was little effect in the participants with educational level 3 whose understanding level was high in both groups. This is consistent with the lines of evidence demonstrating that the educational level is a major determinant of research subjects' comprehension. In research practice, subjects generally come from various backgrounds with different educational levels; thus, the SIDCER ICF could be of value.	12/13

Continued in pag. S321…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
10	Rothwell et al., 2014	United States	To explore the appropriateness of an electronic informed consent model within an RCT	Participants recruited for the parent RCT project were randomly selected and randomized to either an electronic consent group (n = 32) or a simplified paper-based consent group (n = 30). To explore the appropriateness of an electronic informed consent model within a RCT.	Randomized controlled trial.The The survey used in this study was based on a survey that measured subjective understanding of informed consent within the clinical trials	Another finding from this research that may influence the informed consent process was the participants' qualitative responses during the interviews. They reported that some information discussed during the electronic informed consent process appeared misplaced and lengthy. This suggests that it might be most effective to have some elements of the consent process in electronic format and others in paper format of a research study.	12/13
11	Paris et al., 2015	France	Toevaluate the comprehension of participants of an improved informed (ICD). consent document	Between April 2009 and March 2013, 481 patients were seen in the six centers. The Grenoble Centre had 338 patients, Saint-Etienne 57, Lyon 44, Toulouse 21, Créteil 13, and Clermont Ferrand 7.	Randomized controlled trial. Using questionnaire	-The participant's degree of understanding needs improvement; ICDs are not easy to read, and the readability of French ICDs was much lower than the provided text school-level texts. It was not improved following IRB reviews; American IRBS often provide text for informed consent forms that fall short of their own readability standards, and high schools provide text. Readability was also low in other languages, such as Spanish or German.	12/13
12	Aliyu and Mahmud, 2016	Canada	This study evaluates postal recruitment and informed consent obtainment for research involving a rare disease to feasibility, response assesses rate, timeliness, and cost in the context of the disease and setting where physical access to research volunteers for recruitment may be challenging.	A list of narcolepsy cases from the two provincial sleep centers, one at the Psych and Sleep Disorder Center of the Health SciencesCenter and the other at Misericordia Hospital, both located in Winnipeg, Manitoba	A retrospective case-control study. Cases were defined based on confirmation of clinical diagnosis of narcolepsy within the study period. A range of identified information, including personal identifiers, symptoms of narcolepsy, diagnostic laboratory tests, and their outcomes, was needed.	All those who provided consent agreed to the range of confidential information to be extracted. The time from the invitation to the receipt of the signed consent forms in the mail varies from a minimum of 18 days to a maximum of 93 days. The median time for consent obtainment was 39 days with an interquartile range (IQR) of 45 days (Fig. 2). In two cases, the consent forms were re-mailed because the initial documents they received were lost. These cases were identified because their signed consents were not returned, and they had to be contacted by phone to ascertain the status of their consent documents. The estimated cost in Canadian Dollars was based on the components used from the initial invitation to consent obtainment, which included 31 postal stamps, 26 small-size envelopes, 5 large-size envelopes, and 41 printed pages for the	9/10

Continued in pag. S322…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
						Another finding from this research that 41 printed pages for the first invitation; 125 postal stamps, 45 small envelopes, 45 large envelopes and 90 printed pages used for the second invitation. It took an average of 5 to 7 min to print an invitation letter, seal, label, append, stamp, and drop it in the office mailbox. The estimated costs of the ingredients units involved were provided along with corresponding costs per consent in Table 1. Most of the cost was accounted for by staff salary and to a lesser extent, the postal stamp.	
13	Ittenbach et al., 2015	United States	This study aimed to assess the self-reported reading and understanding of informed consent documents in a Phase 1 clinical trial among a sample of adults with low incomes.	A total of 11 respondents reported household incomes of less than US$25,000 per year, averaged 29.0 (SD 10.61) years of age; four = (36%) were male and seven (64%) were female. All 11 (100%) self-reported their race as Black. Nine (82%) reported a high school education, one (9%) a General Equivalency Degree (GED), and one (9%) a 2-year college education. Concerning reading ability, seven (64%) had a reading level of seventh to eighth grade and four (36%) read at the 12th-grade (high school) level	The current study was embedded within a larger Phase 1 randomized immunization study on Escherichia (E.) coli as a supplemental ethics sub-study. Using questionnaire	Hypothesis 1: This may be a version of the therapeutic misconception, in which the physician or researcher is regarded as a trustworthy professional who would not undertake anything that would harm them; hence, it would seem rational and easier to trust a trustworthy professional than to exert the effort to read a consent form critically. Hypothesis 2: Subjects may find the consent material too complex to understand and save face by pretending they read it. Hypothesis 3: Subjects may be so accustomed to signing presumed "boilerplate" that they don't want to read that they treat consent forms much the way they treat agreements pertaining to software they purchase online and download. Hypothesis 4: Subjects may simply not care.	8/8
14	Grady et al., 2014	United States	To better understand the perspectives of adolescent research participants and their parents about assent and parental permission	Recruited a purposive sample of adolescents participating in a wide range of clinical research and representing a variety of illnesses as well as healthy volunteers at the NIH and Seattle Children's Hospital who were 13-17 years of age, had enrolled in the previous six months in a research study for any disorder	Qualitative research. The interviews primarily used close-ended questions, with a few open-ended questions for which respondents were asked to explain or clarify what they were asked to answer. Instrument development is described in detail elsewhere.	A small but disconcerting subset of our teen cohort was dissatisfied with the process, felt pressure to enroll, and/or said it would have been difficult or impossible to refuse. These teens may be the most in need of support and protection. Somewhat unexpectedly, there were no differences by age or severity of illness in perceived pressure	10/10

Continued in pag. S323…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
				or as healthy controls, spoke English or Spanish, were physically and cognitively able to be interviewed, were willing to be interviewed, and had a parent or guardian also willing to be interviewed.		Aor difficulty refusing. There was, however, a trend for female teens to report more pressure and more difficulty saying no than their male counterparts, and parents would have tried harder to convince female teens to unroll.	
15	Karbwang et al., 2018	India, Indonesia, Malaysia, Philippine s, Sri Lanka, Taiwan, and Thailand	To determine the perspectives of research participants about the type and extent of information they need when they are invited to participate in biomedical research.	Individuals participate at various centers (clinical research units or comparable settings) in 7 Asia-Pacific countries.	Multi-center, cross-sectional, descriptive survey. The study materials use a Likert-scale questionnaire.	The top three items that were of most concern to the respondents in this study were related to the concepts of risks and benefits (i.e., major foreseeable risk, direct benefit, and common adverse effects of the intervention).	7/8
16	Kraft et al., 2020	United States	Enrolled parents should evaluate and decide whether to enrol their children in research before or after receiving the consent form.	106 parents were approached and permitted their contact information to be shared with the study team. A total of 88 parents (67 enrolees, 21 decliners) completed the survey (83% participation rate); 79 of 88 reporting gender (instead of sex, as biological sex was not relevant to survey) information were women (91%), 66 participants (75%) were non-Hispanic White, and 63 participants (72%) had annual household.	Cross-sectional study. This study uses an online survey.	A total of 106 parents were approached, and their contact information was permitted to be shared with the study team. Fifty-nine parents (67%) responded that they decided whether to enrol in the weight management study before receiving the consent form. Only 17 of 69 parents (25%) who remembered receiving the consent form responded that it taught them new information.	7/8
17	Jamerson & Shuster, 2023	United States	To determine if an audio-assisted presentation of informed consent with or without teach-back would improve the willingness to consider participation in a clinical trial	The population is African American and biracial in Durham, NC. The sample included 71 participants	Randomized controlled trial. Online Survey and phone for semi-structured interview	Providing audio-assisted informed consent to facilitate communication increased the willingness to participate in a clinical trial.	10/13
18	Celine Y. Chhoa, Alexandra Sawyer, Susan Ayers, Angela Pushpa-Rajah, and Lelia Duley, 2017	UK	To explore clinicians' views and experiences of offering two consent pathways for recruitment to a randomized trial of	Invitations to be interviewed were sent to 20 clinicians, and 17 clinicians from 7 hospitals responded: 5 consultant neonatologists, three neonatal or pediatric registrars, five neonatal nurses, and four midwives	Qualitative research. The interview schedule (Additional file 1) consisted of open-ended questions to explore clinicians' views and experiences of inviting women	The two-stage pathway for consent developed for use in the Cord Pilot Trial when birth was imminent was acceptable to clinicians for comparable low-risk studies, although some concerns were raised about the practicalities of obtaining	9/10

