

The Relationship between Smartphone Addiction and Depression among Health Sciences Students in
The National University of Malaysia
(*Hubungan antara Ketagihan Telefon Pintar dengan Kemurungan di Kalangan Pelajar Sains
Kesihatan di Universiti Kebangsaan Malaysia*)

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ABSTRACT

The COVID-19 pandemic has seen the increased of online activities as there were restriction on face-to-face activities to curb the disease. One of the popular gadgets used is via smartphone. Smartphones are essential nowadays as many essential tasks been assisted by this device. However, the overuse of smartphones is worrying as it could disturb users' daily lives and mental state such as anxiety and depression. Thus, this study aims to investigate the relationship between smartphone addiction and depression among Health Science students of Universiti Kebangsaan Malaysia. This is a cross-sectional study by using convenience sampling. A questionnaire was distributed to undergraduate and postgraduate students of Faculty Health Science in Universiti Kebangsaan Malaysia. Participants were required to fill in online questionnaires which comprised three sections: sociodemographic data, Smartphone Addiction Scale - Short Version (SAS-SV), and Beck Depression Inventory-II (BDI-II). A total of 79 respondents were obtained. The mean score for SAS was 34.8 ± 10.068 and the mean score for BDI was 11.92 ± 10.19 . There were no significant differences between smartphone addiction and depression according to the gender and education level found in this study. A positive and moderate correlation was found between smartphone addiction and depression ($r=0.497$, $p<0.001$). The present study showed that almost 65% of health science students in Universiti Kebangsaan Malaysia showed slightly addicted to smartphones and almost 50% showed to have depression symptoms from mild to severe levels during pandemic. Thus, awareness about the effects should be integrated in their activities to prevent more severe effects.

Keywords: Mental health; Mobile phone; Overuse; University students

ABSTRAK

Pandemik COVID-19 telah menyaksikan peningkatan aktiviti dalam talian kerana terdapat sekatan ke atas aktiviti bersemuka untuk membendung penyakit ini. Salah satu gajet popular digunakan ialah melalui telefon pintar. Telefon pintar adalah penting pada masa kini kerana banyak tugas penting dilaksanakan melalui peranti ini. Bagaimanapun, penggunaan telefon pintar secara berlebihan membimbangkan kerana ia boleh mengganggu kehidupan harian dan keadaan mental pengguna seperti kebimbangan dan kemurungan. Justeru, kajian ini bertujuan mengkaji hubungan antara ketagihan telefon pintar dan kemurungan dalam kalangan pelajar Sains Kesihatan Universiti Kebangsaan Malaysia. Ini adalah kajian keratan rentas dengan menggunakan persampelan mudah. Satu soal selidik telah diedarkan kepada pelajar prasiswazah dan pascasiswazah Fakulti Sains Kesihatan di Universiti Kebangsaan Malaysia. Peserta dikehendaki mengisi soal selidik dalam talian yang terdiri daripada tiga bahagian: data sosiodemografi, Skala Ketagihan Telefon Pintar-Versi Pendek (SAS-SV), dan Inventori Kemurungan Beck-II (BDI-II). Seramai 79 orang responden telah diperolehi. Skor min bagi SAS ialah 34.8 ± 10.068 dan Skor min bagi BDI ialah 11.92 ± 10.19 . Tidak terdapat perbezaan yang signifikan antara ketagihan telefon pintar dan kemurungan mengikut jantina dan tahap pendidikan yang terdapat dalam kajian ini. Korelasi positif dan sederhana didapati antara ketagihan telefon pintar dan kemurungan ($r = 0.497$,

$p < 0.001$). Kajian ini menunjukkan hampir 65% pelajar Sains Kesihatan di Universiti Kebangsaan Malaysia menunjukkan ketagihan telefon pintar yang rendah dan hampir 50% menunjukkan simptom kemurungan dari tahap ringan hingga teruk semasa pandemik. Justeru, kesedaran tentang kesan perlu dilaksanakan dalam aktiviti mereka bagi mengelakkan kesan yang lebih teruk berlaku.

