

**INTERNET ADDICTION AMONG EARLY ADOLESCENTS DURING COVID-19
PANDEMIC IN KOTA BHARU, KELANTAN, MALAYSIA.**

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LIST OF ABBREVIATIONS

DASS-21	Depression, Anxiety and Stress Scale- 21
IA	Internet addiction
IJERPH	International Journal of Environmental Research and Public Health
JEPeM	Jawatankuasa Etika Penyelidikan Manusia
MVIAT	Malay Version Internet Addiction Test
NIA	Non-internet addiction
USM	Universiti Sains Malaysia
WHO	World Health Organization

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ABSTRAK

Pengenalan

Pandemik COVID-19 dan penutupan sekolah mencetuskan revolusi digital dalam system pendidikan, dan mengakibatkan lonjakan penggunaan internet dalam kalangan remaja. Malangnya menurut penggunaan internet yang berlebihan, boleh menjadi masalah dan mengakibatkan ketagihan. Kajian itu bertujuan untuk menentukan kelaziman ketagihan Internet (IA) semasa pandemik COVID-19 dan mengenal pasti factor-faktor berkaitannya dalam kalangan remaja.

Metodologi:

Kajian ini merupakan kajian keratan rentas yang telah dijalankan daripada Februari 2021 sehingga April 2021 dalam kalangan remaja di Malaysia. Peserta telah melengkapkan Ujian Ketagihan Internet Versi Bahasa Melayu (MVIAT), Skala Kemurungan, Kebimbangan dan Tekanan- 21 (DASS-21), dan maklumat sosiodemografi.

Keputusan:

Seramai 535 peserta telah mendaftar dan kelaziman ketagihan internet di kalangan peserta adalah 48.6%. Penemuan menunjukkan bahawa kanak-kanak lelaki (AOR = 2.15, 95% CI = 1.30 – 3.57), penggunaan internet di rumah (AOR = 6.17, 95% CI = 1.94 – 19.58), menggunakan internet untuk menonton/memuat turun muzik (AOR=2.50, 95% CI = 1.52 – 4.12), rangkaian social (AOR = 2.29, 95% CI = 1.19 – 4.40), ikatan ibu bapa/penjaga yang tidak mencukupi (AOR = 2.29, 95% CI = 1.19 – 4.40), kemurungan (AOR = 2.03 , 95% CI = 1.07 – 3.85), kebimbangan (AOR = 2.79 , 95% CI = 1.64 – 4.76), dan tekanan (AOR = 4.67, 95% CI = 2.00 – 10.91) secara signifikan dikaitkan dengan ketagihan internet.

Kesimpulan:

IA berleluasa dalam kalangan remaja di Malaysia semasa wabak ini, hampir 50% remaja di Malaysia mempunyai IA. Kesihatan mental, rangkaian sosial dan hubungan ibu bapa merupakan faktor penting untuk IA dalam kalangan remaja semasa wabak COVID.

Kata kunci: remaja, anizeti, COVID-19, kemurungan, ketagihan internet

ABSTRACT

INTERNET ADDICTION AMONG EARLY ADOLESCENTS DURING COVID-19 PANDEMIC IN KOTA BHARU, KELANTAN, MALAYSIA.

Introduction

The COVID-19 pandemic and school closures sparked a digital revolution in education, resulting in a surge in adolescent internet usage. Excessive internet usage may, unfortunately, be pathological and addicting. The study aimed to determine the prevalence of Internet addiction (IA) during the COVID-19 pandemic and identify its associated factors among early adolescents.

Methodology:

A cross-sectional online survey was conducted from February 2021 to April 2021 among adolescents in Kota Bharu, Kelantan, Malaysia. Participants completed the Malay Version Internet Addiction Test (MVIAT), Depression, Anxiety and Stress Scale- 21 (DASS-21), and sociodemographic information.