Continued in pag. S324…

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No	Authors details and Year	Country	Objectives	Sample and its Characteristics	Material and Methods	Findings	JBI
			timing of cord clamping at very preterm birth		in the trial. Interviews were conducted in a private hospital room or by telephone and lasted approximately 20-30 minutes.	Aor difficulty refusing. There was, horal assent	
19	Kelly et al., 2015	UK	To establish the views of research volunteers on the consent process, to explore their views on the consent process in different research scenarios, and to inform debate on emerging models of consent participation in research. for	Of the 4 284 subjects invited to participate, 2308 completed the online consent questionnaire (54% response rate), with a mean age of 55, age range = 18-87 years (89% female, 11% male)	Cross-sectional study. On joining the registry, volunteers are invited to complete online or postal health questionnaires, come to St. Thomas's Hospital for a clinical study visit, and donate blood for DNA and biochemical markers.	Most volunteers preferred to be informed of the identity of the main researcher of a study in which they are participating, which is contrary to current practice. Over 80% were willing to complete the consent process online instead of face-to-face. Respondents did not view their DNA differently from their medical information regarding the consent process.	8/8
20	Suver et al., 2020	United States	To identify opportunities to improve how IC is obtained in AD research, we examined the IC process from the perspectives of study coordinators at two Alzheimer's Disease Research Centers (ADRC)	The study coordinators were primarily female (n½ 10), two-thirds White (n 1/4 9), one-quarter African American (n½ 4), almost all under 40 years old (n²¼ 11), almost two-thirds under 30 (n¼ 8), and most had at least one year experience as a study coordinator for the ADRC studies (n ¼ 10)	Qualitative research. ICF: We reviewed each center's IC form for content and readability levels	Coordinators reported overall satisfaction with the IC process. However, many reported needing help maintaining participant attention, explaining complex procedures and addressing medical misinformation.	9/10
21	Mazurenko et al., 2022	United States	To describe and evaluate implementing a primarily electronic provider recruitment strategy based on the 7R framework.	Eligible PCPS included physicians, nurse practitioners, and physician assistants from general internal medicine or family medicine practices that provide primary care services to adult patients with chronic pain.	Randomized controlled trial. The research coordinator maintained a detailed spreadsheet of each communication between relevant stakeholders to quantify recruitment effectiveness.	We recruited 45 of 63 eligible PCPs practicing at ten primary care clinic locations over 55 days. On average, It took 17 business days to recruit a PCP (range 0-48) and required three attempts (range 1-7). Email communication	10/13

Appendix 2 Compare Matrices

No	Title	Authors' details and Year	"What challenges are encountered while obtaining informed consent in human subject research?"	Coding
1	Does written informed consent adequately inform surgical patients? A cross sectional study	Agozzino et al., 2019	Most respondents (84.5%) personally received a written IC form, or they reported that they delegated it to a parent or a relative; 1.6% declared that they did not get it, and the others (13.9%) did not recall receiving it. All patients who received the IC form signed it personally or through a relative or parent, but only 51.8% reported reading it thoroughly. Among those who read the IC, 90.9% judged it clear, and 9.1% deemed it partially understandable. No one considered it incomprehensible. Approximately half of patients received the written IC form a day before surgery (at the earliest), while 41.1% received it within some hours or immediately before surgery. Forty-five percent of patients receiving the written forms were given them by the surgeon who performed the procedure (Table 2). Not all patients had the written consent for explained to them; it was explained orally only to 65.6%; however, 93.9% of patients received further oral information; among these, 68.6% judged this information to be incomplete, and only 31.4% considered it complete. The information was provided progressively during pre-operative examinations (66.7%) and was understandable according to most (97.1%) recipients.	1.1 not getting ICF; 1.2 not remember receiving ICF; 1.3 not reading ICF thoroughly; 1.4 partially understandable; 1.5 not being explained; 1.6 incomplete information
2	Reported consent proce-sses and demographics: a substudy of the INSIGHT Strategic Timing of Antiretroviral Treatment (START) trial.	Denning et al., 2015	They did not have a language in common with another participating site (such as the single site in Nigeria, where the patient base speaks Hausa). The regulations strictly limit the length of informed consent documents to less than the length of the researchers' concise consent template. The START study's two-stage site start-up process (beginning enrolment at 101 pilot sites, then adding 120 new sites to complete the trial) was also a limiting factor as many of the sites that had not been part of the pilot did not want the delay in enrolment that may have occurred with participation in substudies.	2.1 did not have a language in common; 2.2 strictly limited the length of informed consent documents; 2.3 two-stage site start-up process
3	The goldilocks co-nundrum: Disclosing discrimination risks in informed consent	Prince et al., 2022	- When making an actual decision about participation in a research study, the informed consent document language may have more or less impact on willingness to participate because individuals are also weighing other potential risks and benefits of the study. - On the other hand, we cannot presume clinicians and researchers know this information nor expect informed consent documents to every possible specific risk of a study or clinical procedure, especially if some are likely to be very rare or unknown or if disclosure would require listing every omission in an anti-discrimination law. Too much detail about the limits of GINA's coverage could overwhelm individuals and heighten fears of discrimination when those risks may be quite low depending on the clinical or research testing being considered	3.1 ICF language
4	Survey on Using Ethical Principles in Environmental Field Research with Place-Based Communities	Quigley et al., 2019	- Provides researchers' recommendations for ensuring community training on informed consent logistics, with knowledge of confidentiality requirements and data access rules; to ensure adequate knowledge of the informed consent document by using native languages and to utilize cultural norms to secure appropriate consent using Native-speaking translators and local languages, report results both in English and local languages, provide a consent copy to participant, do mapping exercise with names, use visual images, mapping and photographs to give voice to the community's own stories. - Without being particularly cognizant of a place's context and/or social structural arrangements, you cannot really understand human behavioral response, organizational decision-making, or emotional reactions to a stressful situation. By working with elders in the consent process, a respondent remarked that their research team was informed about language barriers with different participants and how to allow the community to say when/who/how it was appropriate to work with individual community members. With some	4.1 ICF language; 4.2 assurance of confidentiality; 4.3 lack of understanding in human behavioral response; 4.4 lack of knowledge in organizational decision-making; 4.5 lack of understanding in emotional reactions to a stressful situational