Kata kunci: Kesihatan mental; Telefon bimbit; Terlebih guna; pelajar universiti

INTRODUCTION

The smartphone is a mobile phone that has a wide variety of features and functions. Aside from its use as a means of communication for phone calls and messaging, the smartphone is a device that has an operating system and access to the internet which makes it able to download applications such as games and social media networks as well as be used for banking and shopping. According to Muller (2021), a total of 19 million smartphone users were recorded with an exponential rise to 29 million users in 2021 and the number is projected to be 31 million users in 2025. With varieties of features and livelihood services availed by smartphones, the overuse of smartphones to the extent that it disturbs users' daily lives are notable negative consequences. This includes excessive usage of phones while engaged in other activities such as studying, driving, social gatherings, and even sleeping (Harwood et al. 2014).

Depression is persistent sadness and a lack of interest or pleasure in previously rewarding or enjoyable activities (WHO 2017). Symptoms are such as poor appetite or overeating, insomnia or hypersomnia, low energy or fatigue, feeling of hopelessness, poor concentration or difficulty making a decision, loss of interest or pleasure, low self-esteem, and unhappy mood. Over 300 million people are estimated to suffer from depression, which is equivalent to 4.4% of the world's population (WHO 2017). Interestingly, excessive use of smartphones in terms of calling, texting, internet use, gaming, social networking, and emailing can have an impact on mental health. Addiction or problematic usage patterns may lead to a range of negative consequences including depression, mood alteration, loneliness, social isolation, and stress (Turel & Serenko 2010).

As COVID-19 began, studies showed an increase in the incidence of anxiety and depression together with increased of smartphone usage and its addiction (Marzo et al. 2021; Serra et al. 2021). The pandemic has also changed the trend of teaching and learning mode where physical classes are replaced by online mode and smartphones are the means of communication for learning. Tertiary university students

are no exception and these consequences could affected their mental stability as they need to spend long hours on the device. To make it worse, students experience negative impacts on their mental well-being due to the separation from the college environment, physical activities and social events. Apart from the remarkable advantage of the smartphone in relaying the academic purpose during the pandemic, students are also at risk of overusing the gadget which has potential unwelcomed livelihood impact.

With the dynamic potential possessed by smartphones, it has been a social concern and many countries have produced scientific evidence relating to the impact of smartphone overuse on livelihood. Depression and anxiety disorders were observed previously among 18% of adults using smartphones in Saudi Arabia, while in Taiwan it is reported that adolescents with depression were more likely to have problematic cell phone usage (Alkhatami et al. 2002; Yen et al. 2009). The similar trend also observed in South Korea as anxiety and depression was seen more in people who overused smartphones (Hwang et al. 2012). A study in Pakistan reported that there is a correlation between smartphone addiction & depression (Abid et al. 2020). Association of depression and problematic mobile usage were noticed in a young population group in Austria (Augner & Hacker 2011). Thus, it is an emerging concern as the studies showed that the phenomenal practice occurs irrespective of age levels across the globe. There is a need to evaluate the students status as to determine the relationship between smartphone addiction and depression among health sciences students amidst movement control due to pandemics. The findings of this study may supplement with timely evidence to initiate possible remedies if necessary.

MATERIALS AND METHODS

Methods: Sample calculation

This study used a cross-sectional research design. This study was approved by Research Ethics Committee

UKM (Human) with ethical reference number : JEP-2-21-509. Participants were recruited from the target population of the undergraduate and postgraduate students of the Faculty of Health Science in Universiti Kebangsaan Malaysia. The target population of the undergraduate students were 1362 students, and the postgraduate students were 373 students, so the total of the population is 1735 students. The sampling method used was convenience sampling with G*Power sample size calculation by referring to the objective in the correlation between these two study variables, $r = 0.327$ (Kim et al., 2019). By computing the value in the software, the sample size needed were 71 respondents with effect size 0.327. However, this study managed to get 79 respondents. The inclusion criteria were undergraduate and postgraduate students aged 18 years and above. The exclusion criteria were students already being diagnosed with mental health issues and also those who did not own a smartphone.