Result:

A total of 535 participants enrolled in the study. The prevalence of IA among the participants was 48.6%. Boys (AOR = 2.15, 95% CI = 1.30 – 3.57), internet usage at home (AOR = 6.17, 95% CI = 1.94 – 19.58), using internet to watch/download music (AOR=2.50, 95% CI = 1.52 – 4.12), social networking (AOR = 2.29, 95% CI = 1.19 – 4.40), inadequate parental/ guardian bonding (AOR = 2.19, 95% CI 1.31 – 3.65), depression (AOR = 2.03 , 95% CI = 1.07 – 3.85), anxiety (AOR = 2.79 , 95% CI = 1.64 – 4.76), and stress (AOR = 4.67, 95% CI = 2.00 – 10.91) were significantly associated with IA.

Conclusion:

IA was prevalent among adolescents in Malaysia during this pandemic, almost 50% of the adolescents in Malaysia have IA. Mental health, social networking, and parental relationship were significant factors for IA among adolescents during the COVID pandemic.

Keywords: adolescent, anxiety, COVID-19, depression, internet addiction

CHAPTER 1: INTRODUCTION

1.1 Study background

A highly contagious COVID-19 outbreak emerged in December 2019(Elengoe, 2020). It was declared a worldwide pandemic emergency by the World Health Organization (WHO) due to its rapid spread and extensive death rate(Reboldi1 et al., 2009). Several countries across the globe created strategies such as movement restriction orders, closure of interstate and international borders, and even total lockdown to mitigate and flatten the epidemic curve(Musinguzi and Asamoah, 2020). The education system was critically hit by this, as the school was temporarily shut down so students could stay home and follow social distancing measures(Li et al., 2013; Martins et al., 2020). Unfortunately, adding on to the current burden a highly mutated Omicron variant of concern was discovered in South Africa on November 24, 2021, and was first reported in Malaysia on December 3, 2021(Poudel et al., 2022). The emergence of the highly transmissible Omicron variant, as well as the rising COVID-19 hospitalization, caused significant concern among parents and teachers leading to the continuation of online teaching in some affected areas and schools. Recently it was announced that Malaysia will begin the "Transition to Endemic" phase of Covid-19 on April 1, 2022. It is believed that online learning in some form is likely to persist in our educational system, either owing to a disease outbreak or digital transformation in general. Students and teachers are expected to adapt to hybrid learning, which combines online and in-person learning.

The COVID epidemic has sparked a digital revolution in many industries, increasing internet usage trends. The recent 2020 Malaysian internet user survey discovered that 88.7% of the general population uses the internet, up by 1.3% from a previous survey in 2018(Malaysian Communications and Multimedia Commission. Commission Internet User Survey 2020; Updated June 2021.). Among them, 47% of internet users were from the younger

generation, a rise compared to 18.5% in 2018(Malaysian Communications and Multimedia Commission. Commission Internet User Survey 2020; Updated June 2021.). It is believed that the introduction of online learning during the movement restriction order, increased adolescents' internet use for information, education, and communication(Sun et al., 2020). The internet is also used as a mode of entertainment and withdrawal from stress, anxiety or to alleviate a depressed mood as a result of school closure, which significantly disrupts the typical adolescent lifestyle(Chao et al., 2020; King et al., 2020; Sun et al., 2020). Reasonable internet use is beneficial, excessive uncontrolled utilization can lead to "Internet Addiction", also known as problematic or pathological internet use(Dong et al., 2020).

At the end of the 20th century, Young emphasized Internet addiction (IA) as a growing concern and defined it as an individual's inability to control his or her use of the Internet, which in due course causes psychological, social, school, and work difficulties(Young). From 1996 to 2018, the global prevalence of Internet addiction among the general population increased from 6% to 14.7%(Meng et al.). Subsequently, according to studies conducted after 2020, the incidence of digital addiction has risen drastically as a result of the COVID-19 epidemic(Dong et al., 2020; Islam et al., 2020; Lin, 2020; Siste et al., 2021). In comparison with adults, addiction vulnerability appears to be a more problematic issue among adolescence. Adolescents are believed can be easily exploited for addictive behaviors without foreseeing the possible adverse consequences. Asian countries, such as China and Taiwan have identified this as a worsening public health issue among adolescents during the Covid-19 pandemic with a prevalence of 33.4% problematic internet users in China and 24.4% in Taiwan(Dong et al., 2020; Lin, 2020). Studies in other countries supported the fact that IA rates increased among adolescents during the pandemic compared to previous years, with a prevalence rate of 17.0% in Japan(Oka et al., 2021), 19.1% in Hungary(Tóth et al.), and 19.3% in Indonesia(Siste et al.)