Continued in pag. S326…

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No	Title	Authors' details and Year	"What challenges are encountered while obtaining informed consent in human subject research?"	Coding
			participants, we spent time meeting with them, getting to know them andthem know us, and when they were comfortable participating in the study.	
5	Procedures of recruiting, obtaining informed consent, and compensating research participants in Qatar: findings from a qualitative investigation	Killawi et al., 2014	1. Influence of cultural idiosyncrasies on the level of disclosure and the informed consent process in clinical care. 2. Differences in interpreting ethical research principles 3. Challenges implementing Western research principles, particularly informed consent 4. Difficulty of obtaining informed consent from illiterate individuals	5.1 influence of cultural idiosyncrasies; 5.2. differences in interpreting; 5.3. challenges implementing Western research principles; 5.4. illiterate individuals
6	Long-Term Recall of Elements of Informed Consent: A Pilot Study Comparing Traditional and Computer-Based Consenting	McCarty et al.,2015	The majority of the 52 men who participated in the biobank but declined participation in the consent study, cited the reason as "not interested." Two people declined participation in the consent study because they did not want to be randomized to the kiosk; they preferred the face-to-face consent process. Two people withdrew from the Computer-based consenting arm after they had started and changed to traditional consent; one changed his mind about being willing to use the computer, and one was unable to hear even with the use of headphones. They were not followed further for the consenting study. The men who were randomized to the computer-based consenting reported that the program was easy to use.	6.1 lack of interest; 6.2 respondents' desire; 6.3 changing tools
7	Achieving new levels of recall in consent to research by combining remedial and motivational techniques	Festinger et al., 2015	Quiz scores in the two conditions did not differ at the first administration (p=0.39, d=0.2); however, ICF scores were significantly higher at each subsequent administration (second: p=0.003, Cohen's d=0.6; third: p<0.0001, d=1.4; fourth: p<0.0001, d=1.6; fifth: p<0.0001, d=1.8); The ICF/Incentive Consent Form procedure increased consent recall from 72% to 83%, compared with the CAU/consent as usual condition in which recall decreased from 69% to 59%. This supports the statistical and clinical utility of a combined remedial and motivational consent procedure for enhancing recall of study information and human research protections	7.1 usual consent has lower consent recall than incentivized CF
8	The MICHR Genomic DNA BioLibrary: An Empirical Study of the Ethics of Biorepository Development	Roessler 2015	- As biomedical research has become more complex, relying on long, complex consent forms has been shown to B2:E23 While too much information may be confusing, too little information could leave key questions unaddressed, putting researchers and review committees in the difficult position of weighing the importance of information, particularly presumed required regulatory language, against understanding. - As a result, even if adding words reduces understanding, IRBs are compelled to do so to meet HIPAA requirements. As an example, to meet HIPAA requirements, a newly established UMH Biorepository, which modeled its consent process and documents on the MICHR BioLibrary project, felt compelled to move away from our validated checklist IC to a longer (200 words longer) reorganized IC, which not been validated (University of Michigan Medical School, n.d.). This change gives reassurance of compliance but not understanding, placing compliance above human protection They took the time to understand what we were asking and to make an informed decision about participation. When we approached them during clinic visits, they had less time and took less time to make decisions. For some, a general commitment to helping others was enough to justify enrollment.	8.1 reduce understanding; 8.2 too much and too little information; 8.3 less time

Continued in pag. S327…

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No	Title	Authors' details and Year	"What challenges are encountered while obtaining informed consent in human subject research?"	Coding
9	Improved participants' understanding in a healthy volunteer study using the SIDCER informed consent form: a randomized-controlled study	Koonrungsesomboon et al., 2015	- Interestingly, there were two items in the conventional ICF, but the proportions of the participants who correctly answered between the two groups did not show a statistically significant difference. This could be due to a practicable drawback of the evaluation tool: a close-ended question with multiple answer choices gave an individual a chance to provide the correct answer inadvertently were sufficiently presented in both ICFs but the enhanced ICF group was able to achieve a higher score. - Although there was a trend for baby boomers in the enhanced ICF group to do better, it was not statistically significantly enough to conclude that the enhanced ICF was more effective in this generation than the conventional ICF (83.3 % vs. 63.6 %, p = 0.105). A possible reason for this result is the small number of subjects in the baby boomers generation in comparison to the other generations - With regards to the educational level, although the result indicates that the enhanced ICF increased the proportion of the participants with optimal understanding in the participants with educational levels 1 and 2, there was little effect in the participants with educational level 3 whose understanding level was high in both groups. This is consistent with the lines of evidence demonstrating that the educational level is a major determinant to research subjects' comprehension. In research practice, research subjects generally come from various backgrounds with different educational levels; thus, the SIDCER ICF could be of value.	9.1 less statements; 9.2 generational differences ;9.3 educational level
10	A Randomized Controlled Trial of an Electronic Informed Consent Process	Rothwell et al., 2014	Another finding from this research that may influence the informed consent process was the participants' qualitative responses during the interviews. They reported that some information discussed during the electronic informed consent process appeared misplaced and lengthy. This suggests that it might be most effective to have some elements of the consent process in electronic format and others in paper format	10.1 Misplaced and lengthy; 10.2 Electronic formats; 10.3 paper formats
11	Improved informed consent documents for biomedical research do not increase patients' understanding but reduce enrolment: a study in real settings	Paris et al., 2015	The participant's degree of understanding remains unsatisfactory, ICDs are not easy to read, the readability of French ICDs was much lower than that of highly provided text school-level texts and was not improved following IRB reviews; American IRBs often provide text for informed consent forms that fall short of their readability standards, high school provide text, and readability was also low in other languages such as Spanish or German	11.1 degree of understanding
12	Postal recruitment and consent obtainment from index cases of narcolepsy	Aliyu and Mahmu, 2016 Ittenbach et al., 2015	All those who provided consent agreed to the range of confidential information to be extracted. The time from the invitation to the receipt of the signed consent forms in the mail varies from a minimum of 18 days to a maximum of 93 days. The median time for consent obtainment was 39 days with an interquartile range (IQR) of 45 days. The consent forms were re-mailed in two cases because the initial documents they received were lost. These cases were identified because their signed consents were not returned, and they had to be contacted by phone to ascertain the status of their consent documents. The estimated cost in Canadian Dollars was based on the components used from the initial invitation to consent obtainment which included 31 postal stamps, 26 small size envelopes, 5 large size envelopes and 41 printed pages for the first invitation; 125 postal stamps, 45 small envelopes, 45 large envelopes and 90 printed pages used for the second invitation. It took an average of 5 to 7 min to print an invitation letter, seal, label, append, stamp, and drop it in the office mailbox. The estimated costs of the ingredients units involved were provided along with	12.1 needs more time; 12.2 signed consents were not returned