Materials

A brief description of the study objectives was presented and an informed consent was obtained from those who agreed. An online google form distributed to the health sciences students at UKM consists of 1) a summary of the study; 2) consent form; 3) sociodemographic data; 4) questionnaires consist of Smartphone Addiction Scale Short Version (SAS-SV) (Kwon et al. 2013) and Beck's Depression Inventory (BDI-II) (Beck et al. 1996). For SAS-SV, it comprises 10 items with a 6-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'. Total scores ranged from 0 – 100, which were categorized into non-addicts (1-30 marks); slightly addicts (31 – 60 marks) and addicts (70 – 100 marks).

Beck's Depression Inventory (BDI-II) 2nd edition is a multiple-choice self-report-inventory comprising 21 items with a 4-point scale (Beck et al. 1996). Total scores ranged from 0 – 60, ranging from normal (0-9 marks), mild mood disturbance (10-15

TABLE 1. Sociodemographic characteristics of the students

Data	Groups	Sample	Percentage
Gender	Male	8	10.1
	Female	71	89.9
Age	20 – 29 years old	47	59.5
	30 – 39 years old	28	35.4
	≥ 40 years old	4	5.1
Education level	Undergraduate	14	17.7
	Postgraduate	65	82.3
Nationality	Malaysian	68	86.1
	Chinese	1	1.3
	Indonesian	2	2.5
	Palestinian	2	2.5
	Bruncian	1	1.3
	Libyan	1	1.3
	Nigerian	1	1.3
	Bhutanese	1	1.3
	Saudi Arabian	2	2.5

marks), borderline clinical depression (16-19 marks), moderate depression (20-29 marks), severe depression (30-39 marks) and extreme depression (more than 40).

In this study, there were three analysis carried out. The participant’s demographic data were analyzed using descriptive analysis. The comparison of smartphone addiction and depression levels according to gender and level of degree was analyzed using an independent t-test. Lastly, the relationship between smartphone addiction and depression was analyzed using Pearson’s correlation.

RESULT

Most of the students were from the ages of 20 - 29 years old, followed by the aged 30 - 39 years old. Majority of the students were from postgraduate education level, n = 65 (82.3%) (Table 1). Malaysian students participated

the most, n = 68 (86.1%), while the remaining respondents were international students.

Initially, the normality test on the total Smartphone Addiction Scale and Becks’ Depression Inventory scores has been carried out. Based on Shapiro Wilk’s total SAS score, $p = 0.417$, $p > 0.05$, data were normally distributed. From the conclusion of the normality test based on the Boxplot, it was known that Smartphone Addiction Scale and Beck Depression Inventory were normally distributed. For smartphone addiction, 27 (34.18%) respondents showed non-addicted to smartphones while 52 (65.82 %) respondents showed slightly addicts with the smartphone (Figure 1). However, none of them were categorized as fully addicted to smartphones. The mean score for smartphone addiction was 34.8 ± 10.068 . This showed that overall of respondents showed slightly addicted to smartphones.