Potential risk factors for internet addiction in adolescents were identified as being male(Dempsey et al., 2019; Yang and Tung, 2007) who, in turn, are attracted by elements of

addiction activity the internet offers(Chung et al.). Other research suggested that females are more prone to internet addiction as they are related to problematic smartphone and Facebook usage(Hassan et al., 2020; Zhang et al., 2019). Furthermore, previous studies demonstrated that specific internet activities are potentially addictive because people do not become addicted to the medium, but to the actual behavior they engage in online for example social networking, online gaming, and online pornography(Li et al., 2018; Yang et al., 2014; Zhang et al., 2019). In Hong Kong research dated 2017 discovered that 92% of students possessed smartphones for communication and interaction in online social activities; close to 80% of students reported the major purpose of using the Internet is for playing online games and downloading files or software for games(Chung et al.). Family involvement and parenting type are also important predictors of internet addiction(Dempsey et al., 2019). Previous studies showed that overprotective, restrictive parenting styles and disorganized families were associated with an increased incidence of internet addiction(Li et al., 2019; Yen et al., 2014). It has also been detected that stress, depression, and anxiety are correlated with IA(Gómez et al., 2017; Lebni et al., 2020; Mylona et al., 2020). A study examining the children's mental health because of the COVID-19 pandemic school closure in China has shown a drastic increment in the percentage of depression from 36.6% to 57% and anxiety from 19% to 36.7% during the early period of the outbreak(Dong et al., 2020). Dong et. al suggested that adolescents tend to spend time on the internet to alleviate these negative psychological changes(Dong et al.).

1.2 Problem statement and rationale of the study

The Internet, one of mankind's greatest inventions, is an ever-developing technology that has become part of our daily living necessities. However as mentioned above excessive usage and dependency led to many psychosocial and health complication which subsequently leads to loss of control of time spent on the internet(Gómez et al., 2017), decrease in physical wellbeign, impaired academic performance(Poli and Agrimi, 2012), aggressive behavior, and juvenile crimes among addicted adolescents(Li, 2007; Tang et al., 2014). Some interesting studies conducted in South Korea have concluded its impact as a serious public health issue following 10 series of cardiopulmonary-related deaths in Internet cafés(Choi, 2007), and game-related murder(Koh, 2007).

Globally it is used by all age groups, gender, and culture. In terms of risk population, adolescents, especially secondary school students, are vulnerable, naïve, and inexperienced and can be easily influenced into addictive behaviour without foreseeing the future adverse consequences. The habits that have been developed at this period of age are likely to continue into adulthood and risk their later health and wellbeing. Therefore, internet addiction intervention among adolescents should be done as early as possible.

Potential risk factors for internet addiction in adolescents were identified as being male(Lam et al., 2009), physiological factors such as depression(Lee, 2020), risk behaviour such as alcohol use and substance use(Yen et al., 2008) and physical inactivity(Khan et al., 2017). The relationship between the familial factor and internet addiction among adolescents has been demonstrated in past years. Analysis found that parental control deficits were associated with increased addictive behaviour(Wu et al., 2016). It is important to explore the associated factor of addiction to internet use among adolescents to form the basis of preventive and interventional strategies.

Kota Bharu, being the capital city of Kelantan, is fast becoming a modern city with an urban lifestyle and widespread use of the internet. Kelantan which is located at the East coast of Peninsular Malaysia has a unique culture and population distribution. The majority population in Kelantan is (more than 90%) of Malay ethnicity, compared to states on the West coast with larger proportions of Chinese (30%) and Indians. Even though there are data from studies done in other countries such as Korea(Kim et al., 2006), Hong Kong(Shek and Yu, 2016), and nationwide studies in Malaysia(Ying Ying et al., 2021), it might not be applicable to the Kelantan population due to the cultural and ethnicity difference. Kelantan compared to other states in Malaysia could have different factors associated with internet addiction among adolescents.