Continued in pag. S328…

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No	Title	Authors' details and Year	"What challenges are encountered while obtaining informed consent in human subject research?"	Coding
			corresponding costs per consent in Table 1. Most of the cost was accounted for by staff salary and to a lesser extent, the postal stamp.	
13	Readability and Unders-tanding of Informed Consent Among Participants With Low Incomes: A Preliminary Report	Ittenbach et al., 2015	Hypothesis 1: This may be a version of the therapeutic misconception, in which the physician or researcher is regarded as a trustworthy related professional who would not undertake anything that would harm them; hence, it would seem rational and easier to simply trust a trustworthy professional than to exert the effort to read a consent form critically. Hypothesis 2: Subjects may find the consent material too complex to understand and save face by pretending they read it. Hypothesis 3: Subjects may be so accustomed to signing presumed "boilerplate" that they don't want to read that they treat consent forms much the way they treat agreements pertaining to software they purchase online and download. Hypothesis 4: Subjects may simply not care	13.1 Therapeutic misconception; 13.2 too complex to understanding; 13.3 don't want to read; 13.4 not care
14	Assent in Research: The Voices of Adolescents	Grady et al., 2014	A small but disconcerting subset of our teen cohort was dissatisfied with the process, felt pressure to enroll, and/or said it would have been difficult or impossible to refuse. These teens may be the most in need of support and protection. Somewhat unexpectedly, there were no differences by age or severity of illness in perceived pressure or difficulty refusing. There was, however, a trend for female teens to report more pressure and more difficulty saying no than their male counterparts, and parents would have tried harder to convince female teens to enroll	14.1 dissatisfied; 14.2 elt pressure to enroll; 14.3 impossible to refuse to enroll; 14.4 no differences by age; 14.5 harder to convince female teens to enroll.
15	What information and the extent of information research participants need in informed consent forms: a multi-country survey	Karbwang et al., 2018	The top three items that were of most concern to the respondents in this study were related to the concepts of risks and benefits (i.e., major foreseeable risk, direct benefit, and common adverse effects of the intervention)	15.1 Respondents' concern on risk and benefits
16	Assessing Parent Decisions About Child Participation in a Behavioral Health In-tervention Study and Utility of Informed Consent Forms.	Kraft et al., 2020	How to improve research decision-making: (1) some individuals may make decisions using heuristics rather than deliberative weighing of the details involved in a trial, (2) regulatory review of research should focus more on early engagement with prospective participants, and (3) financial motivations may drive early decision-making for some individuals	16.1. make decisions using heuristics; 16.2. regulatory review of research should focus more; 16.3. financial motivations may drive early decision-making
17	Evaluation of Informed Consent with Teach-Back and Audio Assistance to Improve Willingness to Participate in a Clinical Trial Among Underrepresented Minorities: A Randomized Pilot Trial	Shuster, 2023	- When asked the reasons for not being willing to enroll, the most frequent reasons cited were risks/side effects and further information/other research would be needed and the impact of the study and study drug on their quality of life - When commenting on the presentation of the summary, some individuals commented on the need for the text to be more spaced out or larger - Another group of comments centered on technological features of hearing the audio. Example comments related to the technology were "The voice is too robotic"; "I like the ability to speed up the audio"; "The audio voice was monotone and it took longer due to extra pauses"; and "The audio helped me with the summary. It helps me to organize and understand the document. - For the few participants who did not like the teach-back, the comments were that "it didn't feel like it made me understand better," "it feels awkward because it felt like I am being quizzed, like a pop quiz"	17.1. risks/side effects; 17.2 information/ other research; 17.3. need for the text to be more spaced out or larger; 17.3. few participants did not like the teach-back

Continued in pag. S329…

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No	Title	Authors' details and Year	"What challenges are encountered while obtaining informed consent in human subject research?"	Coding
18	Clinicians' views and experiences of offering two alternative consent pathways for participation in a preterm intrapartum trial: a qualitative study	Celine Y. Chhoa,Alexandra Sawyer,Su-san Ayers, Angela Push-pa -Rajah, and Lelia Duley (2017).	Six major themes were identified in clinicians' experiences of offering the two consent pathways: (1) team approach to offering participation; (2) consent form as a record; (3) consent and involvement as a continual process; (4) different consent pathways for different trials; (5) balance between time, information, and understanding; and (6) validity of consent. Differences were explored between the professions; however, as there were no overall differences between professional groups (i.e. doctor, nurse, midwife) regarding the content of the themes, the results are presented for the whole sample.	18.1. different consent pathways for different trials; 18.2 balance between time, information and understanding; 18.3 validity of consent;
19	Evaluating the Consent Preferences of UK Research Volunteers for Genetic and Clinical Studies	Kelly et al., 2015	In some scenarios, research participants reported that they would be comfortable with not signing a new consent form for future research uses of their data and DNA, and are comfortable with secure, online consent processes rather than traditional face-to-face consent processes. Our findings indicate that the perceived relationship between research participants and researchers plays an important role in shaping preferences regarding consent process and suggest that traditional consent processes do not capture this relationship. We argue that the development of new formats of consent should be informed by empirical re-Search on volunteers' perceptions and preferences regarding the consent process	19.1. comfortable with secure online consent processes rather than traditional face-to-face consent pro- cesses; 19.2. relationship between research participants and researchers
20	Informed Consent in Two Alzheimer's Disease Research Centers: Insights From Research Coordinators	Suver et al., 2020	1. Participant inattention, including the duration of the IC process and boredom 2. Complexity of the study procedures, visit schedule, and consent materials 3. Prior knowledge, including confusion about the scientific process, misinformation, and therapeutic misconception	20.1. participant inattention; 20.2. complexity of the study procedures; 20.3. visit schedule; 20.4. consent materials; 20.5. prior knowledge
21	Evaluation of electronic recruitment efforts of primary care providers as research subjects	Mazurenko et al., 2022	Recruiting individual healthcare providers, such as physicians, nurse practitioners, and other medical professionals, as subjects in research studies is often challenging. Healthcare providers report numerous barriers to participation, including time constraints, low interest in research topics, concerns about relationships with patients, loss of professional autonomy, and reluctance to modify existing clinical workflows. Due to the co-occurring COVID-19 pandemic resulting in high workload and stress among eligible PCPs, we could not gather feedback from eligible PCPs on how they perceived our predominantly electronic recruitment strategy. Relatedly, we did not conduct a baseline assessment of several 7R framework strategies, such as PCPs perception of the research team's reputation for conducting rigorous research, which may have shed more light on the effectiveness of our recruitment efforts.	21.1. time constraints; 21.2. low interest; 21.3. relationships with patients; 21.4. loss of professional autonomy; 21.5. reluctance to modify existing clinical workflows

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Identifying internal and external factors of pressure injury in surgical patients: Literature Review

Identificación de factores internos y externos de la lesión por presión en pacientes quirúrgicos: Revisión de la literatura

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SUMMARY

Introduction: *Pressure injury (PI) induced by surgical interventions usually occurs within a few hours after surgery. This comprehensive study aims to identify internal and external factors of PI in surgical patients.* **Methods:** *The research used descriptive data from all the papers searched in ScienceDirect, CINAHL, PubMed, and Google Scholar databases, ensuring a thorough investigation. The review results were analyzed and grouped into intrinsic and extrinsic factors for pressure injury in patients with surgery.* **Results***: Results of identification of internal factors including reduced mobility, age, body mass index (BMI), albumin, comorbidities, blood pressure, nutritional status, and body temperature, while external factors include length of operation, medical equipment and medication, nurse knowledge, temperature, surfaces or interface pressure, friction and shear, positioning, blood loss, and tools.* **Conclusion:** *The study findings suggest that internal and external factors can predict pressure injuries in surgical patients. The analysis indicates that the predictor variables for surgical patients' pressure injuries are often under control. More studies are required to validate the PI prediction model, but the comprehensive nature of this study provides a solid foundation for future research.*

