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SMARTPHONE ADDICTION LEVELS IN SCHOOL-AGE CHILDREN AFTER THE COVID-19 PANDEMIC IN RURAL AREA

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Abstract: *The level of dependence of children on smartphones increased during the Covid-19 pandemic to 47.5%. The average smartphone use time for school-age children is 6.85 hours a day. Meanwhile, the ideal screen time for school-age children is no more than 2 hours/day. Smartphone addiction is a growing problem in children with adverse physical, psychological, and social health consequences. The purpose of the study was to see the levels of smartphone addiction in school-age children after the Covid-19 pandemic in rural area of Indonesia. This study used a cross-sectional descriptive design. The research subjects were school-aged children at "X" Elementary School (N=114), total sampling. Data collection was carried out using the Indonesian version of the Smartphone Addiction Scale (SAS) instrument which is valid and reliable. Data were analyzed using descriptive statistics. The smartphone addiction levels were 13.2% for low addiction, 77.2% for moderate addiction, and 9.6% for severe addiction. Item 4 SAS, which contains a statement of feeling happy when using a smartphone gets the highest score. The positive anticipation dimension is the most dominant with the highest score. The level of smartphone addiction after the Covid-19 pandemic among school-age children in this study was dominated by moderate smartphone addiction. The role of parents, teachers, health workers, and the government is an important key to reducing smartphone addiction incidents in school-age children in the future.*

INTRODUCTION

The Covid-19 pandemic situation has led to digital transformation or digitization processes in various aspects of human life (Mutiara 2022). Even though at this time the Covid-19 numbers in the world have dropped, digital lifestyles or online habits during the Covid-19 pandemic which aim to minimize contact and prevent the transmission of Covid-19 still survive and even tends to increase because the use of digital technology is considered more practical and makes human life easier. With digitalization, gadgets and internet networks have become a necessity for all circles in this modern era. Starting from young to old age, currently it has been exposed and coexists with gadgets supported by the internet network.

The rapid development of ICT has the potential to cause an increase in the use of gadgets in all circles of society, including student groups. The high rate of gadget use among students in Indonesia is evidenced by the results of Asosiasi Penyelenggara Jasa Internet Indonesia (APJII) research on the level of internet penetration in students has increased to 99.26% in 2022 from the previous 71.8% in 2018 (APJII 2019). Smartphones are one of the most dominant types of gadgets used to access the internet.

In 2022, the gadget market share in the world included smartphones at 60.73%, desktop PCs at 37%, and tablets at 2.27% (StatCounter 2022). According to the results of an APJII survey in 2022, most Indonesians (89.03%) use smartphones to access the internet compared to using computers/laptops (0.73%) (APJI 2022). The reason why more people choose to use smartphones instead of laptops or computers because smartphones are more portable, mobile, practical, can access information quickly and spontaneously, as well as better start-up times compared to desktop PCs and laptops (Bröhl et al. 2018). Smartphones and various applications in them offer quick access to the internet and social media through various applications such as Facebook, Twitter, WhatsApp, and Skype (Aljomaa et al. 2016). In addition, smartphones have many entertainment features such as games, cameras, videos, bluetooth, multi-media, radio, youtube, movies, GPS, and other applications (Aljomaa et al. 2016).

One of the active users of smartphones among students is the group of school-age children. School-age children are defined as individuals who are in the age range of 6 to 12 years.(Damayanti, Lutfiya, and Nilamsari 2019) In this age range, individuals are studying in elementary school. According to APJII research in 2022, in Indonesia, the internet penetration rate in school-aged children (5-12 years) is 62.43% with 89.03% using smartphone devices to access the internet (APJI 2022). Smartphone usage rates are increasing rapidly among school-age children aged 6-10 years (Fischer-Grote, Kothgassner, and Felnhofer 2019). The average smartphone usage time of school-aged children in a day is 6.85 hours, an increase of 53.86% from the pre-pandemic period (Mokhtarinia et al. 2022). On the other hand, the ideal screen-time for school-age children according to IDAI is no more than 2 hours per day (IDAI 2014).

