DIJEMSS
Dinasti International Journal of Education Management and Social Science
+62 813 8765 4578
+62 813 8765 4578
https://dinastipub.org/DIJEMSS
dinasti-info@gmail.com

INTERCORRELATION OF INSOMNIA, SLEEP DURATION, INTERNET USE DURATION AND INTERNET ADDICTION ON MILLENNIAL IN JAKARTA

Hendro Prabowo[1], Mahargyantari Purwani Dewi[2], Nadia[3]
[1,2,3] Faculty of Psychology Gunadarma University, Depok, Indonesia

ARTICLE INFORMATION
Received: 26th February 2020
Revised: 25th April 2020
Issued: 27th June 2020

Corresponding author:
Hendro

E-mail:
ndrahu@yahoo.com
hendroprabowo@staff.gunadarma.ac.id

DOI:10.31933/DIJEMSS

Abstract: With 171,260,000 internet users, Indonesia is the fifth of the internet users in the world. This study aims to examine the intercorrelation between insomnia, sleep duration, internet use duration and internet addiction in 259 millennial respondents. The instruments used were the Insomnia Severity Index (ISI) and the Internet Addiction Test (IAT). The results showed that 79.5% of the participants had sleep duration of less than 6.5 hours per day and 72% of them were also reported had internet use duration of more than 6 hours per day. Result also found that there is a positive correlation between insomnia and internet addiction, negative correlation between insomnia and sleep duration, positive correlation between insomnia and internet use duration, negative correlation between internet addiction and sleep duration, positive correlation between internet addiction and internet use duration, and negative correlation between sleep duration and internet use duration.

Keywords: Insomnia, Sleep Duration, Internet Use Duration, Internet Addiction, Millennials.

INTRODUCTION

On March 2019, China was ranked first among the countries with the most internet users or 829 million internet users; followed by India (560 million internet users), United States (293 million internet users), Brazil (149 million internet users), and Indonesia (143 million internet users) (Clement, 2019). In June 2019, there were 171,260,000 internet users in Indonesia or 63.53% of the 269,536,482 population on 2019 (Internet World Stats, 2020). Most studies indicate that the majority of internet users are teenagers and young people, although the level of internet use among adults is also increasing (Aslanidou, & Menexes, 2008; Giles & Price, 2008; Lenhart et al., 2010).

Based on user age, the majority of internet users in Indonesia are aged 18-25 years or millennials, which is equal to almost half of the total number of internet users in Indonesia

(49%). In addition, social media use ranked highest, browsing in second place, chatting or messaging (3rd), news search (4th), video (5th), and email (6th). Regarding internet-based technology, 85% of total internet users in Indonesia using mobile phones, both in rural and urban area. About 60% of internet users from the age category of 18-25 years access the internet from cellular phones. In the duration of use, more than 80% of internet users in Indonesia access the internet at least once a day. The average internet user in Indonesia accesses the internet for 1 hour per day or 35.3%. About 9% or 20 million people are excessive internet users (7-9 hours for 3% and more than 9 hours for 6%) (APJII, 2014). In 2017, the duration of internet use of 1-3 hours per day was 43.89%, 4-7 hours per day was 29.63% and above 7 hours per day was 26.48% (APJII, 2017). Similarly, The Ministry of Communication and Information, Republic of Indonesia teamed up with the United Nations Children's Fund (2014) researched the pattern of internet use in teenagers. The subjects were 400 teenagers age 10–19 years in Indonesia, including urban and rural areas; the result showed that approximately 80% of teenagers, especially in Jakarta, Banten, and Yogyakarta Special Region, were using the internet in their daily lives.

Teenagers today have different behaviors and mindsets than before. They were born in the world of technology (Reilly, 2012) and were born between 1981 - 1999 (Lancaster & Stillman, 2003). This generation is called digital natives (Prensky, 2001), Net, Millennial, or Gen Y (McCrindle, 2006). The most prominent characteristic of this generation is its convenience with technology and making technology an integral part of everyday life (Reilly, 2012). Millennial is also characterized as used to receive fast information, such as parallel processes, first graphics, random access, functions best when networked, develops with instant gratification and frequent rewards, prefers games for serious work and twitching speed (Prensky, 2001; Prensky & Berry, 2001).

Millennial is constantly connected and the presence of digital technology mediated by screens (Reilly, 2012). This is especially true among the set we call the young and the digital, the world's most connected generation ever. Without a PhD laboratory experiment to notice, teenagers' relentless devotion to being "always on," that is, constantly connected to some kind of a screen (Watkins, 2009). This makes teenagers spend a lot of their time watching television, surfing the internet, playing games, and using cellphones (Yong & Gates, 2014), mobile phone, gadgets, or personal computer (Watkins, 2009). Technology is also used by teenagers to interact with other people (Bennett, Maton, & Kervin, 2008). Watkins (2009) added that the ability of them to be connected to others through anytime, anywhere technology expands our sense of place, what it means to be social, and also reshapes how we experience community. No wonder, they have plenty of friends, in real space and the virtual worlds. Even as they sleep, connections are made online, in the background, they wake up to find them each day. Sometimes, these connections are to people the Millennial would never have had a chance to meet in the offline world.

Theoretical and practical significance exists in reviewing the literature on Internet addiction in adolescence and emerging adulthood in the United States and in China. The United States was among the earliest populations to use the Internet, and has encountered Internet addiction since the 1990s. China has the largest population to use the Internet, and has encountered Internet addiction since the 2000s (Paska & Yan, 2011). In 1995 psychiatrist Ivan Goldberg posted a new disorder called Internet Addiction Disorder on the psychiatry bulletin board at the popular website psych.com. Symptoms included giving up important social activities because of Internet use and unsuccessful efforts to control Internet use (Nakaya, 2015). The first study on Internet addiction occurred in 1996 by Dr. Kimberly

Young when she presented her findings on 600 subjects who met a modified version of the DSM criteria for pathological gambling (Young & de Abreu, 2011).

Internet addiction has been conceptualized as behavioral addiction involving the excessive use of online applications and leading to detrimental impacts on the affected individuals' lives (Kuss, Griffiths, Karila, & Billieux, 2014). Young (1998a) describes Internet addiction as any online-related compulsive behavior that completely dominates the addict's life, interferes with normal living, and causes severe stress to family, friends, loved ones, and one's work environment. Furthermore, internet addiction refers to failure to stop the desire for excessive use of the internet, extreme nervous feelings when losing internet access leads to real suffering and functional disruption in life, such as psychological, social, academic, and / or work difficulties (Bishop, 2015).

