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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.

REFERENCE

1. Belay M, Oumer A, Abdureshid N, Ale A. Overnutrition and Associated Factors Among High School Adolescents in Mid COVID-19 Pandemic in Ethiopia: Neglected Public Health Concern. Adolesc Health Med Ther. 2022;13:1-14.
2. Nurwanti E, Hadi H, Chang JS, Chao JC, Paramashanti BA, Gittelsohn J. Rural–Urban Differences in Dietary Behavior and Obesity: Results of the Riskesdas

Study in 10-18-Year-Old Indonesian Children and Adolescents. Nutrients. 2019;11(11):2813.

3. Najmah S, Haerawati I, Utama F, Sari IP, Rosyada A, Anjani R. Public Health Science: Intersection of Theory & Application in the Indonesian Context. Yogyakarta: Bintang Universe Media; 2022.
4. World Obesity. Global Obesity Observatory. 2020. Available from: https://data.worldobesity.org/country/indonesia-96/
5. UNICEF. Analysis of the Overweight and Obesity Landscape in Indonesia. 2022. Available from: https://doi.org/https://www.unicef.org/indonesia/id/report/analysis-
6. Damayanti ER. Relationship between eating patterns, physical activity and body image with nutritional status in young women at SMA Negeri 3 Tambun Selatan. Indo J Health Dev. 2022;4(1):35-45.
7. Riskesdas. East Java Province Riskesdas Report 2018. Jakarta: Publishing Institution, Health Research and Development Agency; 2018.
8. Azzahra A, Puspita ID. The Relationship between Dietary Patterns, Physical Activity and Intensity of Social Media Use with Overnutrition Status in Adolescents at SMA Negeri 14 East Jakarta. Indo J Health Dev. 2022;4(1):1-8.
9. Aghasi M, Matinfar A, Golzarand M, Salari-Moghaddam A, Ebrahimpour-Koujan S. Internet Use in Relation to Overweight and Obesity: A Systematic Review and Meta-Analysis of Cross-Sectional Studies. Adv Nutr. 2020;11(2):349-356.
10. Hanani R, Badrah S, Noviasty R. Diet, physical activity and genetics influence the incidence of obesity in adolescents. Sai Wawai Metro Health J. 2021;14(2):120-129.
11. Kadir S. Community Nutrition. Yogyakarta: Absolute Media; 2022.
12. Hadianfard AM, Mozaffari-Khosravi H, Karandish M, Azhdari M. Physical Activity and Sedentary Behaviors (Screen Time and Homework) Among Overweight or Obese Adolescents: A Cross-Sectional Observational Study In Yazd, Iran. BMC Pediatr. 2021;21(421):1-10.
13. Banjarnahor RO, Banurea FF, Panjaitan JO, Pasaribu RSP, Hafni I. Faktor-Faktor Risiko Penyebab Kelebihan Berat Badan Dan Obesitas Pada Anak Dan Remaja : Studi Literatur. Studi literaturTrop Public Health J. 2021;2(1):35-45.
14. Sayed M, Naiim CM, Aboelsaad M, Ibrahim MK. Internet Addiction and Relationships with Depression, Anxiety, Stress And Academic Performance Among Egypt Pharmacy Students: A Cross-Sectional Designed Study. BMC Public Health. 2022;22(1):1-10.
15. Buanasita A, Hatijah N. The Relationship between Dietary Patterns, Physical Activity, Internet Addiction and the Nutritional Status of High School Children during the COVID-19 Pandemic in the City of Surabaya. Amerta Nutrition. 2022;6(1):107-116.
16. Wex I, Geserick M, Leibert T, Igel U, Sobek C, Meigen C. Active School Transport in an Urban Environment: Prevalence and Perceived Barriers. BMC Public Health. 2023;23(557):1-12.
17. Khodanazari H, Choupani AA, Aghayan I. The Contribution of Walking to School in Students' Physical Activity and Its Effect on Being Overweight. BioMed Res Int. 2022:1-15.
18. Li X, Hu Q, Liu J, Nambisan S, Khattak AJ, Lidbe A, et al. Pathway Analysis of Relationships Among Community Development, Active Travel Behavior, Body Mass Index, And Self-Rated Health. Int J Sust Transp. 2022;16(4):340-356.
19. Mizwar M, Astiti D, Aji AS, Siswati T. Transportation Mode Choice and Obesity: A Cross-Sectional Study at Senior High School Female Student in Yogyakarta, Indonesia. J Nutr College. 2022;11(2):114-119.
20. Young K.S. Internet Addiction: The Emergence of a New Clinical Disorder. Cyberpsychol Behav. 1998;1(3).
21. Kurniawan H, Farapti F. Hubungan Adiksi Internet dengan Status Gizi pada Mahasiswa Fakultas Kesehatan Masyarakat Universitas Airlangga. Media Gizi Kesmas. 2021;10(2):187-195.
22. Koca SB, Paketci A, Buyukyilmaz G. The Relationship Between Internet Usage Style and Internet Addiction and Food Addiction in Obese Children Compared to Healthy Children. Turk Arch Pediatr. 2023;58(2):205-211.
23. Darmawati I, Setiawan A, Fitriyani P. Implementation of the Walking and Cycling to School Program for School-Age Children in Depok City. J Sports Education. 2020;9(2):181-191.
24. Ferrari G, Drenowatz C, Kovalskys I, Gómez G, Rigotti A, Cortés LY. Walking And Cycling, As Active Transportation, And Obesity Factors in Adolescents from Eight Countries. BMC Pediatr. 2022;22:1-11.
25. Wilson K, Clark AF, Gilliland JA. Understanding Child and Parent Perceptions of Barriers Influencing Children's Active School Travel. BMC Public Health. 2018;18(1):1-14.
26. Ozbil A, Yesiltepe D, Argin G, Rybarczyk G. Children's Active School Travel: Examining the Combined Perceived and Objective Built-Environment Factors from Space Syntax. Int J Environ Res Public Health. 2021;18(1):1-22.
27. Jurak G, Soric M, Sember V, Djuric S, Starc G, Kovac M. Associations of Mode And Distance of Commuting To School with Cardiorespiratory Fitness in Slovenian School children: A Nationwide Cross-Sectional Study. BMC Public Health. 2021;21(291):1-10.