The main impulse of children using smartphones with the support of the Internet is to search and get information, communicate, as well as for entertainment (Zaini and Soenarto 2019). The search for information carried out by children is often motivated by school assignments, while the use of entertainment applications and social media are motivated by personal needs (Broto 2014). Parents' and teachers' awareness of the use of smartphones and the internet as a means of supporting children's teaching and learning activities is increasingly enabling school-age children to use smartphones more often.

The use of smartphones should have a positive impact on elementary school children such as facilitating children's needs to establish relationships with others, obtain and share

information, get entertainment, and support the child's education and learning process. The child's lack of self-control and parental supervision causes the use of smartphones in children to become excessive and uncontrollable (Smartphone addiction). Smartphone addiction can result in a variety of problems in the physical, psychological, and social aspects.

The negative impact of smartphone addiction on physical aspects can cause headaches, pain in the hands, elbows, neck, and back, sleep disturbances, and refractive problems. In the psychological aspect, smartphone addiction can cause depression, neuroticism, Obsessive-Compulsive Disorder (OCD), and have an effect on academic performance (Amalia and Hamid 2020). Other negative impacts on the psychological aspects caused by smartphone addiction include excessive expressions of anger when activities using smartphones are disrupted, being lazy, easily feeling saturated while studying, withdrawing more often, and easily hating others (Aulia 2019). In the social aspect, smartphone addiction also causes negative impacts, including the development of children's social interactions being hampered, children becoming anti-social, and a reduced sense of empathy for others (Aulia 2019).

The negative impact of smartphone addiction in school-age children is quite concerning, so it needs attention from many parties, including parents, teachers, health workers, and the government. From several phenomena that have been stated, knowing the picture of the level of smartphone addiction after the Covid-19 pandemic in school-age children is an urgent thing to do, especially for students from schools that have held online learning before because they have more potential to own and use smartphones. The purpose of this study is to see an overview of the level of smartphone addiction in school-age children after the COVID-19 pandemic in rural area of Indonesia. This research is focused on schools located in rural area to see a picture of the level of smartphone addiction in school-age children in area where the internet penetration rate is still low.

THEORETICAL BASIS

1. School-Aged Children as Smartphone Users

WHO defines school-age children as individuals in the age range of 7-15 years. According to Erik H. Erikson, school age children are in the age range of 5-12 years (Hickson 2022). According to Damayanti et al., school-age children are individuals in the age range of 6 to 12 years (Damayanti, Lutfiya, and Nilamsari 2019). In this age range, individuals are studying at elementary school. School-aged children find it easier to absorb new information and knowledge because their cognitive abilities increasingly develop in that age range (Damayanti, Lutfiya, and Nilamsari 2019). School-aged children can already respond to intellectual stimuli or carry out learning tasks that require intellectual or cognitive abilities such as reading, writing, arithmetic (Basit 2022). In the 6-12 year age period, children begin to gain basic knowledge/cognitive abilities, are able to interact with their peers, and begin to be responsible for their own behavior (Rahmawati, Herlina, and Hasneli N. 2021).

Elementary school students are in the developmental phase of school-aged children, where children experience rapid growth and cultivation of various aspects of human experience (Park 2020). During this phase, children develop sociality along with active interactions with peers in the same age group (Park 2020). They learn a sense of accomplishment and perseverance by acquiring and utilizing behavioral patterns required by society (Park 2020). All of these experiences may have a profound impact on the formation of a positive self-concept and self-esteem (Park 2020). However, excessive

smartphone use can cause many problems for children's healthy growth and development, including reduced physical activity due to increased sitting time, decreased visual function, decreased sleep quality, decreased participation in social activities, and increased risk of depression or anxiety. Additionally, fast and easy access and transfer of information can be detrimental to children's cognitive development by inducing declines in critical thinking and concentration (Sohn et al. 2019). Therefore, it is important to provide appropriate guidance and education to children regarding healthy smartphone usage habits.