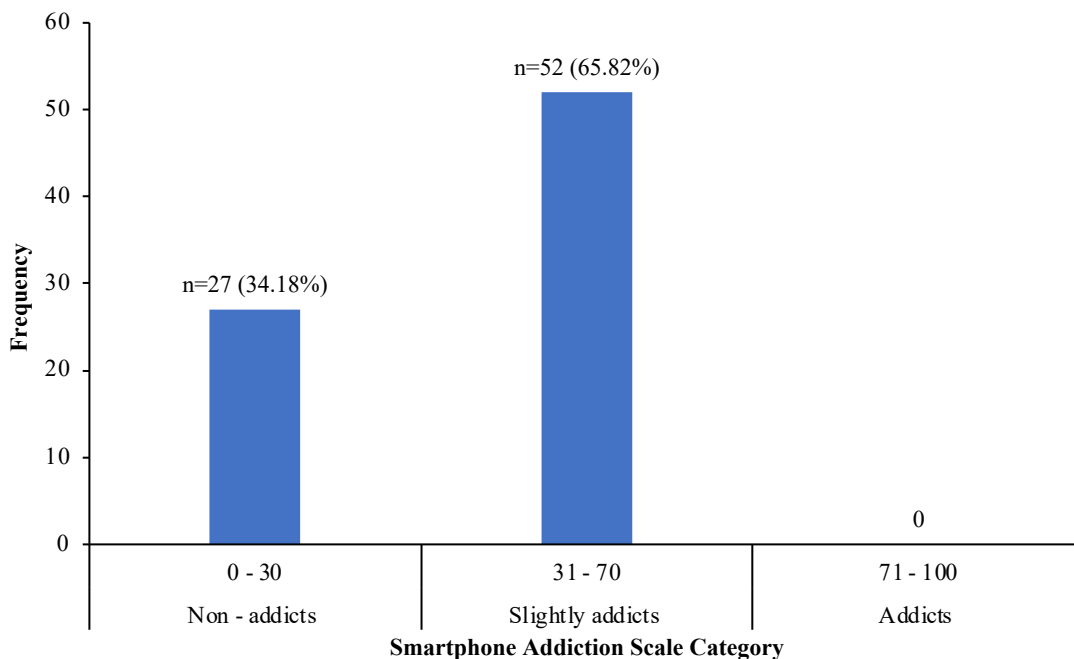


FIGURE 1. The score for smartphone addiction scale (n=79). The score is categorized into non addicts, slightly addicts and addicts.

Based on Beck’s Depression Inventory, a total of 40 (50.63%) of the respondents were considered normal, 12 (15.19%) had mild disturbance, 9 (11.39%) in borderline clinical depression, 12 (15.19%) were having moderate depression, 5 (6.33%) were in severe depression and only one was in extreme depression

(Figure 2). The overall mean score for Becks’ Depression Inventory was 11.92 ± 10.19 that is categorised under mild mood disturbance. Thus, more than 50% of the students were categorized as normal, but the rest tend towards depression from mild to severe levels.

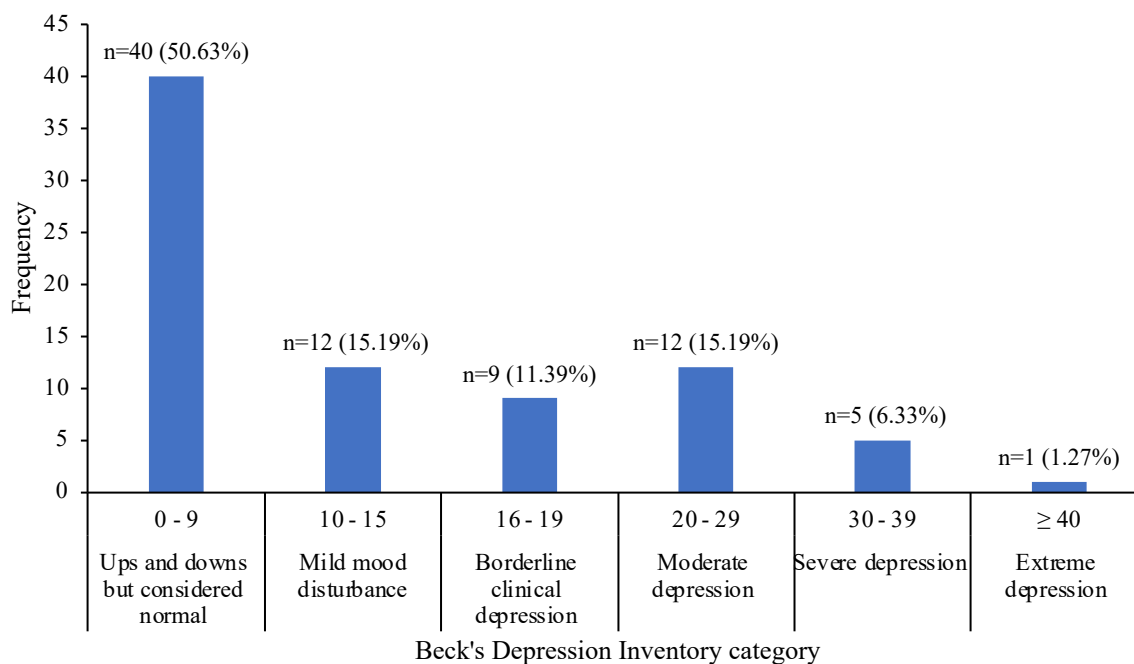


FIGURE 2. The score of Beck's Depression Score. There are 5 categories ranging from normal, mild mood disturbance, borderline clinical, depression, depression and extreme depression.