Keywords: *Risk factors, surgery, pressure injury.*

RESUMEN

Introducción: *Las lesiones por presión inducidas por intervenciones quirúrgicas suelen ocurrir unas horas después de la cirugía. Este estudio tiene como objetivo identificar los factores internos y externos que predicen las lesiones por presión en pacientes quirúrgicos.* **Métodos:** *Se extrajeron datos descriptivos de todos los artículos. Se buscaron artículos en las bases de datos ScienceDirect, CINAHL, PubMed y Google Scholar. Los resultados de la revisión se analizaron*

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y agruparon en dos, a saber, factores intrínsecos y extrínsecos para las lesiones por presión en pacientes con cirugía. **Resultados:** *Resultados de la identificación de factores internos que incluyen movilidad reducida, edad, índice de masa corporal (IMC), albúmina, comorbilidades, presión arterial, estado nutricional y temperatura corporal, mientras que los factores externos incluyen: duración de la operación, equipo médico y medicación, conocimiento de enfermería, temperatura, superficies o presión de interfaz, fricción y cizallamiento, posicionamiento, pérdida de sangre y herramientas.* **Conclusión:** *Los hallazgos del estudio sugieren que los factores internos y externos pueden predecir las lesiones por presión en pacientes quirúrgicos. El análisis indica que las variables predictoras de las lesiones por presión de los pacientes quirúrgicos a menudo están bajo control. Para validar el modelo de predicción de las lesiones por presión, se requieren más estudios.*

Palabras clave: *Factores de riesgo, Cirugía, Lesión por presión.*

INTRODUCTION

Pressure injuries (PI) are caused by persistent pressure on a region, damaging the skin and underlying tissue. PI is more common in surgical patients due to a variety of circumstances, including extended periods of immobility, variables connected to surgery or anesthesia, and pre-existing medical disorders. Patients are more vulnerable to the side effects of anesthesia and surgery, particularly those who are having lengthy operations. This issue arises from prolonged pressure application to the skin and underlying tissue, which disrupts blood flow and causes damage and necrosis of the tissue (1). Another crucial factor is the sharing and friction processes. Despite fluctuations in occurrence and an imprecise number, PI remains a prevalent issue in hospitals. Injuries that develop a few hours to six days following surgery are known as intraoperative pressure injuries. Sores called decubitus that appear a few hours to six days following surgery are called intraoperative PI.

Within 48 to 72 hours following surgery, surgical PI develops, according to the Association of Perioperative Registered Nurses (AORN) (2). Intraoperative PI is more common than inpatient PI, with an incidence range of 4.7 % to 66 % (3). Surgical patients have a PI incidence that ranges from 12 to 66 % (4). PI is one of the main postoperative issues linked to an extended hospital stay. PI following surgery occurred in 17.8 % (34/191) of patients. Age above 70, a history of hypertension, a history of heart disease, a Braden score of less than 15, the type of surgery, and the type of anesthesia are among the factors that influence this occurrence (4).

All PI are costly and risky acute care issues that can lead to extended hospital admissions, morbidity, and unfavorable outcomes (5). Surgical patients are more susceptible to PI because of several illnesses, including aging. In addition to nutritional deficiencies, consequences include diabetes, heart disease, cancer, and extensive procedures. Older skin becomes less elastic, thinner, and less flexible. PI is the postoperative variable contributing to surgical patients' admission to the hospital. PI can range in severity from minor (redness) to major (deep tissue damage). In addition to taking longer to heal, severe wounds are more likely to cause problems.

Finding the disease's risk factors is crucial for both treating and preventing postoperative PI (6). Effective treatment and prevention of intraoperative PI are necessary to preserve patient health and avert unfavorable consequences. PI are a costly and dangerous issue in acute care settings that can lead to extended hospital admissions, morbidity, and adverse outcomes (5). Three significant risk factors need to be considered among 444 patients, with an internal factor of four outside variables. Precise and trustworthy PI risk assessment methods are used to evaluate the risk (7). Patients undergoing surgery are more susceptible to pressure injuries because of both internal and external variables, such as being sedated, immobilized, and unable to communicate their pain or discomfort from their position (2). In perioperative patients, PI is frequently avoidable. Preventing perioperative PI requires multidisciplinary cooperation, which starts before the patient enters the procedure or operation room. Preoperative evaluations of risk variables (internal and external factors) that raise a patient's vulnerability to pressure injuries should be performed on all perioperative patients. The assessment of perioperative PI ought to be complete, visible, and conducted using conventional risk assessment instruments.

Knowledge about preoperative risk factors is important so nurses can implement preventive interventions before tissue injury begins. Therefore, this study aims to identify internal and external factors of PI in surgical patients.

METHODS

Included were all studies discussing risk variables linked to the emergence of PI. Data were taken from all the papers when three or more studies were reported on a particular variable. To find papers, we searched ScienceDirect, CINAHL, PubMed, and Google Scholar databases. The following search terms were used: "risk factors," "surgery," "operative procedures," or "surgical procedures," as well as "pressure ulcer," "decubitus ulcer," or "bedsore." Terms were from the Medical Subject Heading (MeSH). In gathering data, the authors created a form to extract data. Two writers each completed the extraction separately, and their work was then cross-checked for accuracy. The factors looked for were kind, country, year, and title. The eight papers differed in terms of study design, population target, and PI areas of interest.

RESULTS

PI Risk Factors in Surgical Patients

A PI is a localized injury, usually over a bony prominence, brought on by prolonged pressure (including shear-related pressure) to the skin and underlying tissue (15). Although additional complicating factors exist, the primary cause of PI is impaired mobility. People whose activities or movements are restricted may develop PI (16). People are categorized as high risk if they display several risk factors, including the kind, amount, timing, and how long the mechanical load lasted, as well as their susceptibility and tolerance, which are their unique mechanical characteristics, geometry, physiology, repair, and the movement and temperature of characteristics of the tissues (15,17). People who are considered high-risk include individuals who have experienced. One of the perioperative treatment issues that has a detrimental impact on anticipated postoperative results is intraoperative PI (18).

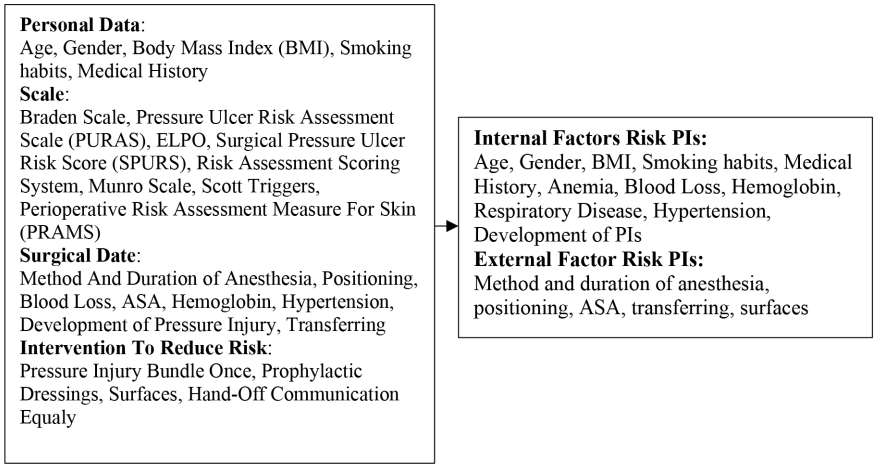

Figure 1. Internal and external risk for PI.