In the last ten years, the prevalence of internet use among adolescents has extremely increased; 93% of adolescences of ages 12–17 year old go online in the U.S, and so 93% of Japanese, 71.8% of Chinese, and 74.5% of Indian adolescents. Similarly, the prevalence in Iranian high school students was 22.2%, in Indians 25.5%, in Tunisians 18.05%, in Taiwanese 10.6% and in Turkish 07.9% (Farsani et al., 2016). The prevalence of pathological internet use among adolescents and young people from 0.9 to 37.9% in Asia. In the United States, it ranges from 0.3% to 8.1% and in Europe it has been reported to be between 2% and 18.3% (Alimoradi et al, 2019). The variety of statistical prevalence across cultures and societies, because the researchers are utilizing various instruments to define Internet addiction, making it harder to have consistency across studies (Young, Yue & Ying, 2011). Recent research shows the prevalence of internet addiction in adolescents in Jakarta is 31.4 percent. This finding is higher than other cities in Asia. This prevalence is higher than other countries because 97% of teenagers in Jakarta have gadgets. Then, 91.1% of teenagers access the internet at home (FKUI, 2019)

Some of the problems researchers associated with excessive internet use include failure to manage time, a loss of sleep, skipped meals, social isolation, and poor performance at school or work (Watkins, 2009). Dependents were found to delay other work to spend time online, lose sleep due to late-night logons, and feel life would be boring without the internet. The hours spent on the internet by dependents were greater than those of non-dependents. On the loneliness measure, significant differences were found between the two groups, with the dependents scoring higher than the non-dependents (Nalwa & Anand, 2003).

Sleep patterns were disrupted due to long internet sessions where addicts often took caffeine pills to facilitate longer internet sessions and suffered from fatigue, poor diet, poor exercise, work and/or school performance due to loss of sleep (Young, 2017). That many adolescents use their time on the internet instead of sleep, our results further suggest that excessive internet use may have not only direct adverse health consequences, but also indirect negative effects through sleep deprivation (Do et al., 2013).

Sleep is an important determinant of both physical and mental health and is also associated with mortality in general populations (Nilsson et al., 2001). Here are some cases of the impact of the internet addiction. An overweight 26-year-old man from north-eastern China has died after a ceaseless gaming session over the Lunar New Year holiday. Or, a 30-year-old man has died in the south China province of Guangzhou after apparently playing an online game continuously for three days (Palfrey & Gasser, 2011). A 17 years old teenager, called Piyawat Harikun in Thailand collapsed and died at his computer after having all-night gaming sessions during his school holidays (Fahey, 2019).

In the early 1980s, as the sleep medicine movement was just gathering steam, there was perhaps no rallying cry as popular as "insomnia is a symptom, not a disorder."

Presumably, this position was taken in part for medico-political reasons, but also because it was genuinely believed that the polysomnographic study of sleep was destined to reveal all the underlying pathologies that give rise to the "symptoms" of insomnia, fatigue, and sleepiness (Attarian & Perlis, 2010). According to Taylor et al. (2014), insomnia is the difficulty to start or maintain sleep at least three nights every week for 3 months, accompanied by impaired functioning during the day. According to Doghramji and Doghramji (2007), insomnia is a complaint or symptom of repetitive sleep difficulties associated with sleep initiation (starting sleep), sleep duration (waking up too early), sleep consolidation (staying asleep), and sleep quality (feeling refreshed after sleeping)

Insomnia is not defined by total sleep time quantitatively, but by the inability to obtain sleep of sufficient length or quality to produce refreshment the following morning (Hamblin, 2007) or overall poor sleep quality (Roth, 2007). For example, a person who needs only 4 h of sleep does not have insomnia if he or she is refreshed in the morning after his/her sleep, whereas the other person who needs 10 h of sleep may have insomnia if he or she does not feel refreshed after 8 h of the sleep (Attarian & Perlis, 2010).

With respect to "how much sleep," many investigators are reluctant to fix a value for this parameter. Of the investigators that are inclined to set minimums, most specify that the amount of sleep obtained on a regular basis be equal to or less than either 6.0 or 6.5 h per night (Attarian & Perlis, 2010). The lack of an established total sleep time cutoff is also related to the possibility that profound sleep initiation or maintenance problems may occur in the absence of sleep loss. This is an important distinction, because it is often assumed that insomnia is synonymous with sleep deprivation. While it is certainly the case that the daytime symptoms associated with insomnia might be explained, in part, by partial chronic sleep loss, daytime symptoms need not be ascribable only to lack of sleep. For example, it has been shown that patients with insomnia reliably exhibit sleep micro-architectural disturbances such as enhanced high-frequency activity during NREM sleep.

There is a diminution of sleep duration is occurring in our modern (Cherasse, 2011). Surveys in some countries have demonstrated a mild reduction in the resting period, for example the Finnish data during the past 33 years indicate a general decrease in self-reported sleep duration of about 18 min and an increase of sleep complaints, especially among the employed middle-aged population (Kronholm et al., 2008). A study in Japan followed adult men for 8 years from 1984 to 1992, and high frequency of difficulty initiating sleep or difficulty maintaining sleep, which are both likely to result in shorter sleep duration (Kawakami, Takatsuka and Shimizu, 2004), where there has been about 40 min lost during the last 40 years. The more critical again in countries such as the USA (more than 1 hour lost since the 1960s) (Cherasse, 2011). For healthy individuals with normal sleep, the appropriate sleep duration for newborns is between 14 and 17 hours, infants between 12 and 15 hours, toddlers between 11 and 14 hours, preschoolers between 10 and 13 hours, and school-aged children between 9 and 11 hours. For teenagers, 8 to 10 hours was considered appropriate, 7 to 9 hours for young adults and adults, and 7 to 8 hours of sleep for older adults (Hirshkowitz et al., 2015).

In Indonesia, the prevalence of insomnia is reported at 10% of the population (28 million people) and this is the highest in Asia (Salbiah, 2018). Furthermore, Peltzer & Pengpid (2019) adopted a survey from the Indonesia Family Life Survey (IFLS) which involved 31,432 people aged 15 years and over and found that 55.7% of participants had no insomnia, 33.3% had sub-threshold insomnia and 11.0% had clinically significant insomnia symptoms. Using cross-sectional study 224 respondents, Prasetyo, Soemarko, and Kusumadewi (2018) conducted the research about the prevalence of insomnia in employees

at central government agencies in Jakarta. They found that symptoms reached 50%, comprising 44.2% with mild insomnia and 5.8% with moderate insomnia symptoms.