2. Smartphone Addiction

2.1. Definition of Smartphone Addiction

Smartphone addiction is a disorder that involves compulsive and excessive use of mobile devices, usually measured as the number of times users access their devices and/or the total amount of time they are online during a certain period (Wigmore 2018). Smartphone addiction is defined as a lack of control over using a smartphone despite adverse effects including financial, psychological and physical, as well as socially harmful consequences on the user (Mehrnaz et al. 2018). Smartphone addiction is uncontrolled behavior in using smartphones which can cause problems in the user's daily life (Antang 2021). Leung (in Simangunsong, 2017) defines smartphone addiction as a condition where a person is tied to a smartphone, accompanied by a lack of control in using the smartphone, which has a negative impact on the person.

2.2. Aspects/Dimensions of Smartphone Addiction

There are six aspects of smartphone addiction according to Kurniawan et al., (2016), namely:

a. Daily-life disturbance

These disorders include carrying out unplanned activities, having difficulty concentrating when working or studying, experiencing blurred vision or mild headaches, experiencing pain in body parts such as the neck, back, elbows and hands, and experiencing disturbed sleep patterns. Someone who is addicted to a smartphone may have difficulty concentrating on the activity they are doing because they cannot forget about their smartphone. Apart from that, smartphone addicts will also spend more time using their smartphone, which will make them feel pain in their wrists, neck, back, eyes, head and other body parts due to prolonged use of their smartphone.

b. Positive anticipation

Positive anticipation is described as a feeling of excitement when using a smartphone, relieving stress by using a smartphone, and a feeling of emptiness when not using a smartphone. For most smartphone users, a smartphone is not just a communication tool, a means for playing games, and a personal digital assistant (PDA), but also a friend in everyday life because it can provide pleasure, relieve fatigue and anxiety, and make them feel safe.

c. Withdrawal

Withdrawal includes a situation where a smartphone user becomes impatient, fussy and intolerant without a smartphone, thinks about the smartphone constantly even when not using it, and becomes very angry or irritated when feeling disturbed when using the smartphone.

d. Cyberspace-oriented relationship

This dimension includes feelings that one's relationship with other people obtained via smartphone is closer than the relationship obtained in the real world, having an excessive sense of loss when one cannot use a smartphone, and checking one's smartphone continuously or periodically. Smartphone users often think of

cyberspace as a streamlined real community or society formed by Social Networking Service (SNS) sites, such as Instagram, TikTok, Facebook, or Twitter.

e. Overuse

Overuse refers to uncontrolled use of a smartphone, a preference for doing your own searches using a smartphone rather than asking someone else for help, always having a charging pack handy, and the desire to use the smartphone again after you have finished using it.

f. Tolerance

Tolerance is defined as a condition where smartphone users always try to control smartphone use but always fail.

METHODS

Study Design

This study uses a quantitative descriptive research design with a cross-sectional time approach.

Study Setting

This research was conducted at "X" Elementary School, Sukasari Kaler Village, Argapura District, Majalengka Regency, West Java Province, Indonesia, in January 2023.

Population and Sample

The population in this study is all Elementary School Students "X" for the 2022/2023 School Year (N = 114).

Sampling in this study used the Total Sampling technique so that the number of samples was equal to the number of populations (n = 114).

Measurement and data collection

This study used a valid and reliable Indonesian Version of the Smartphone Addiction Scale (SAS) Instrument developed by Kurniawan et al., (2016) based on the theory of Kwon et al., (2013) (Kurniawan, Rustika, and Aryani 2016; Kwon et al. 2013).

This instrument is in the form of a self-reporting questionnaire which is composed of 21 statement items from six dimensions of smartphone addiction, namely: daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance. Measurements on this instrument are carried out using a likert scale. Each statement item has six answer scales that describe the respondent's conformity with the respondent's self-centeredness with a scale range of 1-6. On favorable items (an item that supports smartphone addiction variables), the assessment given is as follows: Absolutely Inappropriate (AI) = 1; Inappropriate (I) = 2; Slightly Inappropriate (SI) = 3; Slightly Appropriate (SA) = 4; Appropriate (A) = 5; Absolutely Appropriate (AA) = 6. On unfavorable items (items that do not support smartphone addiction variables), the assessment given is as follows: Absolutely Inappropriate (AI) = 6; Inappropriate (I) = 5; Slightly Inappropriate (SI) = 4; Slightly Appropriate (SA) = 3; Appropriate (A) = 2; Absolutely Appropriate (AA) = 1. The total score of smartphone addiction is obtained through the summation of the score of each item with a total score range from 21 (minimal score) to 126 (maximum score). A higher score indicates a higher level of smartphone addiction as well.

