Circumstances of Internet Addiction and Its Influencing Factors among Adolescents in the Second Years of the Covid-19 Pandemic

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ABSTRACT

Background: Internet use by adolescents has increased rapidly in recent decades. This has been particularly evident during the Covid-19 pandemic due to the shift from face-to-face to online learning. Internet use has become convenient and commonplace. However, negative use can cause internet addiction, which interferes with brain or mental function in everyday life. Purpose: The aim of this survey is to analyze the prevalence of internet addiction and the factors that affect it. Methods: This cross-sectional analytical survey was conducted online with adolescents living in the city of Medan, North Sumatra, from August to November 2021. The demographic data came from a self-reported structured questionnaire, and internet addiction was assessed using the Internet Addiction Diagnostic Questionnaire (KDAI) in Indonesian. The data were processed with descriptive statistics and presented in the form of frequency distribution. Factors affecting the occurrence of internet addiction were analyzed using nonparametric tests. Results: Among the 110 adolescent respondents, the prevalence of internet addiction was 40.0%. The majority of those experiencing internet addiction had a high-school education (56.8%) and were girls (52.3%), firstborn (41.0%), and aged 17–19 (40.9%). The total daily and weekend internet use levels were medium (81.8% and 61.4%, respectively). Total daily internet use time was a statistically meaningful factor affecting the occurrence of internet addiction in adolescents (p = 0.014). Conclusion: The prevalence of internet addiction in adolescents is quite high, and total daily internet use was a factor affecting it.

Keywords: Adolescents, Covid-19, Influencing factors, Internet addiction.

INTRODUCTION

Internet use has increased rapidly in recent decades, particularly among adolescents (Ozkan and Solmaz, 2015; Issa and Isaias, 2016). Access to the Internet is now very convenient and widespread (LaRose *et al.*, 2014). Although this has brought about many positive consequences, it also has the potential to cause harm. Positive consequences include ease of communication and greater access to information and education. The potential for harm is that frequent internet use can lead to internet addiction (Yung *et al.*, 2015). Internet usage in Indonesia has increased annually, based on data from the Association of Indonesian Internet Service Providers. At the end of 2017, the number of internet users in the country reached 143 million. In 2018, this number increased to 171 million. The island of Java has the most internet users, followed by the island of Sumatra. On the latter, North Sumatra Province has the most internet users, with 6.3% of its population (Kompetitif, no date).

Internet addiction is becoming a serious problem globally, particularly in adolescents (Wang *et al.*, 2015). A study conducted on 987 adolescents in India showed that 0.7% experienced internet addiction (Goel, Subramanyam and Kamath, 2013). Meanwhile, a study of 596 adolescents in Padang, West Sumatra, revealed medium-category internet addiction in 50% of participants (Fitria *et al.*, 2018). Excessive internet use can lead to mental health problems, such as anxiety and depression (Goel, Subramanyam and Kamath, 2013), as well as reduced academic performance (Zhang, Qin and Ren, 2018; Mohamed and Bernouss, 2020). All of the above studies used the Internet Addiction Test to assess Internet addiction (Jayanthi *et al.*, 2015; Wang *et al.*, 2015; Fitria *et al.*, 2018) (Zhang, Qin and Ren, 2018; Mohamed and Bernouss, 2020). The IAT has been translated into Indonesian with excellent reliability and good

sensitivity (Fitria *et al*., 2018; Siste *et al*., 2021). Factors that influence internet addiction include poorer academic achievement, experiencing more family conflict, less family communication, and negative relationship with teachers (Xin *et al*., 2018; Chi, Hong and Chen, 2020).

This study was conducted because our center did not have basic data on internet addiction and the factors affecting it in adolescents, including for the period of the Covid-19 pandemic. The main purpose of this study was to determine the prevalence of internet addiction in adolescents and the factors affecting it.

METHODS

Cross-sectional analytical survey research was conducted online with adolescent respondents living in the city of Medan, North Sumatra. The research took four months in total, from August to November 2021. The research sample consisted of adolescents aged 10 to 18, with a consecutive sampling of 110 individuals.

This research was approved by the Research Ethics Committee of the Universitas Sumatera Utara (No:727/KEP/USU/2021). The study used a self-reported structured questionnaire to collect information on age, gender, birth order, education level, and total daily and weekend internet use time. The Indonesian version of the Internet Addiction Diagnostic Questionnaire (KDAI) was used to determine internet addiction in the last 12 months. The KDAI has excellent reliability, with a Cronbach's alpha of 0.942 and a sensitivity of 91.8%. It consists of 44 statements. Each statement has seven answer options, consisting of always, very frequently, frequently, sometimes, rarely, very rarely, and not applicable. The total KDAI score is categorized as normal usage (0–107) or internet addiction (108–264) (Siste *et al*., 2021). If a respondent did not fill in the data completely, their responses were excluded. The data were analyzed using SPSS version 23. All data were analyzed with descriptive statistics and presented in the form of frequency distribution. The factors influencing the occurrence of internet addiction were analyzed using the Kruskal Wallis test and the Mann–Whitney U test, with a significance level of $p<0.05$.

