

# Factors Related to Maternal Readiness at Telehealth in Prenatal Care in Rural Areas of Indonesia

## Factores Relacionados con la Preparación Materna en la Telesalud en Atención Prenatal en Áreas Rurales de Indonesia

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### SUMMARY

**Introduction:** *Pregnancy is a physiological process, but if not managed properly it could become pathological. Telehealth is the use of information and telecommunications technology to support prenatal care. This study aimed to determine the factors related to maternal readiness at Telehealth Prenatal care in rural areas of Indonesia.*

**Methods:** *This research method was a cross-sectional study. The respondents were 65 pregnant women in rural areas in Indonesia. Sampling was done with quota sampling. The variables of this study were the Readiness Factor and Readiness for Prenatal Telehealth. The data were analyzed using univariate data using frequency distribution and bivariate using the Chi-Square test.*

**Results:** *The results showed that maternal Telehealth readiness was high (61.5 %). The results showed*

*that there was a relationship between education and income on maternal readiness for Telehealth prenatal care ( $p < 0.05$ ), and there was no relationship between age, education, or occupation in Telehealth prenatal care ( $p > 0.05$ ).*

**Conclusion:** *Telehealth applications can be developed for prenatal care in rural Rural Areas of Indonesia because the community has proven to be ready to carry out Telehealth.*

**Keywords:** *Readiness, telehealth, prenatal care, maternal child health care.*

### RESUMEN

**Introducción:** *El embarazo es un proceso fisiológico, pero si no se maneja adecuadamente se puede convertir en patológico. La telesalud es el uso de la tecnología de la información y las telecomunicaciones para apoyar la atención prenatal. El propósito de este estudio fue determinar los factores relacionados con la preparación materna en la atención prenatal de telesalud en áreas rurales de Indonesia.*

**Métodos:** *Esta investigación fue un estudio transversal. Las encuestadas fueron 65 mujeres embarazadas en áreas rurales de Indonesia. La muestra fue con muestreo por cuotas. Las variables de este estudio son el Factor de Preparación y Preparación de Telesalud Prenatal. El análisis de datos fue univariado mediante distribución de frecuencias y bivariados mediante prueba Chi-Cuadrado.*

**Resultados:** *Los resultados mostraron que la preparación materna para la telesalud fue categorizada como alta (61,5 %). Los resultados mostraron que hubo una relación entre la educación y los ingresos*

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*en la preparación materna en la atención prenatal de telesalud ( $P < 0,05$ ) y no hubo relación entre la edad, la educación y la ocupación en la atención prenatal de telesalud ( $P > 0,05$ ).*

**Conclusión:** *Las aplicaciones de telesalud se pueden desarrollar en la atención prenatal en las áreas rurales de Indonesia porque la comunidad ha demostrado estar lista para llevar a cabo la telesalud.*

**Palabras clave:** *preparación, telesalud, atención prenatal, atención de salud materno infantil*

## INTRODUCTION

The World Health Organization (WHO) has determined that every pregnant woman and newborn should receive quality care during pregnancy, childbirth, and postnatal. However, Maternal mortality is unacceptably high. About 287 000 women died during and following pregnancy and childbirth in 2020. Almost 95 % of all maternal deaths occurred in low and lower-middle-income countries in 2020, and most could have been prevented (1). Therefore, quality prenatal care is essential to reduce maternal mortality, such as identification, prevention, and management of pregnancy-related or concomitant diseases, health education, and health promotion (2-5). Apart from pregnancy complications, there is also a COVID-19 pandemic which can cause morbidity and mortality for pregnant women (3). Pregnant women infected with COVID-19 are expected to experience severe symptoms due to physiological changes in pregnancy, potentially experiencing an increased risk of complications from respiratory diseases. These include decreased lung function, increased oxygen consumption, and immune changes (6).

Telehealth, or information and telecommunications technology for remote healthcare, offers accessible and adaptable virtual care via voice and video calls (7,8). During the COVID-19 pandemic, it improved care and lowered exposure risks. Telehealth has shown potential in removing barriers to medical care delivery, particularly in rural areas (9). It can be used across medical disciplines to keep patients safe and prevent the spread of COVID-19 (10). In addition, telehealth aid provides rapid and easy answers to treatment-related questions (11). Telehealth development

improvements for prenatal care in remote areas demand consideration. Future research into telehealth services in rural areas is needed to improve prenatal care delivery (12).

A prior study evaluated high-risk scores and pregnancy outcomes between standard care and telemedicine groups. The telehealth group had significantly more prenatal visits and a higher proportion of high-risk women. Maternal mortality was decreased in the telehealth group. Combining telemedicine with routine treatment can enhance outcomes in high-risk pregnancies (13). Early detection and intervention improve maternal health and reduce maternal and perinatal mortality. Recent research has investigated the feasibility and efficacy of telemedicine techniques for managing high-risk pregnancies. Telehealth exchanges information through computerized systems, video conferencing, and mobile devices. It is a very young study area, and their findings differ (9).