Figure 1 is the result of a literature review determining risk factors for pressure injury in patients with surgery. The initial identification was categorized into four categories: demographic data, surgical data, assessment scale, and risk prevention interventions. Then, the author categorized the four categories into two groups: internal and external risk factors for pressure injury in patients with surgery.

Table 1. Characteristics of the study

Authors	Title	Setting Internal Factor	Finding Factor PI
(8)	Relationship between predisposing and facilitating factors: Does it influence the risk of developing peri-operative pressure injuries?	A retrospective cohort study design.	1.Personal data: age, gender, hemoglobin, Body Mass Index (BMI), smoking habits, medical history 2.Surgical Data: method of anesthesia, the duration of anesthesia, patient positioning, blood loss. The method of anesthesia, the duration of anesthesia, patient positioning, therapy anticoagulants
(9)	Incidence and Risk Factors of Pressure Injuries in Surgical Spinal Patients.	A retrospective study.	Variable: Sex, sender, specific spinal injury, location of surgical intervention, operative time, preoperative, postoperative, Body Mass Index (BMI), length of surgery, development of any PI
(10)	A prediction tool for hospital-acquired PI among Surgical Patients: Surgical PI risk score. Keywords: nosocomial, PI, surgery, surgical risk factors, risk assessment	Original Article	Identified risk factors who developed hospital-acquired pressure injury: age, female, American Society of Anesthesiologists (ASA), BMI, preoperative Braden score, anemia, respiratory disease, and hypertension
(11)	Knowledge and practices of operating room nurses in the prevention of pressure injuries.	Clinical Study, Cross-sectional approach	Part I: Descriptive Characteristics of the nurses: age, gender, nursing schools attended, years worked, and patient safety and pressure injury education Part II: OR Nurses' Preventive Measures for Pressure Injury: utilizing a scale or form to assess PI risk; transferring; conducting risk assessments for PI during surgery; implementing interventions to prevent PI; creating support structures for pressure areas; and documenting interventions to prevent PI. Part III: OR nurses' familiarity with ORPI: The risk-focused elements.
(12)	The Effect of Selected Risk Factors on Perioperative PI Development	Cross-sectional	1.Sociodemographic and Clinical Characteristics Survey: age, sex, BMI, clinical characteristics, including albumin, hematocrit, and hemoglobin levels (obtained from laboratory samples); skin turgor; type of procedure; surgical clinic where the patient was admitted; and the presence of diabetes mellitus, heart disease, and peripheral vascular disease 2.Braden Scale 3.Surgery Related Pressure Ulcer Risk Factors Assessment Survey: procedure duration, the exact

Continued in pag. S333…

…continuation Table 1. Characteristics of the study

Authors	Title	Setting Internal Factor	Finding Factor PI
			exact time a pressure injury was first observed, pressure injury stage and location, intraoperative position of the patient, type of surgical procedure, intraoperative diastolic blood pressure, and intraoperative vasopressor use.
(13)	Risk assessment for perioperative pressure injuries.	Original Article	Sociodemographic variables, such as age, sex, self-reported skin color, and clinic variables (body mass, hemoglobin values, ASA physical status classification, and atrial temperature) of the patient, were used. The Risk Assessment Scale for Perioperative Pressure Injuries (ELPO) is composed of the following variables: duration of the surgery, type of anesthesia, surgical positioning, support surface, positioning of upper and lower limbs, comorbidities and age of the patient.
(7)	Using Evidence to Prevent Risk Associated with Perioperative Pressure Injuries.	Clinical Study	Using Evidence: 1.Assessment of Patient PI Risk Assessment: Risk Assessment Scoring Systems, Braden Scale, Munro, Scott Triggers, Perioperative Risk Assessment Measure for Skin (PRAMS) 2.PI Risk Factors: Risk factors contributing to PI formation include those unique to the patient (intrinsic) and those due to environment or surgical needs (extrinsic). 3.Interventions to Reduce Risk: Pressure Injury Bundles Once, Prophylactic Dressings, surfaces, Handoff Communication Equally 4.Attitudes and Education
(14)	Construction of a Risk Prediction Model for Intraoperative Pressure Injuries: A Prospective, Observational Study.	A prospective, observational study	1.To explore the incidence and risk factors of intraoperative pressure injuries: age, malnutrition, BMI, poor circulation, diabetes mellitus, cardiovascular disease, anemia, body temperature, anesthesia type, surgery time, humidity, support surface (decompression pad) type, and surgical position. 2.Risk factor screening: 3 days after transfer to the ICU, and in the first (24 hours), second (48 hours), and third (72 hours) days postoperatively in the ICU).

Internal Factors

Internal factors originate from the patient, including reduced mobility, age, body mass index (BMI), albumin, comorbidities, blood pressure, nutritional status, and body temperature.

Reduced Mobility

The primary factor in tissue deterioration and pressure sores' emergence is decreased mobility (15). When soft tissue is crushed for an extended time, usually between an exterior surface and a bony prominence, tissue necrosis results, and certain conditions such as drowsiness, restrictions, trauma, dementia, or a disease process might result in immobility or limited mobility (19). Pressure sores are skin and underlying tissue damage caused by constant pressure or friction (20).

Age

The development of pressure sores and tissue disintegration is also highly associated with age, as aging causes a reduction in muscle, collagen, flexibility, and subcutaneous fat (15,19). Since the majority of pressure sores are preventable, as stated by the NPUAP, the prevalence of pressure sores has been utilized as a gauge of the caliber of patient care (21). For bariatric individuals, one of the risk factors is age. The highest frequency of PI was observed in patients above 65. According to several studies, aging skin has reduced muscle, adipose tissue, collagen, and dermal thickness, making it less elastic and more prone to tissue injury. These outcomes align with the review findings. Male sex was found to be a more significant risk factor than female sex (22). A significantly increased risk of perioperative PI was associated with being older than 60 years old (23).

Body Mass Index (BMI)

PI development and BMI were found to be statistically significantly correlated (24). Individuals with a BMI of less than 23 kg/m^2 are equally susceptible to pressure injuries, but the prevalence of these accidents is higher in those with a BMI of more than 30 kg/m^2. The majority of patients with a BMI higher than 25 kg/m^2 will be at risk of having more extensive surgical intervention and longer recovery times, according to the study's results, which are in line with previous research (24-26). The risks of PI were not significantly impacted by obesity or morbid obesity, according to this systematic study and pooled data meta-analysis. Being underweight has been associated with an increased risk of pressure injuries while being overweight has been connected to a lower incidence of PI. When creating weight-loss and dietary strategies for the treatment of PI, these data may be taken into account (27).

Albumin

An individual's dietary status significantly impacts skin integrity and tissue perfusion. Thin individuals with less tissue covering their bony features are more vulnerable to pressure sores (19). Because vitamins and proteins improve tissue and cell wall integrity and help avoid pressure sores, malnourished people are more likely to have tissue disintegration (28). Micronutrients and supplements are important for preserving tissue integrity; on the other hand, deficits and deficiencies hinder the healing of wounds. A patient may suffer intraoperative PI if their albumin levels are less than 3.5 mg/dL. The risk of intraoperative PI was increased by 2.4 times in patients with low albumin levels. Individuals who have low serum albumin levels run the risk of developing preoperative interstitial edema, which can cause harm from pressure. The current study found a significant correlation between preoperative hemoglobin, low albumin levels, and high lactate levels with the development of PI after surgery (29).