Each statement item in the Indonesian Version of the Smartphone Addiction Scale (SAS) Modification Instrument contains one of the six dimensions of smartphone addiction with the distribution of smartphone addiction dimensions on each item number as follows:

Table 1. Distribution of Smartphone Addiction Dimensions on Each SAS Item Number

No.	Dimension	Item		Total
		Favorable	Unfavorable	
1.	Daily-life disturbance	1, 2, 3		3
2.	Positive anticipation	4, 6, 7, 8	5	5
3.	Withdrawal	9, 10, 11	12	4
4.	Cyberspace-oriented relationship	13, 14	15, 16	4
5.	Overuse	17, 18, 19		3
6.	Tolerance	20, 21		2
Total		17	4	21

This study used a paper-based questionnaire consisting of several fill-in sheets with the following data collection procedures: 1) Distributing a research questionnaire that already contains a questionnaire introduction sheet, research information, informed consent sheet, respondent identity sheet, and an Indonesian version of the Smartphone Addiction Scale (SAS) sheet to potential respondents; 2) Respondents respond to fill-in, questions, or statements that are on the research questionnaire. The answers from the Smartphone Addiction Scale (SAS) questionnaire used a likert scale with six answer choices; 3) After the questionnaire is filled in completely, the researcher collects the questionnaire from the re-spondents and performs data processing.

Data Analysis

This research explores four things, namely: demographic characteristics of the study subject, levels of smartphone addiction, analysis of SAS items, and analysis of SAS dimensions. Data processing and analysis are carried out with the help of Microsoft Excel software version 2212 and IBM SPSS Statistics version 26.

The levels of smartphone addiction in this study was expressed in 3 categories, namely: 1) Low addiction: $X < \text{Mean} - SD$; 2) Moderate addiction: $\text{Mean} - SD \leq X \leq \text{Mean} + SD$; 3) Severe addiction: $X > \text{Mean} + SD$. This categorization uses the basis of hypothetical categorization, namely by comparing the total scores obtained by the study subjects with the standard cut scores obtained from the scale. Hypothetical norms are based on the scale of measuring instruments. The category points are arranged based on the hypothetical mean value and the hypothetical standard deviation obtained from the instrument. In this study, the instrument used was the Modified Smartphone Addiction Scale (SAS) version Indonesian which had 21 statement items with a six-scale likert scale that had a score range of 1-6. Based on the information, it can be known that Xmaks = 126; Xmin = 21; Hy-pothetical Mean 73.5; Hypothetical Standard Deviation: 17.5. Thus, the level of Smartphone Addiction can be obtained by comparing the value of X with the following cut scores: 1) Low addiction: $X < 56$; 2) Moderate addiction: $56 \leq X \leq 91$; 3) Severe addiction: $X > 91$; where X is the total score obtained by the study subjects from the Indonesian version of the Smartphone Addiction Scale (SAS) instrument. After the data were categorized, the researcher presented a table of the frequency distribution of the levels of the smartphone of the study subject.

Smartphone Addiction Scale (SAS) item analysis was carried out by ranking the cumulative value of the study subjects on 21 SAS items from the highest to the lowest scores with the help of the microsoft excel rank function.

Smartphone Addiction Scale (SAS) dimension analysis was carried out by ranking the average cumulative value of the study subjects on 6 SAS dimensions from the highest to the lowest scores with the help of the Microsoft Excel rank function.

Research Ethics

This research has received ethical approval from the Research Ethics Committee of Padjadjaran University with Number: 84/UN6.KEP/EC/2023.