The recent pandemic of coronavirus disease 2019 (COVID-19) has lead to nationwide school closure as an emergency measure to prevent the spreading of the infection. Subsequently, massive efforts was made by schools and teachers at all levels to create online courses and deliver them through the internet. Although these measures and efforts are highly commendable and necessary, there are reasons to be concerned because a recent unusual period might result in different associated factors with internet addiction compared to all the other previous studies. Given the importance of basic data and to gain a better understanding of the factors associated with internet addiction as important elements in the formulation of strategic measures and prevention programmes, this study was aimed to tackle the current gap by identifying the prevalence and factors associated with internet addiction among lower secondary school students in Kota Bharu, Kelantan. This is also expected to be helpful among the teachers, school, and education ministry in providing and regulating effective online learning and preventing the possible impact of internet addiction among secondary school students.

Excess internet usage and dependency may lead to psychosocial and health complications, which subsequently leads to loss of control of time spent on the internet, impaired academic performance, eye symptoms, poor sleep quality, lack of physical activity, and musculoskeletal disorder such as neck pain (Alaca, 2020; Çelebioğlu et al., 2020; Chong Guan et al., 2015; Ying Ying et al., 2021). Given the prolonged pandemic situation, more data need to be collected to fully understand the biopsychosocial factor that may contribute to the worrying rise of internet addiction. This study aims to determine the prevalence and factors associated with internet addiction among adolescents in Kota Bharu, Malaysia. The findings will be used to spur and guide a national policy about mental health and addiction, particularly IA during and after the COVID-19 outbreak. COVID-19 is not the first or the last virus to pose a threat to civilization. We need to use effective techniques to help and defend the future of the world's children.

1.3 Objectives and research hypothesis

1.3.1 Research question:

1. What is the prevalence of internet addiction among lower secondary school students in Kota Bharu, Kelantan during the COVID 19 pandemic?
2. What are the associated factors contributing to internet addiction among lower secondary school students in Kota Bharu, Kelantan during COVID 19 pandemic?

1.3.2 General objective:

To determine the prevalence of internet addiction and identify its associated factors among lower secondary school students in Kota Bharu, Kelantan during COVID 19 pandemic.

1.3.3 Specific objectives:

1. To determine the prevalence of internet addiction among lower secondary school students in Kota Bharu, Kelantan during the COVID 19 pandemic.
2. To determine the associated factors for internet addiction among lower secondary school students in Kota Bharu, Kelantan during COVID 19 pandemic.

1.3.4 Research hypothesis:

Sociodemographic, internet usage profile, familial, psychological, risk behaviors and physical inactivity are significant associated factors for internet addiction among lower secondary school students in Kota Bharu, Kelantan, during COVID 19 pandemic.

1.4 Dissertation organization

This dissertation was arranged according to guideline by Postgraduate Office, School of Medical Sciences (2016). The following chapter consists of the manuscript in a format comply with submission under the International Journal Of Environmental Research And Public Health (IJERPH) and the authors' guidelines for the IJERPH submission. Chapter 3 is the study protocol that had been submitted and had obtained ethical approval from both Jawatankuasa Penyelidikan Etika Manusia (JEPeM), Universiti Sains Malaysia, and the Malaysia Ministry of Education. Chapter 4 are the appendices which include additional information on sample size calculation from the study protocol, approval letter from Jawatankuasa Penyelidikan Etika Manusia (JEPeM), Universiti Sains Malaysia, Malaysia Ministry of Education and Kelantan Department of Education, patient's information sheet and consent forms in Malay, case report form and certificate of participation in oral presentation of 23rd Family Medicine Scientific Conference 2021 for this thesis.