LITERATURE REVIEW

Jenaro et al. (2007) found that heavy Internet use is associated with high anxiety; high cell-phone use is associated to being female, and having high anxiety and insomnia. Similarly. Bhatt and Gaur (2019) conducted a study on 320 postgraduation students in India, found that internet addiction and smartphone addiction each had a significant positive relationship with psychological risk factors including insomnia, anxiety, depression, stress, and self-esteem. Gammal et al. (2019) conducted a study of 60 students from Al-Azhar University in Egypt and found statistically significant correlation between sleep quality and internet addiction. Li et al. (2017) conducted a study of 1,015 secondary school students from Guangzhou, China and found that internet addiction and online social networking addiction each had a significant positive relationship with depression and insomnia. In Japan, Kawabe, Horiuchi, Oka, dan Ueno (2019) conducted study to junior high school students and found that Internet addiction is strongly associated with sleep habits and problems.

On 727 adolescents as respondents, Ferreira et al. (2017) found that the phone and laptop were the main devices used. Online games and social networks use were the main activities performed. Internet dependence was observed in 19% of adolescents, and it was associated with male gender, social networks use, mainly Twitter and Instagram use, self-perceived sleep problems, initial and middle insomnia and excessive daytime sleepiness. A meta-analysis conducted by Alimoradi et al. (2019) to 23 studies included 35,684 participants and found that internet addiction may result in sleep problems, including lowered sleep quality and reduced sleep duration. Their finding demonstrates that the association between internet addiction and sleep disturbances exists across different countries, cultures, and ethnicities.

According to the phenomenological study, Kurniasih (2017) found that for internet user in Indonesia, the internet addiction supposed as part of their daily needs and lifestyle. In addition, Hakim and Raj (2017) found that the average of research subject was accessing the internet as much as 10 hours per day, and they never stopped faster when accessing the internet because of their desire to continuously want to use the internet such as accessing social media one then opens the other, then opens later, opens and closes again and so on. They feel half of their needs are met through the internet and the internet makes them feel not lonely. However, Hakim and Raj (2017) also found negative impacts such as reduced direct social interaction because when they gathered together they felt that their friends played cellphones more than chatting, often delayed work and tasks, insomnia, disruption of eye health, decreased performance learn because you're lazy to study. When offline, they feel scared, anxious, confused, bored, panicked, sad, resentful and upset. As a result, the activity carried out while offline is while sleeping or watching a movie that has been downloaded. Fifty-two subjects from psychiatric residents of the Faculty of Medicine, Universitas Indonesia, 85% of them reported feeling that they did not have adequate knowledge of internet addiction (Hanafi et al., 2019). On 180 adolescents aged 16 to 17 years, Nursalam, Octavia, Tristiana, dan Efendi (2018), the reasons of SNS (social network site) usage, duration of SNS usage, and academic stress are major factors associated with insomnia in adolescents.

RESEARCH METHODS

This study aims is to examine the intercorrelation between insomnia, sleep duration, internet use duration and internet addiction on millennial respondents in Jakarta. This quantitative research approach and cross-sectional study, using 259 smartphone users, millennial's student and officer who live in Jabodetabek metropolitan area (Jakarta, Bogor, Depok, Tangerang & Bekasi). The instruments used include Insomnia Severity Index (ISI) by Morin (2004) to measure tendency for insomnia, Internet Addiction Test (IAT) by Young (1998b) to measure internet addiction. In addition, internet use asked with: how long do you spend internet a day? And sleep duration asked with: how long do you sleep daily?

The Insomnia Severity Index (ISI) consists of 16 items using 5-point Likert scale ranging from 1 (none) to 5 (very severe). The Internet Adiction Test (IAT) consists of 20 items using 5-point Likert scale ranging from 1 (not at all) to 5 (often). Both of the instruments were adapted into Indonesian and following back translated procedure. The reliability testing of the two instruments was carried out on 112 respondents on September 5-25, 2019. The results showed the Insomnia Severity Index (ISI) had an Alpha reliability coefficient of 0.918 and the Internet Adiction Test (IAT) of 0.895.

FINDINGS AND DISCUSSION

Descriptively, we concluded that the average sleep duration of the respondents is 5.2 hours per day (X_{max} = 4, X_{min} = 6, SD = 0.33) which tend to insomnia because less than 6.5 hours (Morin, 2004). The result is more than the studies of Yang et al. (2005) in South Korea, Do et al (2013) in South Korea, and Tagaya et al (2004) in Japan. Furthermore, the result is less than the studies of Chung & Cheung (2008) in Hong Kong, and Nuutinen et al. (2014) in Finland, France and Denmark (table 2). It is opposite, Hirshkowitz, et al. (2015) concluded that the number of healthy sleep to early adulthood and adult around 6 -7 hours. The sleep duration has been reduced from 9 hours in 1960 to 7 hours (National Sleep Foundation 2002). However, the research supports previous studies (Nalwa & & Anand 2003; Do et al., 2013; Young 2017), which indicating reduction the sleep on millennials.

79.5% of the participants had sleep duration of less than 6.5 hours per day. The result is more than the average of the world-wide prevalence of insomnia. Like Canada: 20.1% (Ohayon, 1996), Canada: 24% (Sutton et al., 2001), France: 29% (Leger et al. , 2001), German: 25% (Simen et al., 1995), Japan: 20,3% (Ishigooka et al., 1999); Japan: 21.4% (Kim et al., 2000); Norway: 11,7% (Pallesen et al., 2001); South Korea: 17% (Ohayon & Hong, 2002); Mexico: 35% (Lopez et al., 1995); Singapore: 15.3% (Yeo et al., 1996); and Austria: 26% (Zeitlhofer et al., 1994) (table 3).