Many factors can affect the readiness of mothers in Telehealth, which are formed from the readiness of attitudes, needs, information, access to the internet and information technology tools, and the ability to use Prenatal care (PNC) information technology. Such factors are characteristic of the patient. Factors that can influence include age, education, occupation, and maternal income (14). However, there is a lack in the literature concerning the parameters related to maternal readiness for Telehealth Prenatal Care in developing-country rural locations. As a result, this study aimed to analyze the factors related to maternal readiness for Telehealth Prenatal Care in rural areas of developing Countries. Understanding these factors allows for developing appropriate treatments and strategies to improve the preparedness and utilization of telehealth services among mothers.

## METHODS

The design was a cross-sectional study. The sample of this study was all pregnant women in Bandung Regency, Indonesia, who met the inclusion and exclusion criteria. The inclusion criteria were pregnant women domiciled in rural areas. A participant who was not willing

to participate in this research was excluded. Sampling was performed through quota sampling. The sample size formula for analyzing the relationship between the independent and dependent variables for the proportion of a single population in one sample. This study determined a type I error of 5 %, a one-way hypothesis so that  $Z_{\alpha} = 1.96$ . Type II error is 20 %, hence  $Z_{\beta} = 0.84$ . The proportion of dependent and independent variables in the previous study was 73 %, and the proportion of dependent and independent variables expected was at least 83 %. So, the number of samples consists of 65 people.

The variables of this study were the readiness factor of prenatal care telehealth and readiness of prenatal care telehealth. Data analysis was performed with univariate test using frequency distribution and bivariate using the Chi-Square test. The instruments in this study were modified questionnaires from the telehealth readiness questionnaire from the Maryland assessment tool (14) and the National Center for Farmworker Health questionnaire (15). In this study, the data analysis design was carried out using quantitative analysis using the Chi-Square test with a significance value  $< 0.05$ .

## RESULTS

As shown in Table 1, readiness obtained on Telehealth in the district Bandung was relatively high at 61.5 % and the unprepared at 38.5 %. In addition to the above categorization, the study results show attitudes, needs, information, access to the Internet, and technological tools navigation capabilities using information technology that can form readiness for Telehealth. Based on the results of the study, it was found that mothers' attitudes towards Telehealth Prenatal care were categorized as good (58.5 %), the need for Telehealth was high (95.4 %), namely wanting to go through WhatsApp (86.2 %), E-mail (1.5 %), web internet (55.4 %), special applications (44.6 %). Mothers have received information about Prenatal care telehealth before (93.8 %), namely from friends (15.4 %), TV (27.7 %), Internet (24.6 %), health workers (6.2 %), and social media (44.6 %). Access to the Internet is categorized as good (83.1 %). All mothers had cellphone (HP) (100 %) that were used personally (81.5 %) and

with family (18.5 %). 100 % of mothers have internet access, with 98.5 % using mobile data and 92.3 % using stable internet networks. 95.4 % of mothers have internet access skills, Able to use WhatsApp 80 %, Instagram 38.5 %, telegram 30.8 %, Facebook 60 %, and health applications 29.2 %. Mothers can access Wi-Fi as much as 89.2 %. The ability to navigate information technology through HP was categorized as high (70.8 %).

Table 2 depicts the association between factors and readiness in Telehealth Prenatal Care. The study found no link between age and readiness ( $p = 0.278$ ). However, there was a substantial relationship between education and readiness, with higher education levels indicating greater readiness ( $p = 0.028$ ). Income was also strongly linked with readiness, with higher-income people being more prepared for Telehealth prenatal care ( $p = 0.002$ ). While work status did not demonstrate a significant association ( $p = 0.079$ ), further analysis may be required. These findings highlight the need to consider education and poverty levels when adopting telehealth services for prenatal care.

## DISCUSSION

Our present results indicate that Telehealth readiness was relatively high up to 61.5 % readiness, while a 38.5 % was low. This indicates that Telehealth applications can be developed in rural areas in Indonesia. Telehealth can be a solution for patients who cannot reach health services directly or can be reached by patients whose residences are far from health services (16). In the current public health emergency, Telehealth can maintain patient access and continuity of care while minimizing the risk of COVID-19 transmission (9). Telehealth is an alternative mode of service delivery that allows people living in rural and remote areas to access health care within their local communities. Telehealth is the distribution of health-related services and information via electronic information and telecommunication technologies that utilize information and communication technologies such as telephone, videoconferencing, electronic messaging, or digital monitoring to improve health services (7). It allows long-distance patient