Comparison of smartphone addiction levels according to gender and level of education was shown in Table 2. The mean of smartphone addiction for undergraduate students was 38.43 ± 9.96 , and for postgraduate students was 34.02 ± 9.99 . There was no significant level of addiction in smartphones between

undergraduates and postgraduates ($t= 1.50$, $df= 77$, $p= 0.138$). The mean smartphone addiction between genders, for males, was 36.13 ± 6.40 , and for females was 34.65 ± 10.42 . There was also no significant difference in smartphone addiction between males and females ($t= 0.391$, $df= 77$, $p= 0.697$).

TABLE 2. Comparison of smartphone addiction according to the gender and level of education

	Gender		Level of Education	
	Male	Female	Undergraduate	Postgraduate
Mean	36.13	34.65	38.43	34.02
SD	6.402	10.42	9.96	9.99
<i>t</i> value	0.391		1.50	
<i>p</i> value	0.697		0.138	

Another comparison was conducted among the level of depression according to the gender and level of education shown in Table 3. The mean depression level for males was 12.13 ± 6.93 and for females 12.20 ± 10.69 . There was no significant difference between gender ($t= -0.019$, $df=77$, $p= 0.985$). The mean

depression level for undergraduate students was 16.64 ± 10.68 and for postgraduate students was 11.23 ± 10.09 . There was no significant difference in depression level between undergraduate and postgraduate students ($t= 1.80$, $df= 77$, $p= 0.75$).

TABLE 3. Comparison depression according to the gender and level of education

	Gender		Level of Education	
	Male	Female	Undergraduate	Postgraduate
Mean	12.13	12.20	16.64	11.23
SD	6.93	10.69	10.68	10.09
<i>t</i> value	-0.019		1.80	
<i>p</i> value	0.985		0.75	

The relationship between smartphone addiction and depression statistically showed a positive and moderate correlation ($r=0.497$, $p<0.001$, $n=79$) (Table 4). This correlation indicates that the higher

the addiction to smartphone use, the higher the risk of depression in a person. It is necessary to have wise control in the use of smartphones to minimize the risk of depression.

TABLE 4. Relationship between smartphone addiction and depression according to Pearson Correlation analysis

		total SAS	total BDI
total_SAS	Pearson Correlation	1	.497**
	Sig. (2-tailed)		.000
	N	79	79
total_BDI	Pearson Correlation	.497**	1
	Sig. (2-tailed)	.000	
	N	79	79

** . Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

The COVID-19 pandemic showed massively affected the social and communication norm worldwide. The online platform has been a main platform from communication, education, work and completing everyday's chores. One of the most popular gadget used are smartphones. As it is handy and contains various applications, it has become a prominent device that must be owned. However, uncontrolled usage and screening time may imposed health effects to the users. As it is highly used among younger and educated adults (Silver et al. 2019), thus a study was conducted among the tertiary university students to identify the status of the smartphone addiction and its relationship

to depression.

The mean score of smartphone addiction and mean score of depression score in this study was lower than in previous studies as a previous study conducted in Middle East reported the mean score for smartphone addiction was 50.2 ± 20.25 and the mean score for depression was 13.6 ± 10.0 (AlHassan et al. 2018). Furthermore, a study in Pakistan recorded the mean score for smartphone addiction, was 54.8 ± 17.2 and the mean score for depression was 13.4 ± 9.6 (Abid et al. 2020). These indicates that the addiction and depression were not as severe compared to those county.

The mean score of smartphone addiction in the undergraduate students was slightly higher than in postgraduate students. However, there was

no significant difference in smartphone addiction between gender and education level. This finding was supported by previous study in Karachi (Abid 2020) showed the comparison of mean smartphone addiction based on education level was significantly different as undergraduate participants had higher mean smartphone addictions scores than postgraduate. Another study by Chen (2017) also found that there were no significant differences in smartphone addiction between males and females. Thus, the smartphone addiction in the participants of this study may not depend on education level or gender.