Table 1. Descriptive

Category	Sub Category	Amount / Percent
Ages	X_{min}	19
	X_{max}	25
	Mean	21.2
Sex	Male	75
	Female	184
	Total	259
Occupation	Officer	33
	Student	226
Hometown	Tangerang	2
	Bekasi	12
	Bogor	57

	Depok	110
	Jakarta	78
Poor sleep	Yes	170
	No	89
Sleep duration	Normal (6.5 hour or more)	20.5%
	Not normal (less than 6.5 hour)	79.5%
Internet use duration	Normal (less than 6 hours)	28%
	Not normal (6 hours or more)	72%
Activity before sleep	Use internet	227
	Play the game	3
	Do the task	4
	Watching TV/Video	9
	Listen to the music	10
	Others activity	6

Table 2. World-wide Sleep Duration

Author(s)	Respondent	Country(s)	Sleep Duration (hour)
Yang et al. (2005)	1,457 11th and 12th grade students	South Korea	5.4 hours
Do et al. (2013)	800 students (400 middle schools and and 400 high schools)	South Korea	43% of had less than 6 hours; only 27% had more than 7 hours
Tagaya et al. (2004)	3,478 high school students	Japan	6.3 hours
Chung & Cheung (2008)	1,629 adolescents aged 12 – 19 years	Hong Kong	7.3 hours
Nuutinen et al. (2014)	5,402 adolescents (15 year)	Finland, France and Denmark	8 hours

Table 3. World-wide Prevalence of Insomnia

Author(s)	Respondent	Country	Prevalence (%)
Ohayon (1996)	5,622 French subjects of 15 years or older	Canada	20.1%
Sutton et al. (2001)	15 years and above	Canada	24%
Leger et al. (2000)	12,778 individuals	France	29%
Simen et al. (1995)	1,997 subject of 13 years or above	German	25%
Ishigooka et al. (1999)	6,277 new outpatients	Japan	20.3%
Kim et al. (2000)	3,030 subject of the general population	Japan	21.4%
Pallesen et al. (2001)	2,001 subjects of 18 years or above	Norway	11.7%

Husby & Lingjaerde (1990)	14,667 subjects	Norway	41.7% of the women and 29.9% of the men
Ohayon & Hong (2002)	3,719 subjects of 15 years or older	South Korea	17.0%
Lopez et al. (1995)	1,000 subjects of 18–84 years	Mexico	36%
Yeo et al. (1996)	2,084 subjects of 15-55 years	Singapore	15.3%
Zeitlhofer et al. (1994)	1,000 13% in 14-30 year-old subjects, 22% in 31-50 year-old ones and 41% in subjects over 50.	Austria	26%

The average internet use duration of the respondents is 8 hours per day (X_{max} = 12, X_{min} = 7, SD = 0.83) or 72% of the respondents. Tao, et al (2010) states that the duration of internet addiction is at least 6 hours of use internet per day. The result is higher than other studies like Tahiroglu et al. (2008) in Turkey, Eldeleklioğlu & Vural-Batik (2013) in Turkey, Yang (2001) in Korea, and Nuutinen et al (2014) in Finland, France and Denmark (table 4). The percentage of 72% also higher than in Hongkong (Cheung & Wong, 2011), China (Leung, 2004; Lam et al., 2009), Korea (Whang, Lee & Chang, 2003; Choi et al., 2009), Nepal (Bhandari et al., 2017), Greece (Siomos et al., 2008), and Turkey (Bener et al., 2019) (table 5).

From the intercorrelation matrix (table 6), we found that,

1. There is a positive correlation between insomnia and internet addiction (r=0.544, p<0.01)
2. There is a negative correlation between insomnia and sleep duration (r=-0.377, p<0.01)
3. There is a positive correlation between insomnia and internet use duration (r=0.232, p<0.01)
4. There is a negative correlation between internet addiction and sleep duration (r=-0.139, p<0.05)
5. There is a positive correlation between internet addiction with internet use duration (r=0.199, p<0.01)
6. There is a negative correlation between sleep duration and internet use duration (r=-0.195, p<0.01).

Table 4. World-wide Internet Use Duration

Author(s)	Respondent & Amount	Country(s)	Internet Use Duration (hour/day or week)
Tahiroglu et al. (2008)	3,975 undergraduate students	Turkey	44.6% used 1-2 hours/week 7.6% for more than 12 hours/week
Eldeleklioğlu & Vural-Batik (2013)	206 adolescents aged between 15-18 years	Turkey	6.8% for more than 5 hours/day
Yang (2001)	1,296 students (12–19 years)	Korea	87.7% for 1.5 - 2 hours/day

Nuutinen et al (2014)	5,402 adolescents (15year)	Finland, France and Denmark	2 hours/day

Table 5. World-wide Prevalence of Internet Addiction

Author(s)	Respondent	Country(s)	Internet Addiction (%)
Cheung & Wong (2011)	719 adolescents	Hong Kong	17.2%
Leung (2004)	699 millennials	China	37.9%
Lam et al. (2009)	1,618 (school students aged 13-18 years)	China	Moderate (10.2%) Severe (0.6%)
Whang, Lee & Chang (2003)	13,588 users	Korea	3.5%
Choi et al. (2009)	2,336 high school students	Korea	2.5%
Bhandari et al. (2017)	984 undergraduate students	Nepal	35.4%
Siomos et al. (2008)	2,200 adolescent students (12-18 years)	Greece	8%
Poli & Agrimi (2012)	2,533 school students aged 14 - 21 years	Italy	0.8%
Niemz, Griffiths, & Banyard (2005)	371 university students	England	18.3%
Kuss, Griffiths, & Binder (2013)	2,257 university students	England	3.2%
Kuss at al (2013)	3,105 adolescents	Netherland	3.7%
Černja, Vejmelka & Rajter (2019)	352 high school students, aged 15–20	Croatia	3.4%
Bener et al. (2019)	3,000 students (18 - 25 years)	Turkey	17.7%

Table 6. Intercorrelation Matrix

		Insomnia	Internet Addiction	Sleep Duration	Internet Use Duration
Insomnia	Pearson Correlation	1	0.544**	-0.377**	0.232**
	Sig. (2-tailed)		0.000	0.000	0.000
	N	259	259	259	259
Internet Addiction	Pearson Correlation	0.544**	1	-0.139*	0.199**
	Sig. (2-tailed)	0.000		0.026	0.001
	N	259	259	259	259
Sleep Duration	Pearson Correlation	-0.377**	-0.139*	1	-0.195**
	Sig. (2-tailed)	0.000	0.026		0.002

	N	259	259	259	259
Internet Use Duration	Pearson Correlation	0.232**	0.199**	-0.195**	1
	Sig. (2-tailed)	0.000	0.001	0.002	
	N	259	259	259	259

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

Insomnia and Internet Addiction

There is a positive correlation between insomnia and internet addiction. Descriptively, Cheung and Wong (2011) found that among students in Hongkong with internet addiction (17.2%), 51.7% were also identified as insomniacs. Zhang et al. (2017) also demonstrated that 21.2% of the participants were diagnosed with Internet addiction, 26.7% of those with Internet addiction also reported that they have had sleep related difficulties.