RESULTS AND DISCUSSION

1. Demographic Characteristics of the Research Subject

Table 2. Demographic Characteristics of the Research Subject

Characteristic	Frequency	Percentage (%)
Gender		
Male	67	58,8%
Female	47	41,2%
Total	114	100%
Class		
1	18	15,8%
2	23	20,2%
3	16	14,0%
4	13	11,4%
5	20	17,5%
6	24	21,1%
Total	114	100%
Age (Years)		
7	22	19,3%
8	22	19,3%
9	13	11,4%
10	14	12,3%
11	17	14,9%
12	21	18,4%
13	5	4,4%
Total	114	100%
Smartphone Users		
User	114	100%
Not User	0	0%
Total	114	100%
Smartphone Ownership		
Personal	101	88,6%
Parents	12	10,5%
Sib	1	0,9%
Total	114	100%
Main Purposes of Using Smartphone		
Play Games	56	49,1%
Learning	12	10,5%
Opening Tiktok	24	21,1%
Opening Youtube	6	5,3%

Characteristic	Frequency	Percentage (%)
Opening WhatsApp	12	10,5%
Opening Instagram	4	3,5%
Total	114	100%

Based on the information in Table 2, it can be seen that the research subjects in this study were 114 elementary school students "X" (100%), consisting of 67 (58.8%) male students and 47 (41.2 %) female students. The study subjects consisted of 18 (15.8%) class 1 students, 23 (20.2%) class 2 students, 16 (14.0%) class 3 students, 13 (11.4%) class 4 students, 20 (17.5%) class 5 students, and 24 (21.1%) class 6 students who were in the age range of 7-13 years. As many as 114 (100%) "X" elementary school students are smartphone users. In everyday life, as many as 101 (88.6%) people use personal smartphones, 12 (10.5%) people use smartphones owned by their parents, and 1 (0.9%) people use smartphones owned by relatives. The majority of students, 56 people (49.1%) use smartphones for the main purpose of playing games.

2. Smartphone Addiction Levels

Table 3. Smartphone Addiction Levels Frequency Distribution

Category	Score	Frequency	Percentage
Low Addiction	$X < 56$	15	13,2%
Moderate Addiction	$56 \leq X \leq 91$	88	77,2%
Severe Addiction	$X > 91$	11	9,6%
Total		114	100,0%

Based on Table 3, it can be seen that as many as 15 students (13.2%) had low-level smartphone addiction, as many as 88 students (77.2%) had moderate-level smartphone addiction, and as many as 11 students (9.6%) had severe smartphone addiction. The most dominant level of smartphone addiction in school-age children in elementary school "X" is moderate-level smartphone addiction as the first rank (77.2%), followed by low-level smartphone addiction as the second rank (13.2%), and severe level of smartphone addiction as the third rank (9.6%).

3. Item Analysis of Smartphone Addiction Scale (SAS)

Table 4. Smartphone Addiction Scale (SAS) Item Ranking

Ranking	Item	Statement	Score
1	4 (PA)	I feel happy when I use my smartphone	489
2	6 (PA)	Using a smartphone is the most fun thing for me to do	476
3	7 (PA)	I feel very free when using a smartphone	454
4	13 (COR)	I can get to know more people through the use of smartphones	448
5	3 (DLD)	My concentration in doing tasks is often interrupted due to the use of smartphones	398
6	21 (T)	I have tried many times to shorten my smartphone usage time but always failed	391
7	20 (T)	People around me told me that I had been using my smartphone for too long	385

Ranking	Item	Statement	Score
8	18 (O)	I'm using my smartphone longer than I planned	384
9	11 (W)	I always think of my smartphone even though it's not using it	380
10	17 (O)	I prepare a backup battery or power bank so that smartphone use is not interrupted	380
11	14 (COR)	I feel that relationships with friends on smartphones are more intimate than friends in real life	373
12	9 (W)	I can't resist not having a smartphone	368
13	8 (PA)	My life feels empty without a smartphone	363
14	19 (O)	Every time I finish using the smartphone, I will be encouraged to reuse it	363
15	15 (COR)	I feel like my real-life friend understands me better than my friend on a smartphone	361
16	5 (PA)	I remain confident even if I don't use a smartphone	354
17	10 (W)	I get annoyed when disturbed while using a smartphone	339
18	2 (DLD)	I experience dizziness or blurred vision due to excessive smartphone use	333
19	1 (DLD)	I often miss activities /activities that I have planned due to the use of smartphones	325
20	12 (W)	I was able to stay patient even if I didn't bring a smartphone	315
21	16 (COR)	I'd rather go for a walk with a friend in real life than talk to my friend on a smartphone	309