The mean depression level of undergraduate students was slightly higher than postgraduate students. However, there was no significant difference in depression based on education level. This study shows that the level of study has no impact on depression and is in contrast with the study by Zheng et al. (2021) that found the higher-level university students mostly being affected by depressive symptoms. Similarly, there was no significant level of depression based on gender. The result in contrasts with a study by Karger (2014), who found that women are diagnosed with depression twice as often as men. Females at mid-puberty have higher rates of depression while the males until early adolescence (Piccinelli & Wilkinson 2000; Platt et al. 2021).

There were no significant mean difference between smartphone addiction and depression by gender and education level. In spite of that, a significant and moderate correlation was found between these variables. This finding was in accordance to the previous study that explored smartphone addiction as a predictor of anxiety and depression (Hwang et al., 2012; Ithnain et al., 2018; Kim et al., 2015). Alhassan et al. (2018) also explained that higher smartphone addiction leads to altered lifestyles such as skipping meals, gaining weight, eating unhealthy diets, and sleeping disorders that can be predisposed to depression. Thus, there is a risk that the excessive smartphone usage may lead to depression if uncontrolled. Kang & Park (2012) underlined that as smartphone addiction shows a negative impact on mental health such as obsession, depression, anxiety, psychosis, and social phobia, it is necessary to strengthen its countermeasure. Good self-awareness is needed to control the use of smartphones in this era of an all-digital world to prevent the impact on productivity and quality of life.

CONCLUSION

The present study showed that majority of health science

students in University Kebangsaan Malaysia showed slightly addicted to smartphones and are categorized as normal in depression. Self awareness is important to avoid potential risk of developing depression due to this behaviour.

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REFERENCES

- Abid, U., Khan, T. J., Sheikh, A., Saleem S., Kayani, H.A. & Habib, M. A. 2020. The relationship between smartphone addiction and depression among university students in Karachi: a cross-sectional study. *International Journal of Community Medicine and Public Health* (Gujarat) 7 (9): 3472-3479. doi.org/10.18203/2394-6040.ijcmph20203909.
- Alhassan, A. A., Alqadhib, E. M., Taha, N. W., Alahmari, R. A., Salam, M., & Almutairi, A. 2018. The relationship between addiction to smartphone usage and depression among adults: a cross-sectional study. *BMC Psychiatry* 18: 148. doi.org/10.1186/s12888-018-1745-4.
- Al-Khatami, A. D. & Ogbeide, D. O. 2002. Prevalence of mental illness among Saudi adult primary-care patients in central Saudi Arabia. *Saudi Medical Journal* 23(6): 721 - 724.
- Augner, C. & Hacker G. W. 2011. Associations between problematic mobile phone use and psychological parameters in young adults. *International Journal of Public Health* 57 (2): 473 – 441. doi.org/10.1007/s00038-011-0234-z.
- Beck, A.T., Steer, R.A., & Brown, G.K. 1996. Manual for the Beck Depression Inventory-II. San Antonio, TX: Psychological Corporation.
- Chen, B., Liu, F., Ding, S., Ying, X., Wang, L., & Wen, Y. 2017. Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. *BMC Psychiatry* 17: 341. doi.org/10.1186/s12888-017-1503-z.
- Harwood, J., Dooley, J. J., Scott, A. J. & Joiner, R. 2014. Constantly connected –the effects of smart-devices on mental health. *Computers in Human Behavior* 34: 267-272. doi.org/10.1016/j.chb.2014.02.006
- Hwang, K. H., Yoo, Y. S. & Cho, O. H. 2012. Smartphone overuse and upper extremity pain, anxiety, depression, and interpersonal relationships among college students. *The Journal of the Korea Contents Association* 12 (10): 365 – 375. doi.org/10.5392/JKCA.2012.12.10.365.
- Ithnain, N., Ghazali, S. E. & Jaafar, N. 2018. Relationship between smartphone addiction with anxiety and depression among undergraduate students in Malaysia. *International Journal of Health Science and Research* 8: 163 – 171.