Lam (2014) found that the problematic of internet use was associated with sleep problems including subjective insomnia and poor sleep quality. Similarly, Choi et al. (2009) found that internet addiction is strongly associated with excessive daytime sleepiness in adolescents. Chen and Gau (2016) demonstrate the temporal relationship of early and middle insomnia predicting internet addiction, which subsequently predicts disturbed circadian rhythm. Cheung and Wong (2011) found the associations among Internet addiction, insomnia, and depression is another few studies that attempted to address the issue of the underlying mechanism of the relationship found in the area. Younes et al. (2016) stated that there was a significant relationship between internet addiction and psychological stressors such as insomnia, stress, anxiety, depression and self-esteem.

Insomnia and Sleep Duration

There is a negative correlation between insomnia and sleep duration. This result supports Yen et al. (2008) that found the correlates of short sleep duration were not identical to those of subjective insomnia on adolescences in Taiwan. On 1,359 Chinese adolescents, Liu and Zhou (2002) found that sleep duration of less than 7 hour/day was significantly associated with most behavioral problems in those without complaints of insomnia. Vgontzas et al (2009) found that chronic insomnia associated with objectively measured short sleep duration is a clinically significant risk factor for hypertension on 1,741 men and women from Pennsylvania. Grandner and Kripke (2004) used the sample consisted of 1,004 adults (500 men and 504 women) above age 18, they found that there are U-shaped relationships of sleep complaints with reported weekday total sleep time. More specifically, 8-hour sleepers reported less frequent symptoms than long sleepers or 7-hour sleepers. Means et al (2003) the insomnia sufferers, as a group, showed a greater tendency to underestimate the time they slept than did the normal sleepers Hale et al. (2019) also found a high level of screen use and poor sleep health (i.e., short duration, poor quality, and late timing) among adolescents.

Insomnia and Internet Use Duration

There is a positive correlation between insomnia and internet duration. Syamsoedin, Bidjuni, and Wowiling (2015) provided the results of the study that there was a correlation between the duration of social media use and the incidence of insomnia in adolescents. Nursalam et al. (2019) also found that SNS (social network site) duration is a major factors associated with insomnia in adolescents.

Lange et al. (2017) also found that everyday use of electronic media devices is associated with insomnia complaints in adolescents. Ikeda and Nakamura (2014) found that the use of mobile phones for calling and for sending text messages after lights out is associated with sleep disturbances among Japanese adolescents. Similarly, the study of Brunborg et al. (2011) indicatesd that the use of computers and mobile telephones in the bedroom are related to poor sleep habits, but that media use in the bedroom seems to be unrelated to symptoms of insomnia. The use of social media also correlated with insomnia (Bhat et al., 2018; Goodwin, Lemola, & Ben-Ezra, 2018). In addition, the uses of internet games are associated with sleep problem (Bruni, et al., 2015) or insomnia (Tamura et al., 2017)

Internet Addiction and Sleep Duration

There is a negative correlation between internet addiction and sleep duration. The result is similar with Randler et al. (2016) that found that sleep duration during the week was negatively correlated with smartphone addiction. Canan et al. (2013) revealed a significant negative and independent association of internet addiction with daily sleep duration. Bener et al (2019) found that sleepiness, headaches, hurting eyes, tired eyes, and hearing problems were significantly associated with (and key predictors of) internet addiction. Those with internet addiction had significantly less hours sleep compared to those without internet addiction. Do et al (2013) also found that shorter self-reported sleep duration was associated with a higher likelihood of reporting depressive symptoms, suicidal ideation, and overweight or obese status, and a lower likelihood of reporting better self-rated health, even after accounting for time spent on Internet use. Excessive Internet use was found to be an independent risk factor for these outcomes.

Randler et al (2016) result of this study was that morningness–eveningness is an important predictor for smartphone addiction; even stronger than sleep duration. While sleep duration on weekdays negatively predicted s martphone addiction, age, sleep duration on weekends, and midpoint of sleep on weekdays and weekends did not predicted smartphone addiction in both scales.

Internet Addiction and Internet Use Duration

There is a positive correlation between internet addiction and internet duration. Bener et al. (2019) demonstrated that the duration of internet use was significantly associated with internet addiction. An internet addiction had significantly high number of hours' internet use as compared to those without internet addiction. Eldeleklioğlu and Vural (2013) revealed that in terms of internet use duration, too, it is observed that the internet addiction scores differred ($p < .01$). The internet addiction scores of those spending over 5 hours on the internet are higher when compared to those of the students spending 2-5 hours and less than 2 hours on the internet. As the internet use duration increases, so does the internet addiction significantly.

Young (1996) concluded that the more interactive the internet function, the more addictive it is, and while normal users reported little negative effects of internet use, dependents reported significant impairment in many areas of their lives, including health, occupational, social and financial. Based on in-depth interviews with 20 Internet addiction treatment experts from Europe and North America, Kuss and Griffiths (2015) found that in inpatient and outpatient clinical settings, Internet addiction and Internet-use related problems are associated with significant impairment and distress for individuals, which have been emphasised as the criteria demarcating mental disorders. This suggests that in the clinical

context, Internet addiction can be viewed as mental disorder requiring professional treatment if the individual presents with significant levels of impairment. Psychotherapists treating the condition indicate the symptoms experienced by the individuals presenting for treatment appear similar to traditional substance-related addictions, including salience, mood modification, tolerance, withdrawal, conflict and relapse.

Sleep Duration and Internet Use Duration

There is a negative correlation between sleep duration and internet duration. In general, Nuutinen et al. (2014) found that computer use was associated with shorter sleep duration. Do et al. (2013) revealed that excessive internet use may have not only direct adverse health consequences, but also have indirect negative effects through sleep deprivation. In addition, daytime and bedtime use of electronic devices were both related to sleep measures, with an increased risk of short sleep duration, long sleep onset latency and increased sleep deficiency (Hysing et al., 2015). Mak et al (2014) researched about screen viewing devices (including televisions, personal computers, mobile phones, and portable video devices) are viewed in relation to sleep duration, sleep quality, and daytime sleepiness among Hong Kong adolescents. They found that television and computer viewing remain prevalent, but were not correlated with sleep variables. Mobile phone viewing was correlated with all sleep variables, while portable video device viewing was shown to be correlated only with daytime sleepiness.

CONCLUSION AND SUGESTION

There was an intercorrelation between insomnia, sleep duration, internet use duration and internet addiction on millennial in Jakarta. All of the six correlations are significant. The results also indicated that 79.5% of the participants had sleep duration of less than 6.5 hours per day or tend to insomnia and 72% of them were also reported had internet use duration of more than 6 hours per day or internet addicted.