Comorbid

Comorbidity is a concomitant disease, meaning there are other diseases experienced in addition to the main disease (30). For many patients, PI represents the last stop on a journey that leads to the accumulation of severe comorbidities and aggravating illnesses that impair the fragile (31). Several additional comorbid conditions have previously been shown to impact the development of PI, including immobility, urinary or bowel incontinence, chronic kidney disease, congestive heart failure, dementia, diabetes, malnutrition, moisture-associated dermatitis, neoplasm, neuropathy, shock, vasopressor use, anemia, fluid and electrolyte disorders, sepsis, history of

diabetic ulcers of the lower limb, quadriplegia/ hemiplegia, unstable spine, and obstructive sleep apnea (30).

Blood Pressure

The entire duration of time a patient's mean arterial blood pressure was below 60 mmHg while on vasopressors may be a separate predictor of the onset of pressure damage. According to current thinking, intraoperative hypotension and the damage threshold are both at 65 mmHg for mean arterial pressure (MAP) (32).

Nutritional Status

Hemoglobin levels might reveal nutritional status. Another risk factor that causes less nutrition and lower oxygenation and pressure injuries grows more quickly, and low hemoglobin hastens up wound recovery (33). It was found that while low hemoglobin levels promoted the development of pressure injuries, oxygenation, and hemoglobin levels had no effect in preventing pressure injuries (34). Inadequate nutrition and oxygenation (low serum albumin and hemoglobin), which are critical for preventing tissue damage, cause pressure injuries to develop more quickly (35).

Body Temperature

Frequent perioperative hypothermia has been associated with increased rates of wound infection, blood loss, fusion requirements, length of stay in the post-anesthesia care unit, and costs. Temperature regulation before, during, and after surgery is essential to reduce the risk of perioperative hypothermia (36). Hypothermia is the cause of disorders with the coagulation of plasma. Hypothermia can result in decreased enzyme activity, decreased enzyme capacity, and coagulopathy, which increases blood loss, thrombocytopenia, and hypercoagulation. A significant drop in temperature accelerates blood loss. For example, a mere 10 ºC decrease in core temperature was associated with greater rates of transfusion need (+22 %) and bleeding ePIodes (+16 %). Perioperative hypothermia's duration and severity significantly increase the chance of transfusion (37).

External Factors

External factors are environmental factors that have a deteriorating effect on the external layer of the skin, including length of operation, medical equipment and medication, nurse knowledge, temperature, surfaces or interface pressure, friction and shear, positioning, blood loss, and tools.

Length of Operation

An average person may spend 45 minutes to seven hours in an operating room. One study found that patients on the operating table for longer than 6.15 hours had a higher risk of pressure injuries (PI). A medical device's compression of the surrounding skin or mucosa increases with its duration of use, leading to pressure sores (23).

Medical equipment and Medication

A single vasopressor infusion increases the risk of PI (PI), and some evidence suggests that dopamine may play a role in the development of PI (14). The most frequent effects of dopamine include activation of beta-adrenergic receptors at moderate dosages, vasoconstriction in peripheral vasculature as a result of activation of alpha-adrenergic receptors at high doses (>10 pg/kg), and selective vasodilatory effects at low doses (1-2 pg/kg). This study found that dopamine did not influence the development of PI in the patients, perhaps because of the low mean dose (4.47 mcg/kg/min) given to the patients (38).

Nurse Knowledge

The majority of OR (operating room) nurses did not obtain information regarding patients with a high PI risk from clinical nurses, and some of them only received information verbally. OR nurses also did not use scales or assessment

tools. This makes sense because the OR nurses are not informed of the patient's PI high-risk condition (11).

Temperature

Temperature is a quantity that indicates the degree of hotness or coldness of an object, while humidity is the level of wet air conditions caused by the presence of water vapor (26). According to epidemiological research, there isn't necessarily a correlation between general measures of skin wetness like fecal and urine incontinence and a higher chance of PI development. The following scales, measurements, and descriptions are used in the literature to represent skin moisture in the literature. Proper skin function and resistance require a specific amount of moisture. One of the previously mentioned reasons is excess wetness. Moisture has an impact on the skin's physiologic, mechanical, healing, sensitivity, and tolerance properties (14).

Surfaces or Interface Pressure

Support surfaces are specialized instruments that regulate pressure redistribution, microclimate, and tissue stress. This emphasizes how important it is for everyone who has PI or is at risk of using a high-quality pressure redistribution support surface. Prolonged, unrelieved pressure on the skin is the cause of these PI, which often mimic the shape or pattern of the device. The emergence of these PI is influenced by several factors, including systemic variables, associated dampness, decreased sensibility or perfusion, and sometimes local edema. Interfacial pressure refers to the pressure that is applied through a particular surface, like foam or mattresses, to minimize pressure injuries, as well as pressure that is generated by external forces, such as the application of force, the use of restraints, or operational postures. Most of the foam pads or mattresses that were inspected served as general protective elements (15). Finding the support surface with the largest skin contact area, lowest peak interfacial pressure, and lowest average interfacial pressure is critical. The operation position (supine or prone) should be considered when choosing a surface type (viscoelastic or gel). Patients prone to pressure injuries should use a viscoelastic foam support surface in the operating room (39).

Anesthesia

In perioperative patients, pressure injuries (PI) can be more likely due to anesthetic drugs and surgical placement. The kind of anesthetic used is a significant risk factor during the intraoperative stage. This factor affects how much the neurological system, pain receptors, and muscles relax, making it more likely that the patient may experience pain and pressure injury because their defensive mechanisms won't be able to fend off pressure (13).

Friction and Shear

Shearing wounds and friction frequently coexist. Dragging or rubbing an object across the skin, such as a bed sheet, can result in friction wounds. When forces are applied to body components or tissues that cause them to move in opposite directions, shearing wounds result (40). A mechanical load is any force applied to a person's soft tissue because of skin contact with a solid surface, such as other body surfaces, air- or water-filled support surfaces, or medical equipment. It consists of the forces supported by the skeletal structures and transmitted by the soft tissue to the supporting surface. Mechanical stresses are commonly described by two types of forces: shear forces, which are parallel to the skin surface, and normal forces, which are perpendicular to the skin surface. In practical situations, the interaction force usually consists of a normal and a shear force (21).

Positioning

The surgeon, anesthesiologist, and operating room nurses all share responsibility for positioning the patient for a surgical procedure. A trade-off between the ideal surgical access position and the position the patient can tolerate may need to be made to achieve the ideal position (41). Significant risk factors for PI developing within 30 minutes included the patient's position in the

operating room, the surgical specialty (prone *vs*. supine: odds ratio, 22.10 (95 % CI, 5.72); lateral *vs*. supine: odds ratio, 14.32 (95 % CI, 0.37), and the surgical type (orthopedic surgery *vs*. general surgery: odds ratio, 18.33 (95 % CI, 2.31); cardiac surgery *vs*. general surgery: odds ratio, 22.00 (95 % CI, 2.19) (42).