CHAPTER 2: STUDY PROTOCOL

2.1 Literature review

2.1.1 Introduction

The exponential progress of internet usage has been recognized in Malaysia and elsewhere worldwide in the past decennium.(MOH, 2017a; WS *et al.*, 2018) Advancement in communication and information industries has changed the manner we live and the way we work. Cyberspace communication provides a new environment in which people are linked from all over the world, enhancement inefficiency of learning, and a platform for acquiring and disseminating knowledge.(Alam *et al.*, 2014) In Malaysia, internet usage has grown rapidly with the availability of household computers and mobile gadgets with good accessibility. Malaysia internet user survey in 2018 have shown increment in the percentage of internet usage from 76.9% in 2016 to 87.4% among general population. Extrapolation of the data indicates that 8.1% of the users are adolescent below the age of 20 comparing to general population. The same survey also clearly shows that the smartphone remains the popular choice of internet survey, followed by laptop and desktop. Major online activities are communication by the usage of text (96.5%), visiting social networking platforms (85.6%), information gathering (85.5%), and download/watch online video/tv (77.6%).(MCMC, 2018) Utilization of the internet elicits new concern, labelled “Internet Addiction”.

Since the mid-1990s, internet addiction has been recognized as a new form of addiction. Internet addiction has aroused attention of psychologist worldwide as it causes mental health issue with signs and symptoms similar to those of other addictions.(Lam *et al.*, 2009) Internet addiction is defined as an individual’s inability to control his or her use of the internet, which in due course causes psychological, social, school and work difficulties.(Young, 2016) This disorder is currently being considered as a psychiatric illness in DSM - 5 by the American Psychiatric Association.(Christakis and Moreno, 2009) Among Asian countries, South Korea

and China have identified this as a public health issue hence initiatives at national level involving significant investment are implemented in both countries.(Block, 2008)

A study conducted among high school students in China found that 12.2 % of the 12,446 Internet users were addicted.(Wang *et al.*, 2011). Many other studies done in other countries indicate that the incidence of Internet addiction varies from 1.6% to 17.1%.(Kim *et al.*, 2006) Internet addiction among adolescent are increasing as this generation is highly dependent on the internet for information, social activities and leisure social issue with negative psychosocial and health consequences. Identified psychological distresses that arise with excessive internet utilization are social anxiety(Huan *et al.*, 2014), interpersonal disruption(Zhang *et al.*, 2008), avoidant personality disorder(Ang *et al.*, 2018), and sleep deprivation(Young, 1998). Another perilous internet over-usage associated psychosocial problems are online gaming addiction, accessing pornographic websites, misuse of a social networking site and exposure to cyberbullying environment.(MOH, 2017b)

2.1.1.a Internet Addiction

Internet is a novel technology that is being embraced by millions of people, including our adolescent and children worldwide. Internet caused a revolution in our daily communication and living activity in an unprecedented manner.(Young, 2004) According to the Internet addiction centre survey, 1 out of 8 people exhibited sign of internet addiction and 82% of surveyed respondents spend more than 5 hours per day online.(Ang *et al.*, 2018) Based on the research in 2014 by Pew Research Centre, approximately 53% of internet users have admitted difficulty to stop the usage of internet or mobile devices.(Ang *et al.*, 2018) Shapira *et al.* 2003 define internet addiction as extreme engrossment with computer networks that lead to psychological dysfunction.(Shapira *et al.*, 2003)

Internet addiction caught the attention of numerous researchers as it is not a new phenomenon. Internet addiction was first discussed at the Annual Meeting of the American Psychological

Association in 1996.(Young, 2004) In general, internet links people to a vast range of information and is a highly promoted technology tool as it offers several direct benefits in our society. However, research suggested that extensive usage of the internet is linked to reducing communication among family members, reduction in a social circle, which indirectly increase loneliness and depression.(Kraut *et al.*, 1998) Similarly to other addiction to achieve satisfaction, internet addiction promotes longer time spend online. This might subsequently lead to sleep deprivation, interference with a concentration on school or work, and reduction in physical activity indirectly leaving the addict vulnerable to disease.(Young, 2004)