RESULTS AND DISCUSSION

A total of 110 respondents completed the questionnaire, among whom the incidence of internet addiction was 40.0%. The majority who experienced internet addiction had a senior high-school level of education (56.8%) and were girls (52.3%), firstborn (41.0%), and aged 17–19 (40.9%). The total daily and weekend internet use levels were medium (81.8% and 61.4%, respectively; Table 1).

Table 1. Basic characteristics of research respondents.

Characteristic	Internet addiction	
	Yes (n= 44)	No (n= 66)
Age, n (%)		
10–13 years (early adolescence)	9 (20.5)	20 (30.4)
14–16 years (middle adolescence)	17 (38.6)	23 (34.8)
17–19 years (late adolescence)	18 (40.9)	23 (34.8)
Gender, n (%)		
Boy	21 (47.7)	34 (51.5)
Girl	23 (52.3)	32 (48.5)
Birth order, n (%)		
First	18 (41.0)	31 (47.0)
Second	13 (29.5)	16 (24.2)
Third or later	13 (29.5)	19 (28.8)
Education level, n (%)		
Primary school	2 (4.5)	7 (10.6)
Junior high school	12 (27.3)	16 (24.2)
Senior high school	25 (56.8)	33 (50.0)
College	5 (11.4)	10 (15.2)
Total daily internet use in hours, n (%)		
<3 h (low)	3 (6.8)	9 (13.7)
3–16 h (medium)	36 (81.8)	55 (83.3)
>16 h (high)	5 (11.4)	2 (3.0)

Total weekend internet use in hours, n (%)		
<3 h (low)	2 (4.5)	5 (7.6)
3–16 h (medium)	27 (61.4)	50 (75.7)
>16 h (high)	15 (34.1)	11 (16.7)

The top three electronic devices used to access the internet were smartphones (98.2%), laptops (37.3%), and PCs and tablets (both 8.2%). The top five online activities were studying (72.7%), information-seeking (68.2%), chat (63.6%), gaming (55.4%), and streaming (38.2%). The top five applications used were WhatsApp (87.3%), YouTube (72.7%), Instagram (52.7%), Google Meet (50.0%), and Zoom (44.5%; Figure 1).
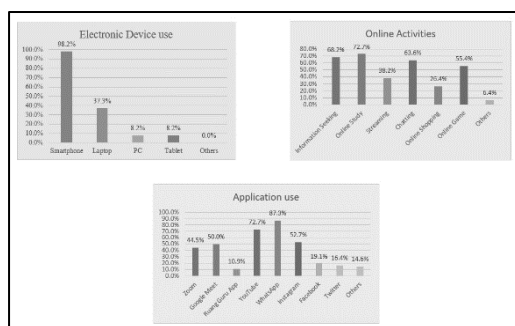

Figure 1. Electronic device use, online activities, and application use when accessing the internet.

The factor that affected the occurrence of internet addiction was total daily internet use time (p = 0.014; Table 2), while age, gender, birth order, education level and total weekend internet use time have no statistical effect.

Table 2. Factors influencing the occurrence of internet addiction.

Characteristic	Mean rank	p-value
Age		
10–13 years (early adolescence)	42.88	
14–16 years (middle adolescence)	59.96	0.460[a]
17–19 years (late adolescence)	60.07	
Gender		
Boy	55.46	0.990[b]
Girl	55.54	
Birth order		
First	51.16	
Second	59.33	0.440[a]
Third or later	58.67	
Education level		
Primary education	34.33	
Junior high school	56.14	
Senior high school	58.70	0.206[a]
College	54.63	
Total daily internet use in hours		
<3 h (low)	39.21	
3–16 h (medium)	55.48	0.014[a]
>16 h (high)	83.64	
Total weekend internet use in hours		
<3 h (low)	40.93	
3–16 h (medium)	53.63	0.134[a]
>16 h (high)	64.96	

[a] Kruskal Wallis test; [b] Mann–Whitney U test

The post hoc test using Mann-Whitney U test to determine the difference in the average KDAI score between two groups of total daily internet use. Mean rank of KDAI score in low total daily internet use (7.67) is lower than high (14.00), likewise medium total daily internet use (47.64) is lower than high (73.64). There was a difference in the average KDAI score by total daily internet use, with z-value -2.366 between low and high, -2.332 between medium and high, respectively (Table 3).

Table 3. Post hoc test results.

Total daily internet use	Mean rank	z-value	p-value
<3 h (low)	38.04	-1.722	0.085
3–16 h (medium)	53.84		
<3 h (low)	7.67	-2.366	0.018*
>16 h (high)	14.00		
3–16 h (medium)	47.64	-2.332	0.020*
>16 h (high)	73.64		

*Mann–Whitney U test

This study found that the incidence of internet addiction in adolescents in the city of Medan was high, at 40%. This is higher than in the previously mentioned study in India (0.7%) (Goel, Subramanyam and Kamath, 2013).