In table 4, we can find out the score ranking of 21 SAS items. This score is obtained by adding up the scores of 114 respondents in each item. Researchers then sort the scores from largest to smallest scores and sort the equal-valued scores by item number. The item with the largest score (489) is item number 4 of the positive anticipation dimension which contains the statement, "I feel happy when using a smartphone". The item with the smallest score (309) is item number 16 of the cyberspace-oriented relationship dimension that contains the statement "I would rather go for a walk with a friend in real life than talk to my friend on a smartphone". A larger item score indicates a higher population smartphone addiction rate on the item. The larger the item score, the greater the match between the population with the statement on the favorable item or with the negation of the statement (~P) on the unfavorable item.

4. Dimension Analysis of Smartphone Addiction Scale (SAS)

Table 5. Smartphone Addiction Scale (SAS) Dimension Ranking

Ranking	Dimensions	Item	Score
1	Positive anticipation	4, 5, 6, 7, 8	427,2
2	Tolerance	20, 21	388
3	Overuse	17, 18, 19	375,7
4	Cyberspace-oriented relationship	13, 14, 15, 16	372,8

Ranking	Dimensions	Item	Score
5	Daily-life disturbance	1, 2, 3	352
6	Withdrawal	9, 10, 11	350

In table 5, we can find out the score ranking from the 6 dimensions of SAS. This score is obtained by average the score of items on each dimension. The researchers then sorted the dimension scores from largest to smallest. The SAS dimension ranking and their scores are as follows: 1) Positive anticipation (427.2); 2) Tolerance (388); 3) Overuse (375.7); 4) Cyberspace-oriented relationships (372.8); 5) Daily-life disturbance (352); 6) Withdrawal (350). A larger dimension score indicates the smartphone addiction behavior of the population that is more dominant in that dimension.

Based on the results of the analysis of respondents' characteristics, 114 (100%) of "X" elementary school students were smartphone users with 101 (88.6%) students using personal smartphones. This suggests that the majority of school-age children aged 7-13 years in primary school "X" already have a personal smartphone device. These findings are in line with the results of a ChildWise survey of 2,167 children aged 5-16 years which revealed that the majority of children (53%) already had a personal smartphone by the age of seven (ChildWise 2020). The covid-19 pandemic situation in the past can be an antecedent of the high level of smartphone ownership in school-age children today. Seeing the percentage of smartphone users reach 100% in elementary school students "X" indicates that smartphones have now become a fundamental part of the lives of school-age children. Smartphones have now become a necessity for everyone including groups of children, as they can help them to connect with each other as well as keep them busy by browsing websites, playing games, listening to music, and watching movies (Lava 2018). Today's technological advances have not only penetrated into adult lives, but have also touched the lives of children.

In this study, it was found that the majority of children, 88 out of 114 children (77.2%), in elementary school "X" had a moderate level of smartphone addiction. Moderate smartphone addiction can be interpreted as a condition in which a person feels heavy-hearted when parting with a smartphone, even though no pathological signs have appeared yet (Sumiyarini and Yuliyani 2022). The results of this study are not in line with the research of Vyas (2021) on subjects of schoolchildren aged 8-12 years in Nadiad City, India, which stated that out of 100 children, the majority of children as many as 49 people (49%) had a severe level of smartphone addiction (Vyas 2021). The results of this study are also not in line with the research of Mokhtarinia et al (2022) on school-age children in the capital of Teheran Iran, which stated that the majority of children as many as 312 out of 585 children (53.3%) had a high level of smartphone addiction (Mokhtarinia et al. 2022). The discrepancy in the results of this study can be caused by differences in internet infrastructure in urban and rural areas, where in urban areas the digital infrastructure is more built than in rural areas.