- Kang, H. Y. & Park C. H. 2012. Smartphone addiction scale, factor analysis, cross-validation, preoccupation, life difficulty, usual, excessiveness, relationship. *Korean Journal of Psychology General* 31(2):563–580.
- Karger, A. 2014. Gender differences in depression. *Bundesgesundheitsblatt- Gesundheitsforschung- Gesundheitschutz* 57 (9): 1092-1098. doi.org/10.1007/s00103-014-2019-z.
- Kim, S. G., Park, J., Kim, H. T., Pan, Z., Lee, Y. & McIntyre, R.S. 2019. The relationship between smartphone addiction and symptoms of depression, anxiety, and attention-deficit/hyperactivity in South Korean adolescents. *Annals of General Psychiatry* 18: 1. <https://doi.org/10.1186/s12991-019-0224-8>.
- Kim, M., Kim, H., Ju, S., Choi, J., & Yu, M. 2015. Smartphone addiction: (focused depression, aggression, and impulsivity) among college students. *Indian Journal of Science and Technology* 8(25): 1-8. 10.17485/ijst/2015/v8i25/80215.
- Kwon, M., Kim, D. J., Cho, H. & Yang, S. 2013. The smartphone addiction scale: development and validation of a short version for adolescents. *PLoS One* 12: e83558. 10.1371/journal.pone.0083558.
- Marzo, R. R., Vinay, V., Bahari, R., Chauhan, S., Ming, D. A. F., Fernandez, S. N., Jhonson, C. C. P., Thivakaran, A. Q., Rahman, M. M., & Goel, S. 2021. Depression and anxiety in Malaysian population during the third wave of the Covid-19 pandemic. *Clinical Epidemiology and Global Health* 12: 100868.
- Muller, J. 2021. Smartphone users in Malaysia 2010-2025. <https://www.statista.com/statistics/494587/smartphone-users-in-malaysia/> [8 November 2021].
- Platt, J. M., Bates, L., Jager, J., McLaughlin, K. A., & Keyes, K. M. 2021. In the US gender gap in depression changing over time? A meta-regression. US: Oxford University Press.
- Piccinelli, M. & Wilkinson, G. 2000. Gender differences in depression: a critical review. *British Journal Psychiatry* 177: 486-492. 10.1192/bjp.177.6.486.
- Serra, G., Scalzo, L. L., Giuffre, M., Ferrara, P. & Corsello, G. 2021. Smartphone use and addiction during the coronavirus disease 2019 (Covid-19) pandemic: cohort study on 184 Italian children and adolescents. *Italian Journal of Pediatrics* 47: 150. doi.org/10.1186/s13052-021-01102-8.
- Silver, L., Smith, A., Johnson, C., Jiang, J., Anderson, M & Rainie, L. 2019. Mobile Connectivity in Emerging Economies. <https://www.pewresearch.org/internet/2019/03/07/use-of-smartphones-and-social-media-is-common-across-most-emerging-economies/> [21 May 2022].
- Turel, O. & Serenko, A. 2010. Is mobile email addiction overlooked? *Communications of the ACM*, 53(5): 41-43. doi.acm.org/10.1145/1735223.1735237
- WHO. 2017. Depression and Other Common Mental Disorders: Global Health Estimates. Geneva: World Health Organization.
- Yen, C., Yang, T. C., Yen, J. Y., Lin, C. L., Huang, C. F., Liu, S. C. & Ko, C. H. 2009. Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in southern Taiwan. *Journal of Adolescence* 32 (4): 863 – 873. 10.1016/j.adolescence.2008.10.006.
- Zheng, X., Guo, Y., Ma, W., Yang, H., Luo, L., Wen, L., Zhou, X., Li, Q., Bi, J., Wang, P., & Wang, H. 2021. A longitudinal study on the mental health of college students in Jinan during the peak stage of the Covid-19 epidemic and the society reopening. *Biomedicine Hub* 6(3): 102-110. doi.org/10.1159/000519586.

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