However, medium-category internet addiction (20%) is lower than in the study in Padang (50%) (Fitria *et al.*, 2018). This difference can be explained by how the sample in the current study was 10–20% of the study samples in India and Padang.

Internet addiction was more prevalent in girls (52.3%) and in those aged 17–19 (40.9%). This is in contrast to a Chinese study, which found a higher incidence of internet addiction among boys (54.0%) (Chi, Hong and Chen, 2020). This can be explained by how most of the respondents in the current study were girls (52.3%) and teenage girls are more likely to use social media, online shopping, sharing for information, messaging services, videos, in contrast to boys who prefer to play online games or searching for information. Late adolescents aged 17-19 years have reached the final stage of high school education and early stage of college. At this time, teenagers often access the internet for the purposes of academic and non-academic activities. This survey was conducted at the time of entering school, where face-to-face is still limited with hybrid learning methods, some students study in class, others study online and the time spent studying is about three to four hours a day. Thus, students who study online tend to continue to access the internet. However, during the holidays before starting school or college, more time is spent on the internet.

The study found that the education level of adolescents who experienced internet addiction was mostly senior high school (56.8%). This is likely because most of the respondents who filled out the questionnaire were high school teenagers. Furthermore, during the Covid-19 pandemic, high-school education has involved many internet-based activities, such as online study, searching and sharing for information, sending assignments, messaging, and online games. These results are in line with research conducted in China (Xin *et al.*, 2018).

The majority of adolescents used smartphones for internet activities (98.2%), because they are easy to carry, can be used anywhere and anytime, have interesting features such as social media, SMS services, music, podcasts, radio, video and online TV. This result is the same as that of a meta-analysis of digital-device use by adolescents (Marciano *et al.*, 2022). The most common online activity among participants was learning (72.7%). This can be explained by the shift from face-to-face to online learning during the Covid-19 pandemic. It should be noted, however, that face-to-face learning has recently begun to return, albeit under strict health protocols. These results are consistent with those of previous studies (Gedam *et al.*, 2017).

The app most widely used by adolescents when accessing the internet was WhatsApp (87.3%), which allowed them to communicate with family and school friends by text or call. Another use of WhatsApp can be as a medium to send files in various forms such as Word, Excel, PowerPoint, pdf, and jpg. This makes it easier for adolescents to send assignments to their teachers and sharing information between teenagers. This result also featured in research conducted nationally in Indonesia (Siste *et al.*, 2020).

The most common total daily internet use time by adolescents who experienced internet addiction was 3–16 hours (81.8%). This medium daily use of the internet occurs because, during the pandemic, there was a policy for the implementation of adolescents' education through online with a time of three hours per day. In addition, adolescents also use the internet to complete homework; finally the internet usage is more than three hours per day. This result is the same as in previous studies (Mohamed and Bernouss, 2020; Siste *et al.*, 2020).

Total daily internet use was the factor affecting the occurrence of internet addiction in adolescents, with an effect when the time was greater than 16 hours. The more time spent doing online activities, the higher the total KDAI score. Internet users do not realize if the time is used more and more. Initially only a few hours, but because the internet content was interesting, it made users not realize that more and more time was being spent. If this is done for days and without parental supervision when accessing the internet, it will allow internet usage to reach 24 hours per day. Eventually, users will experience internet addiction. The results of this study are in line with research conducted nationally in Indonesia (Siste *et al.*, 2020).

The advantage of this study is that it can be conducted anywhere and at any time. Moreover, as long as the network connection is good, the results can be obtained immediately. There are,

however, several shortcomings in the study. These include incomplete answers and more than one answer to a question being filled in, with the result that only 110 of the 946 respondents (12%) filled in all parts of the survey correctly. This is perhaps due to the different education levels of the respondents, which may have caused an unequal understanding of the survey contents. If the survey were conducted in person rather than remotely, respondents could seek clarification from the researcher when confused. Unfortunately, however, face-to-face contact is not always possible during the Covid-19 pandemic. Other possibility could be due to the use of a mandatory mark in each statement, so it cannot be submitted if not filled out completely.

CONCLUSION

The prevalence of internet addiction in adolescents in Medan city is quite high and the influencing factor is total daily internet use. The problem of internet addiction among teenagers should not be underestimated, as it can interfere with their behavior, daily activities, and mental health. Parents need to monitor their adolescent children's internet use to ensure that it is not excessive. Teenagers should also be made aware of the risks of internet addiction and be taught how to protect themselves against it. Other stakeholders also involved in internet addiction prevention include school or college authorities, health and social care providers, and digital and gaming companies.

For school authorities, it can start with developing an online safety learning system, communicating rules and policies of online learning for students and parents, and training teachers to detect earlier the possibility of internet addiction. Health and social care providers play a role in providing education on the risk of internet addiction, how to detect and prevent it and provide support. Digital and gaming companies can add parental control features in online activities and games, or create a game program involving more physical activity.

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