Blood Loss

Blood loss in PI is an external factor that is one of the causes of the severity of PI. The severity of PI with blood loss ≥1 000 mL increases compared to blood loss ≤100 mL. By reducing body temperature and vasoconstriction, anesthetics modify the patient's autonomic thermoregulatory responses. This lowers soft tissue pressure, particularly in locations where pressure is constant. The patient's mean arterial pressure is also lowered during surgery due to blood loss. Stage 2 PI was more common in patients who lost over 1 000 milliliters of blood during surgery. Increased blood loss following surgery results in increased cellular hypoxia, hemodynamic fluctuations that lower blood pressure and filling pressure, and a higher risk of pressure injuries (PI) occurring or worsening (8).

Tools

The risk of surgical pressure sores was assessed in this descriptive cross-sectional study. The 3S Intraoperative PI Risk Assessment Scale and the Patient Descriptive Information Form (PDIF) were used to gather data (IPIRAS) (43). The Scott Triggers, Perioperative Risk Assessment Measure for Skin (PRAMS), Munro PI Risk Assessment Scale for Perioperative Patients, and Risk Assessment Scale for Perioperative Pressure Injuries (ELPO) were used to evaluate risk (41). These instruments are reliable and accurate for PI risk assessment. The research findings on the prevalence of PI differed widely. The lack of PI preventive and treatment regimens and variations in the PI evaluation instruments employed may be the cause of the highest incidence observed in the research (44). The complex and dynamic interactions among risk factors are not fully considered by the conceptual frameworks and risk assessment techniques that are now in use. This may indicate that the risk factors we synthesized need to be reexamined and that additional high-quality research, such as cohort studies, is required to understand better how hospital-acquired pressure injuries in adult patients are predicted (45).

DISCUSSION

Risk Factor PI in Surgery

Surgery patients have the danger of suffering pressure injuries (PI), which can be fatal or result in serious injury. Frequently, pressure injuries go unnoticed in the first few days following surgery. It could take up to 72 hours for an injury to show symptoms (13). The evaluation, diagnosis, and execution of a personalized preventive plan for at-risk patients are essential steps in preventing pressure injuries. When assessing risk, patient and environmental factors linked to the development of PI are considered (46). Effective pressure sore management requires ongoing patient assessment for possible risk factors and appropriate interventions to lower the risk of injury to vulnerable individuals (39). The ability of the skin and the structures that support it to withstand the impacts of pressure by serving as a cushion and transmitting pressure loads from the skin's surface to the skeleton is known as tissue tolerance. When pressure is present, tissue tolerance is influenced by both internal and extrinsic elements.

Pressure

Although pressure injuries are less likely to injure the superficial skin layer, the physical examination may not reveal as much damage as is there (33). The underlying history of immobility encompasses bedridden people, among others. Localized skin injuries with or without underlying tissue involvement are classified as skin and soft tissue pressure-induced injuries. But they typically develop over a bony protrusion. Shear stress, along with pressure, is the initiating component (40). The most prevalent bone prominences are ischium, sacrum, and

calcaneus. It's important to distinguish between PI-induced and superficial moisture-induced lesions, skin tears, tape burns, perineal dermatitis, or excoriation. Pressure injuries are believed to be caused by pressure from a medical device or an individual's body weight applied for an extended period above a specified threshold. An absence of pressure feedback response in persons with sensory deficiencies may lead to prolonged pressure that damages tissue. Increased arteriole pressure, shearing forces, friction, moisture, and nutritional condition are just a few of the many variables that can lead to PI and injury formation (24).

Tissue Tolerance

When pressure exceeds a threshold, it can induce persistent tissue ischemia, which can eventually result in necrosis and pressure injuries to the skin and soft tissues (47). Another contributing element is injury from reperfusion, since the creation of reactive oxygen species following a period of ischemia can create an inflammatory response. When patients are positioned at an angle, gravity pushes internal tissues like bone and muscle lower, causing tissue hypoxia because of deformed or flattened blood arteries (15).

Internal Factors

Internal variables lower the skin's tolerance by affecting the skin's vascular, lymphatic, and supporting tissues. The demographic trait most strongly linked to a higher risk of PI is advancing age. Patients who are older than 65 are more vulnerable, and the risk rises with age beyond 75. Men and Caucasians are at higher risk in certain studies (1,4,6,); however, opinions on the significance of these demographic traits are divided. A study (4 found, 25 males had a higher chance of developing peripheral ischemia during the chronic phase of Spinal cord ischemia (SCI) (eight studies, odds ratio OR 1.3, 95 % CI 1.1 to 1.7) in an SR on risk variables in SCI patients. In this population, age and ethnicity did not seem to be associated with PI risk. PI risk is also increased by chronic disorders that affect sensibility, the lymphatic system, and tissue perfusion. Additionally, a higher risk of peripheral ischemia is linked to illnesses and disorders that hinder oxygen transport to the tissues. Lower limb fractures, pneumonia, and a history of deep vein thrombosis have all been linked to an increased risk of peripheral ischemia (PI) in patients with chronic SCI. Chronic diseases and ailments are linked to an increased risk of peripheral artery disease (PI) that affect oxygen supply, tissue perfusion, sensibility, and lymphatic function.

External Factors

The skin's capacity to withstand pressure is affected by shear, friction, and wetness. Shear is a mechanical force that causes the body to slide due to a tangential, parallel load pushing against resistance between the skin and a contact surface. The blood arteries and lymphatic system between the dermis and deep fascia get distorted due to the deep fascia moving with the skeleton. In contrast, the skin's outer layers, the dermis and epidermis, remain constant. Thrombosis and capillary blockage result from this. Shear, a mechanical force generated by parallel stress, makes the skin and a contact surface oppose each other and cause the body to slide. The dermis and epidermis, the skin's surface layers, stay in place while deep fascia moves in tandem with the skeleton to create. Shear is caused by friction, a mechanical force that develops when two surfaces move over one another, creating resistance between the skin and the contact surface. Moisture causes maceration, which changes the epidermis' resistance to external forces, especially when the skin is exposed for extended periods. Perspiration, wound exudate, and incontinence can all result in moisture. Certain types of wetness, like fecal incontinence, increase the risk of certain conditions by exposing the skin to bacteria and enzymes that raise the skin's pH.

CONCLUSION

Pressure injuries (PI) can result from both surgical techniques and clinical circumstances that can trigger PI development. These findings may benefit the development of models to forecast

the risk of pressure injuries. A risk assessment should be part of the education provided to health professionals about pressure injuries. Only a small number of very predictive risk factors for pressure injuries must be used in the screening process to meet the screening objectives. Risk factors for PI in surgical patients are divided into two factors, namely internal and external factors. Internal factors include reduced mobility, age, body mass index (BMI), albumin, comorbidities, blood pressure, nutritional status, and body temperature. External factors include length of operation, medical equipment and medication, nurse knowledge, temperature, surfaces or interface pressure, friction and shear, positioning, blood loss, and tools. Pressure sores are a common problem among surgical patients, particularly in those with compromised sensory function or restricted mobility. The emergence of a pressure sore may shorten a patient's stay and increase the need for medical care. Applying the prevention strategies outlined and having a thorough understanding of the pathophysiology of pressure sores can reduce the occurrence and associated costs. When treating a patient with a pressure sore, a multidisciplinary team approach involving medical and allied health specialists is the most effective method. Further research is needed to understand why the prevalence of PI varies so significantly between surgical locations and types of surgery.

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