Some authors indicated that cognitive–behavioral and pharmacological approaches as potentially effective treatments for internet addiction (Peukert et al., 2010; Winkler et al., 2013). A few of the approach are positive psychology intervention (Khazaei, Khazaei, & Ghanbari, 2017) and mindfulness (Shonin, Van Gordon, & Griffiths, 2014; Yao et al., 2017). Winkler et al. (2013) conducted a meta-analysis was based on 16 studies, covered a total of 670 participants from China, Korea and United States. Psychological treatment included MLC (Multi-level Counseling Program), CBT (Cognitive Behavioral Therapy), MI (Motivational Interviewing), SoCo (Social Competence Training), SFBT (Solution-focused Brief Therapy), CT (Cognitive Therapy) and ACT (Acceptance and Commitment Therapy). Effect size estimates suggest that psychological and pharmacological interventions were highly effective for improving internet addiction (g=1.61), time spent online (g=0.94), depression (g=0.90) and anxiety (g=1.25) from pre- to post-treatment in the overall sample.

Khazaei, Khazaei, & Ghanbari (2017) conducted an experiment with Positive Psychology Interventions (PIs) to evaluate the efficacy of a group-based PI in treating internet addiction. The results indicate that severity internet use and internet addiction rate in the experiment group are lower than in the control group. Yao et al. (2017) use an intervention that combining reality therapy and mindfulness meditation in reducing decisional impulsivity and internet gaming disorder severity. Results indicate that (1) at baseline, internet gaming disorder subjects showed greater inter temporal and risky decisional impulsivity than healthy comparison subjects; (2) After intervention, internet gaming disorder subjects were decreased in delay discounting rate and internet gaming disorder `severity, but

did not perform differently on decisional impulsivity in risky choices, as compared with baseline.

Lan et al. (2018) investigate the effectiveness of a group mindfulness-based cognitive-behavioral intervention (GMCI) on smartphone addiction in a sample of Chinese university students. Results indicate that twenty-seven students in intervention and control group completed the intervention and the follow-up. Smartphone use time and internet addiction scores significantly decreased from 1st week to 14th week in the intervention group. Compared with the control group, the intervention group had significantly less smart phone use time at 8th week, 14th week, and 20th week and significantly lower internet addiction scores at 14th week.

Morin et al. (2006) collected the evidence (1998–2004) on psychological and behavioral treatment of insomnia. They found that five treatments met criteria for empirically-supported psychological treatments for insomnia: Stimulus control therapy, relaxation, paradoxical intention, sleep restriction, and cognitive-behavior therapy. Ström, Pettersson, & Andersson (2004) investigated the effects of an Internet-based intervention for insomnia. Participants were randomly assigned to a cognitive-behavioral self-help treatment and a waiting list control condition. The 5-week intervention mainly consisted of sleep restriction, stimulus control, and cognitive restructuring. Sleep diary data were collected for 2 weeks at baseline and at posttreatment. Results showed statistically significant improvements in the treatment group on many outcome measures, including total sleep time, total wake time in bed, and sleep efficiency. However, improvements were also found in the control group.

REFERENCE

Alimoradi, Z., Lin, C. Y., Broström, A., Bülow, P. H., Bajalan, Z., Griffiths, M. D., ... & Pakpour, A. H. (2019). Internet addiction and sleep problems: A systematic review and meta-analysis. *Sleep Medicine Review, 47*, 51-61.

Aslanidou, S., & Menexes, G. (2008). Youth and the Internet: Uses and practices in the home. *Computers & Education*, *51*(3), 1375-1391.

Asosiasi Penyedia Jasa Internet Indonesia (APJII). (2014). *Profil pengguna internet Indonesia 2014*. Jakarta: Asosiasi Penyedia Jasa Internet Indonesia.

Asosiasi Penyedia Jasa Internet Indonesia (APJII). (2017). Infografis penetrasi & perilaku pengguna internet Indonesia: Survey 2017. Jakarta: Asosiasi Penyedia Jasa Internet Indonesia & Teknopreneur.com.

Attarian. H.P. & Perlis, M.L. (2010). Defining insomnia. In Attarian, H. P., & Schuman, C. (Eds.). *Clinical handbook of insomnia: Second edition*. New York, USA: Springer, pp. 3-12.

Bener, A., Yildirim, E., Torun, P., Çatan, F., Bolat, E., Alıç, S., ... & Griffiths, M. D. (2019). Internet addiction, fatigue, and sleep problems among adolescent students: a large-scale study. *International Journal of Mental Health and Addiction*, *17*(4), 959-969.

Bennett, S., Maton, K., & Kervin, L. (2008). The "digital natives" debate: A critical review of the evidence. *British Journal of Educational Technology, 39(5), 775–786.* doi:10.1111/j.1467-8535.2007.00793.x

Bhandari, P. M., Neupane, D., Rijal, S., Thapa, K., Mishra, S. R., & Poudyal, A. K. (2017). Sleep quality, internet addiction and depressive symptoms among undergraduate students in Nepal. *BMC Psychiatry*, *17*(1), 106-112.

Bhat, S., Pinto-Zipp, G., Upadhyay, H., & Polos, P. G. (2018). "To sleep, perchance to tweet": In-bed electronic social media use and its associations with insomnia, daytime sleepiness, mood, and sleep duration in adults. *Sleep Health*, *4*(2), 166-173.

Bhatt, S., & Gaur, A. (2019). Psychological risk factors associated with internet and smartphone addiction among students of an Indian dental institute. *Indian Journal of Public Health*, *63*(4), 313-317.

Bishop, J. (2015). *Psychological and social implications surrounding internet and gaming addiction.* Hershey PA, USA: Information Science Reference, An Imprint of IGI Global.

Brunborg, G. S., Mentzoni, R. A., Molde, H., Myrseth, H., Skouverøe, K. J. M., Bjorvatn, B., & Pallesen, S. (2011). The relationship between media use in the bedroom, sleep habits and symptoms of insomnia. *Journal of sleep research*, *20*(4), 569-575.

Bruni, O., Sette, S., Fontanesi, L., Baiocco, R., Laghi, F., & Baumgartner, E. (2015). Technology use and sleep quality in preadolescence and adolescence. *Journal of Clinical Sleep Medicine*, *11*(12), 1433-1441.

Canan, F., Yildirim, O., Sinani, G., Ozturk, O., Ustunel, T. Y., & Ataoglu, A. (2013). Internet addiction and sleep disturbance symptoms among T urkish high school students. *Sleep and Biological Rhythms*, *11*(3), 210-213.