FACTORS RELATED TO MATERNAL READINESS

Table 1. Overview of Readiness on Prenatal Care Telehealth

| Variable   | Category              | F    | %    |
|--|-----------------------|------|------|
| Readiness on Prenatal Care Telehealth                              | Less                  | 25   | 38.5 |
|  | High                  | 40   | 61.5 |
| Sub Variable   |                       |      |      |
| Attitude   | Less                  | 26   | 40   |
|  | High                  | 38   | 58.5 |
| Necessity  | No need               | 3    | 4.6  |
|  | Need                  | 62   | 95.4 |
| Information  | Desired means:        | 56   | 86.2 |
|  | - Whatsapp            | 1    | 1.5  |
|  | - E-mail              | 36   | 55.4 |
|  | - Web Internet        | 29   | 44.6 |
|  | - Health Apps         |      |      |
|  | Never get information | 4    | 6.2  |
|  | Get information       | 61   | 93,8 |
| Access to Information Technology and the Internet:<br>HP Ownership | Resources             |      |      |
|  | -Friend               | 10   | 15.4 |
|  | -Television           | 18   | 27.7 |
|  | -Internet             | 16   | 24.6 |
|  | - Health Workers      | 4    | 6.2  |
|  | - Social Media        | 29   | 44.6 |
|  | Less                  | 11   | 16.9 |
| Good   | 54                    | 83.1 |      |
| Internet network   | Doesn't have          | 0    | 0    |
|  | Have:                 |      |      |
|  | 1. With Family        | 12   | 18.5 |
|  | 2. Personal           | 53   | 81.5 |
| Internet network stability   | No.                   | 0    | 0    |
|  | Yes                   | 100  | 100  |
| Ability to access platforms on the Internet with a mobile phone    | Wifi                  | 12   | 18.5 |
|  | Data cellphone        | 64   | 98.5 |
|  | No stable             | 5    | 7.7  |
| Wi-Fi access capability  | Stable                | 60   | 92.3 |
|  | Can't afford it       | 3    | 4.6  |
| Navigation Capabilities with HP                                    | Can, through:         | 62   | 95.4 |
|  | - WhatsApp            | 52   | 80.0 |
|  | - Instagram           | 25   | 38.5 |
|  | - Telegram            | 20   | 30.8 |
|  | - Facebook            | 39   | 60.0 |
|  | - Health apps         | 19   | 29.2 |
|  | Can't afford it       | 7    | 10.8 |
| Can  | 58                    | 89.2 |      |
| Low  | 19                    | 29.2 |      |
| High   | 46                    | 70.8 |      |

Table 2. Relationship between Determinants and Readiness in Telehealth Prenatal Care

| Variable             | f     | %    | P-value* |
|----------------------|-------|------|----------|
| Age                  |       |      |          |
| Median               | 28    | -    | 0.278    |
| Range                | 16-42 |      |          |
| Education            |       |      |          |
| Primary School       | 6     | 9.20 | 0.028    |
| Junior High School   | 25    | 38.5 |          |
| High School or above | 34    | 52.3 |          |
| Income               |       |      |          |
| Low                  | 42    | 64.6 | 0.002    |
| High                 | 23    | 35.4 |          |
| Work                 |       |      |          |
| Work                 | 53    | 81.5 | 0.079    |
| Does not work        | 12    | 18.5 |          |

\*Chi-Square test

and clinician contact, care, advice, reminders, education, intervention, monitoring, and remote admissions. With the Internet and infrastructure improvement, video conferencing, in particular, improved the excellence of Telehealth delivery in health services (17).

Telehealth programs overcome physical barriers to provide patients and caregivers access to convenient medical care, however, in the process of implementing Telehealth, there are still obstacles experienced by health workers regarding the ability to implement Telehealth to support the continuity of outpatient care during the pandemic (18,19), by minimizing in-person visits and reducing face-to-face contact between physicians and patients, the use of virtual care solutions can decrease the transmission of the virus and also protect medical practitioners from infection. The difficulties in implementing telehealth solutions are also influenced by financial and medical-legal considerations. In addition, some of the physicians themselves are troubled with technical difficulties, and many issues concerning the decision-making capability in this constellation, and the appropriate standards of quality, safety, and privacy, that should be maintained in such services. Telehealth has also proven beneficial for inpatient care, specifically to help balance clinical service provision with surging demand across physical or geographic boundaries, conserving personal protective

equipment, and providing remote patients connections to family and friends (20,21). Telehealth has several key strengths that can improve emergency response services when the environment is in a biological hazard and during infectious disease outbreaks (22).

This research showed that there was no relationship between age and occupation factors on PNC telehealth readiness; meanwhile, there was a significant relationship between education and income with readiness in PNC telehealth. Several determinants such as characteristics influence patient readiness for Telehealth. Characteristics of the patient population, such as age, education, occupation, and income, can affect telehealth admissions (14).

## CONCLUSION

Maternal readiness for Telehealth was categorized as high. The results showed a relationship between education and income on maternal readiness on telehealth PNC and no relationship between age, education, and occupation on Telehealth PNC. It is hoped that telehealth applications will be developed for PNC practice because the community has proven to be ready to carry out Telehealth.

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