2.1.1.b Associated factors

2.1.1.b.i Sociodemographic factors

There are several studies with sociodemographic data and internet addiction. Primarily age is the most crucial factor as addictive behaviour prevalent among adolescent group predominantly, and it tends to fade out across time.(Shek and Yu, 2016) According to the WHO classification, adolescents are individuals between ages 10 to 19 years old.(Awaluddin *et al.*, 2019) Events during this period of age greatly influence a person's life and mould their attitude and behaviour in later life.(Karacic and Oreskovic, 2017) Adolescent is particularly vulnerable and receptive during this stage, can become drawn to the internet as a form of relinquishment. Over time, this can become an addiction.(Karacic and Oreskovic, 2017) According to research in 2017, those aged 13-14 used the internet more for entertainment, and less for school. While those aged 15 -16 showed the highest range of internet addiction among adolescents.(Karacic and Oreskovic, 2017)

Similar to other addictive behaviour, gender has also been investigated as a variable associated with internet addiction in many research. However, a consistent conclusion could not be established despite the mounting research investigation on this issue. For example, a study by

Adieand and Olatokun concluded that male adolescents were at higher risk of developing internet addiction than female adolescents.(Shek and Yu, 2016) However, there also research showed no significant gender difference in internet addiction as currently, we are in an era of easy accessibility to the internet from anywhere via mobile devices.(Seyrek *et al.*, 2017) In conclusion, there is no definitive agreement on the gender difference in internet addiction, which indicated the need for further investigation of this variable.(Shek and Yu, 2016)

2.1.1.b.ii Internet usage profile

Previous researchers claimed that specific activities on the Internet that are potentially addictive because people do not become addicted to the medium, but to the actual behaviour they engage online. For example, gaming application,(Huang, 2006) online chatting, online instant messengers,(Leung, 2004) and social networking site such as Facebook(Kittinger *et al.*, 2012) are among the addictive applications. Moreover, more time spent on online activities such as shopping and gaming are attributed to depressive symptoms.(Morgan and Cotten, 2003) With respect to the location of internet addiction was highest among Internet cafe users. It is mostly likely due to lack of parental control in Internet cafes which allows adolescents to freely surf the Internet.(Tsitsika *et al.*, 2009)

2.1.1.b.iii Familial factor

Families play a significant role in shaping adolescent social activity,(Barker and Hunt, 2004) which has been shown to be a protective factor of preventing adolescents from participating in problematic and risky behaviours. Being an adolescent with divorced parents was a strong predictor of internet addiction. A single parent, in a divorce family would have to support the whole family, which means there is little time to establish a relationship with the children. In addition to this, an adolescent in divorced families may use the internet to relieve the psychological insecurities that formed in a single parent family setting.(Ni *et al.*, 2009)

Adolescents with high household incomes had a higher probability of internet addiction. However, a study by Shek revealed that family economic status has no significant influence on participants' addictive behaviours associated with internet use.(Shek and Yu, 2012) There is also statistically important correlation between internet addiction and parental control. Previous studies showed that parental control deficits were associated to an increased incidence of internet addiction such as gambling.(Floros *et al.*, 2013) This factor has been well studied by other researchers and used as control variable.

2.1.1.b.iv Personal and psychological factors

a. Psychological factor

Globally and especially in Malaysia, mental health-related issues have been recognized as ever-increasing challenges among adolescents. A survey in 2017 by National Health Morbidity postulates rise in prevalence of depression (18.3%) and anxiety (39.7%) amid adolescent compared to a similar survey in 2012.(MOH, 2017c) Mental illness, namely depression or anxiety, can hinder with adolescent daily life and interest.(Uba *et al.*, 2010) Preceding research discovered that internet addiction is abysmally interconnected with mental health illness among adult and adolescent.(Weinstein and Lejoyeux, 2010) The increase in mental health problem, may, in turn, exacerbates internet addiction.

b. Risk behaviours

Previously, addiction has been defined to involve substance-related matter only. Numerous studies have concluded that one addiction can lead to another. A study in Korea suggested that the hazard of internet addiction has a direct correlation between smoking and substances usage.(Lee *et al.*, 2013) Furthermore, intensive use of the internet is significantly associated with severe alcohol consumption, smoking and substance usage.(Lee *et al.*, 2013) The adolescents' group are most vulnerable to different addictive pleasure that the internet influence during this age transition