"X" elementary school is a school located in a rural area of Argapura District, Majalengka Regency, Indonesia. When the researcher took data to the study site, the researcher found a blank spot area or area that did not receive a signal from the telecommunication tower (Base Transceiver Station). The cell phone signal available at the research site is only for the largest provider in Indonesia with a signal strength that is not too large. At the study site, there is no signal available for the provider that the researcher uses (the 4th largest provider in Indonesia), so the researcher does not have access to the internet while there. From these circumstances, researchers assessed that access to the

internet at the study site was not so adequate when compared to urban and suburban areas. When internet access is poor, access to application features on smartphones will also be limited, making a person's attachment to a smartphone not too strong because the utility obtained from a smartphone is not optimal. This can lead to the level of smartphone addiction at the study site not being as severe as in urban areas as in the studies of Vyas(2021) and Mokhtarinia et al (2022).

Although the results showed that severe smartphone addiction in school-age children in primary school "X" was third (9.6%), this situation should still get intervention as early as possible so as not to cause more serious smartphone addiction with worse consequences. To solve this problem, researchers suggest that parents as the closest people to the child: 1) provide supervision, restrictions, and strict schedules for children in smartphone use; 2) Activate the parental controls feature on the child's smartphone to set the child's screen-time restrictions so that the child does not constantly use the smartphone for a long time; 3) encourage children to increase non-screen-time activities such as exercising, reading books, painting, cooking, cleaning the house, etc.; 4) invite children to chat and interact while at home so that children do not feel lonely and look for busyness through smartphones.

Based on the analysis of SAS items, the findings of the item with the largest score were 4-dimensional positive anticipation items that contained the statement "I feel happy when using a smartphone". This shows smartphone addiction behavior in school-aged children in primary school "X" which is the most dominant indicator of feeling happy when using a smartphone. Feelings of pleasure when using smartphones can be associated with increased dopamine levels in the brain (Farhud, Malmir, and Khanahmadi 2014). Positive social stimuli obtained when using a smartphone, such as seeing happy expressions, getting positive recognition from others through comments or likes, as well as getting calls or messages from loved ones can activate the dopaminergic reward pathway so as to make a person feel happy (Krach et al. 2010; Haynes 2018). To feel the sensation of pleasure again a person will be more intense to access a smartphone. This is what causes a person to experience addiction and feel heavy to part with a smartphone (Sumiyarini and Yuliyani 2022).

Based on the analysis of SAS dimensions, the dimension findings with the largest score (427.2) were obtained, namely the positive anticipation dimension which includes items 4, 5, 6, 7, 8. This shows that smartphone addiction behavior in school-age children in elementary school "X" is dominated by a positive anticipation dimension. Positive anticipation includes the feeling of relaxation, calm, excitement, and confidence that a person feels when using a smartphone (Sumiyarini and Yuliyani 2022). Positive anticipation is described as a way of reducing stress by using a smartphone and feeling empty when there is no smartphone (Mohamed and Mostafa 2020). The embodiment of smartphone addiction behavior the positive anticipation dimensions experienced by the study subjects includes: feeling happy when using a smartphone, lack of confidence when not using a smartphone, feeling that using a smartphone is the most fun thing to do, feeling very free when using a smartphone, and feeling that life feels empty without a smartphone.

Smartphones have helped many people around the world in various ways, such as connecting people globally and providing easy access to different types of information. However, excessive smartphone use or smartphone addiction can be detrimental to the physical, mental, and social health of individuals especially school-age children in this context. Individuals who experience smartphone addiction are more prone to physical problems such as feeling tired quickly, headaches, pain in the joints, and visual impairment

(Fathya, Sari, and Mawarpury 2020); it is easier to experience mental problems such as poor sleep disorders, insomnia symptoms, low self-esteem, stress, anxiety, and depression(Bhattacharyya 2021; Lemola et al. 2015; Chłoń-Domińczak, Sienkiewicz, and Trawińska-Konador 2014); and it is easier to experience social problems such as withdrawing, favoring interaction through social media as opposed to in-person interaction, and lowering children's social engagement (Jennifer 2018; Bian and Leung 2015). Therefore, there is a need for increased awareness to address this contemporary problem by maximizing positive utility and minimizing the negative impact of smartphone use.