Černja, I., Vejmelka, L., & Rajter, M. (2019). Internet addiction test: Croatian preliminary study. *BMC Psychiatry*, *19*(1), 388-397.

Chen, Y. L., & Gau, S. S. F. (2016). Sleep problems and internet addiction among children and adolescents: a longitudinal study. *Journal of Sleep Research*, *25*(4), 458-465.

Cheng, S. H., Shih, C. C., Lee, I. H., Hou, Y. W., Chen, K. C., Chen, K. T., ... & Yang, Y. C. (2012). A study on the sleep quality of incoming university students. *Psychiatry Research*, *197*(3), 270-274.

Cherasse, Y. (2011). Overview of sleep and sleep medicine in Asian countries. *Sleep and Biological Rhythms*, *9*, 84–89.

Cheung, L. M., & Wong, W. S. (2011). The effects of insomnia and internet addiction on depression in Hong Kong Chinese adolescents: an exploratory cross- sectional analysis. *Journal of Sleep Research*, *20*(2), 311-317.

Cheung, L. M., & Wong, W. S. (2011). The effects of insomnia and internet addiction on depression in Hong Kong Chinese adolescents: an exploratory cross- sectional analysis. *Journal of Sleep Research*, *20*(2), 311-317.

Choi, K., Son, H., Park, M., Han, J., Kim, K., Lee, B., & Gwak, H. (2009). Internet overuse and excessive daytime sleepiness in adolescents. *Psychiatry and Clinical Neurosciences*, *63*(4), 455-462.

Chung, K. F., & Cheung, M. M. (2008). Sleep-wake patterns and sleep disturbance among Hong Kong Chinese adolescents. *Sleep*, *31*(2), 185-194.

Clement, J. (2019). Countries with the highest number of internet users 2019. https://www.statista.com/statistics/262966/number-of-internet-users-in-selected-countries/

Do, Y. K., Shin, E., Bautista, M. A., & Foo, K. (2013). The associations between self-reported sleep duration and adolescent health outcomes: what is the role of time spent on Internet use?. *Sleep Medicine*, *14*(2), 195-200.

Doghramji, K., & Doghramji, P. P. (2007). *Clinical management of insomnia: First edition.* New York, USA: Professional Communication, Inc

Eldeleklioğlu, J., & Vural, M. (2013). Predictive effects of academic achievement, internet use duration, loneliness and shyness on internet addiction. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *28*(28-1), 141-152.

Fahey, R. (5 November 2019). Video game addict, 17, is found slumped dead on his computer after suffering a stroke as he played at night in Thailand https://www.dailymail.co.uk/news/article-7650671/Video-game-addict-17-slumped-dead-computer-Thailand.html

Farsani, S. I., Allahbakhshi, K., Valipour, A. A., & Mohammadian-Hafshejani, A. (2016). Some facts on problematic Internet use and sleep disturbance among adolescents. *Iranian Journal of Public Health*, *45*(11), 1531-1537.

Ferreira, C., Ferreira, H., Vieira, M. J., Costeira, M., Branco, L., Dias, A., & Macedo, L. (2017). Epidemiology of internet use by an adolescent population and its relation with sleep habits. *Acta Med Port*, *30*(7-8), 524-533.

FKUI. (2019, November 26). Remaja di Jakarta paling candu internet se-Asia. Retrieved from https://fk.ui.ac.id/infosehat/remaja-di-jakarta-paling-candu-internet-se-asia/

Gammal, A., Soliman, M. A. F., Elsheikh, M. M. A., & Abozahra, A. A. E. (2019). Internet addiction and internet gaming disorder and associated insomnia among a sample of Al-Azhar University sudents, Clinical study. *The Egyptian Journal of Hospital Medicine*, *77*(5), 5718-5726.

Giles, G., & Price, I. R. (2008). Adolescent computer use: Approach, avoidance, and parental control. *Australian Journal of Psychology*, *60*(2), 63-71.

Goodwin, R., Lemola, S., & Ben-Ezra, M. (2018). Media use and insomnia after terror attacks in France. *Journal of Psychiatric Research*, *100*(98), 47-50.

Grandner, M. A., & Kripke, D. F. (2004). Self-reported sleep complaints with long and short sleep: a nationally representative sample. *Psychosomatic Medicine*, *66*(2), 239.

Hakim, S. N., & Raj, A. A. (2017). Dampak kecanduan internet (internet addiction) pada remaja. *Prosiding Temu Ilmiah Nasional X Ikatan Psikologi Perkembangan Indonesia: Peran Psikologi Perkembangan dalam Penumbuhan Humanitas pada Era Digital*, *1*, 280-285. ISBN: 978-602-1145-49-4.

Hale, L., Li, X., Hartstein, L. E., & LeBourgeois, M. K. (2019). Media Use and Sleep in Teenagers: What Do We Know?. *Current Sleep Medicine Reports*, *5*(3), 128-134.

Hamblin, J. E. (2007). Insomnia: An ignored health problem. *Primary Care: Clinics in Office Practice*, *34*(3), 659-674.

Hanafi, E., Siste, K., Kurniawan, A., Nasrun, M. W. S., & Kusumadewi, I. (2019). Perception of internet addiction among psychiatric residents in an urban area in Indonesia. *Medical Journal of Indonesia*, *28*(4), 380-385.

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., & Neubauer, D. N. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health*, *1*(1), 40-43.

Husby, R., & Lingjaerde, O. (1990). Prevalence of reported sleeplessness in northern Norway in relation to sex, age and season. *Acta Psychiatrica Scandinavica*, *81*(6), 542-547.

Hysing, M., Pallesen, S., Stormark, K. M., Jakobsen, R., Lundervold, A. J., & Sivertsen, B. (2015). Sleep and use of electronic devices in adolescence: results from a large population-based study. *BMJ open*, *5*(1), e006748.

Ikeda, K., & Nakamura, K. (2014). Association between mobile phone use and depressed mood in Japanese adolescents: A cross-sectional study. *Environmental Health and Preventive Medicine*, *19*(3), 187-196.

Ishigooka, J., Suzuki, M., Isawa, S., Muraoka, H., Murasaki, M., & Okawa, M. (1999). Epidemiological study on sleep habits and insomnia of new outpatients visiting general hospitals in Japan. *Psychiatry and Clinical Neurosciences*, *53*(4), 515-522.