Some ways that can be done to prevent smartphone addiction in children include: monitoring the daily time of smartphone use on the screen-time dashboard in the digital wellbeing & parental controls smartphone feature; following IDAI's recommendations on screen-time limits for school-aged children to a maximum of 2 hours per day; providing children's strict supervision, restrictions, and schedules in smartphone use; activating the parental controls feature on children's smartphones to set children's screen-time restrictions so that children do not continue to use the smartphone for a long time; invite children to increase non-screen-time activities; encourage children to perform the 20-20-20 technique when using a smartphone to maintain eye health. The 20-20-20 technique means resting for 20 seconds, every 20 minutes, by looking at objects 20 feet (6 meters) away.

This study provides an overview of the level of smartphone addiction after the COVID-19 pandemic in school-age children in elementary school "X". The results of this study are not a diagnosis, but only as an early detection to assess the severity of a child's addiction to smartphones. Ching et al (2015) proposed criteria A, B, and C as criteria for the diagnosis of future smartphone addiction (Ching et al. 2015). Although the population is still dominated by moderate addiction, this should be a warning to all parties, including school-age children, parents, teachers, and health workers, especially nursing, to equally prevent more serious incidents of smartphone addiction in children in the future.

The implications of the results of this study for nursing can be a trigger for promotion and prevention efforts of smartphone addiction in school-age children, one of which is through education on healthy smartphone use and early detection of smartphone addiction. With these efforts, health problems caused by smartphone addiction, such as visual impairment, musculoskeletal disorders, sleep disorders, headaches, stress, anxiety, and depression in children can also be prevented. This can improve the degree of health of children who are an aggregate of the community so that the goals of health development that are part of national development can also be achieved. Healthy children will be the seeds of superior human resources for a nation. In preparing the next generation of a superior nation, the health of children should be a priority. The role of parents, teachers, health workers, and the government is an important key to making this happen.

This study has several limitations, including: 1) It has not been able to statistically prove the difference in the level of smartphone addiction in rural and urban areas, so the researcher suggested to the next researcher to conduct a comparative study to see these differences; 2) Researchers do not present old data on smartphone usage which should be a predictive factor of smartphone addiction because the data collected is in the form of self-report of children's estimates, it is feared that there are more biases and are not representative. The researcher suggested to the next researcher to look at the length of smartphone use in children not based on self-report of the child's estimated results, but self-report the results of looking at the screen-time dashboard on the child's smartphone to find out how long the smartphone use time is in one day accurately.

CONCLUSION

A total of 114 (100%) "X" elementary school students are smartphone users with 101 (88.6%) people owning a personal smartphone. The level of smartphone addiction in school-age children in elementary school "X" is 15 students (13.2%) had low-level smartphone addiction, 88 students (77.2%) had moderate smartphone addiction, and 11 students (9.6%) had severe smartphone addiction. In this study, moderate-level smartphone addiction became the most dominant (77.2%) in contrast to the results of the research of Vyas (2021) and Mokhtarinia et al (2022), where the most dominant was severe-level addiction. The difference in the characteristics of internet infrastructure in urban and rural areas can be the cause of this. Based on the analysis of SAS items, the item with the highest score (489) is item number 4 of the positive anticipation dimension which contains the statement "I feel happy when using a smartphone". The feeling of pleasure when using a smartphone can be associated with an increase in dopamine levels in the brain. Based on the SAS dimension analysis, the dimension findings with the largest score (427.2) were obtained, namely the positive anticipation dimension, which includes items 4, 5, 6, 7, and 8. Positive anticipation includes the feeling of relaxation, calm, vibrancy, and confidence that a person feels when using a smartphone.

The implication of the results of this research for nursing is that it can be a trigger for promotive and preventive efforts for smartphone addiction in school-aged children, one of which is through education on healthy smartphone use. By carrying out these efforts, health problems resulting from smartphone addiction such as vision problems, musculoskeletal disorders, sleep disorders, headaches, stress, anxiety and depression in children can be prevented. This can improve the health status of children who are the aggregate of society, so that the goals of health development which is part of national development can be achieved. Healthy children will become superior human resources for a nation. In preparing the nation's superior next generation, children's health should be a priority. The role of parents, teachers, health workers and the government is an important key to making this happen.

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