Jenaro, C., Flores, N., Gómez-Vela, M., González-Gil, F., & Caballo, C. (2007). Problematic internet and cell-phone use: Psychological, behavioral, and health correlates. *Addiction Research & Theory*, *15*(3), 309-320.

Kawabe, K., Horiuchi, F., Oka, Y., & Ueno, S. (2019). Association between sleep habits and problems and internet addiction in adolescents. *Psychiatry Investigation*, *16*(8), 581-587. DOI: 10.30773/pi.2019.03.21.2.

Kawakami, N., Takatsuka, N., & Shimizu, H. (2004). Sleep disturbance and onset of type 2 diabetes. *Diabetes Care*, *27*(1), 282-283.

Khazaei, F., Khazaei, O., & Ghanbari-H, B. (2017). Positive psychology interventions for internet addiction treatment. *Computers in Human Behavior*, *72*, 304-311.

Kim, K., Uchiyama, M., Okawa, M., Liu, X., & Ogihara, R. (2000). An epidemiological study of insomnia among the Japanese general population. *Sleep*, *23*(1), 41-47.

Kronholm, E., Partonen, T., Laatikainen, T., Peltonen, M., Härmä, M., Hublin, C., ... & Valve, R. (2008). Trends in self- reported sleep duration and insomnia- related symptoms in Finland from 1972 to 2005: A comparative review and re- analysis of Finnish population samples. *Journal of Sleep Research*, *17*(1), 54-62.

Kronholm, E., Partonen, T., Laatikainen, T., Peltonen, M., Härmä, M., Hublin, C., ... & Valve, R. (2008). Trends in self- reported sleep duration and insomnia- related symptoms in Finland from 1972 to 2005: a comparative review and re- analysis of Finnish population samples. *Journal of Sleep Research*, *17*(1), 54-62.

Kurniasih, N. (2017). Internet addiction, lifestyle or mental disorder? A phenomenological study on social media addiction in Indonesia. *KnE Social Sciences*, 135-144.

Kuss, D. J., & Griffiths, M. D. (2015). Internet addiction: A real addiction?. In *Internet Addiction in Psychotherapy* (pp. 54-104). London: Palgrave Pivot.

Kuss, D. J., & Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. *World Journal of Psychiatry*, *6*(1), 143-176.

Kuss, D. J., Griffiths, M. D., & Binder, J. F. (2013). Internet addiction in students: prevalence and risk factors. *Computers in Human Behavior, 29*(3), 959–966

Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014). Internet addiction: a systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design, 20,* 4026–4052.

Lam, L. T. (2014). Internet gaming addiction, problematic use of the internet, and sleep problems: a systematic review. *Current Psychiatry Reports*, *16*(4), 444.

Lam, L. T., Peng, Z. W., Mai, J. C., & Jing, J. (2009). Factors associated with Internet addiction among adolescents. *Cyberpsychology & Behavior*, *12*(5), 551-555.

Lan, Y., Ding, J. E., Li, W., Li, J., Zhang, Y., Liu, M., & Fu, H. (2018). A pilot study of a group mindfulness-based cognitive-behavioral intervention for smartphone addiction among university students. *Journal of Behavioral Addictions*, *7*(4), 1171-1176.

Lancaster, L. C., & Stillman, D. (2003). *When generations collide: Who they are, why they clash, how to solve the generational puzzle at work*. New York, NY: HarperBusiness.

Lange, K., Cohrs, S., Skarupke, C., Görke, M., Szagun, B., & Schlack, R. (2017). Electronic media use and insomnia complaints in German adolescents: gender differences in use patterns and sleep problems. *Journal of Neural Transmission*, *124*(1), 79-87.

Leger, D., Guilleminault, C., Dreyfus, J. P., Delahaye, C., & Paillard, M. (2000). Prevalence of insomnia in a survey of 12 778 adults in France. *Journal of Sleep Research*, *9*(1), 35-42.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). Social Media & Mobile Internet Use among Teens and Young Adults. Millennials. *Pew internet & American life project*.

Leung, L. (2004). Net-generation attributes and seductive properties of the internet as predictors of online activities and internet addiction. *CyberPsychology & Behavior*, *7*(3), 333-348.

Li, J., Lau, J. T. F., Mo, P. K. H., Su, X., Tang, J., Qin, Z., & Gross, D. L. (2017). Insomnia partially mediated the association between problematic internet use and depression among secondary school students in China. *Journal of Behavioral Addictions*, *6*(4), 554-563.

Liu, X., & Zhou, H. (2002). Sleep duration, insomnia and behavioral problems among Chinese adolescents. *Psychiatry Research*, *111*(1), 75-85.

López, A. T., Sánchez, M. E. G., Torres, F. G., Ramírez, M. P. N., & Olivares, M. V. S. (1995). Yeo, B. K., Perera, I. S., Kok, L. P., & Tsoi, W. F. (1996). Insomnia in the community. *Singapore Med J*, *37*(3), 282-284.

Mak, Y. W., Wu, C. S. T., Hui, D. W. S., Lam, S. P., Tse, H. Y., Yu, W. Y., & Wong, H. T. (2014). Association between screen viewing duration and sleep duration, sleep quality, and excessive daytime sleepiness among adolescents in Hong Kong. *International Journal of Environmental Research and Public Health*, *11*(11), 11201-11219.

McCrindle Research. (2006). *New generations at work: Attracting, recruiting, retraining and training Generation Y*. Sydney, Australia: McCrindle Research. www.tanz.ac.nz/pdf/NewGenerations AtWork.pdf

Means, M. K., Edinger, J. D., Glenn, D. M., & Fins, A. I. (2003). Accuracy of sleep perceptions among insomnia sufferers and normal sleepers. *Sleep Medicine*, *4*(4), 285-296.

Morin, C. M., & Espie, C. A. (2004). *Insomnia: a clinical guide to assessment and treatment*. New York, USA: Kluwer Academic Publisher.

Morin, C. M., Bootzin, R. R., Buysse, D. J., Edinger, J. D., Espie, C. A., & Lichstein, K. L. (2006). Psychological and behavioral treatment of insomnia: update of the recent evidence (1998–2004). *Sleep*, *29*(11), 1398-1414.

Nakaya, A. C. (2015). *Internet and social media addiction*. San Diego, California: Reference Point Press.

Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: A cause of concern. *Cyberpsychology & Behavior*, *6*(6), 653-656.

National Sleep Foundation. (2002). "Sleep in America" Poll. https://sleepfoundation.org/sites/default/files/2002SleepInAmericaPoll.pdf

Niemz, K., Griffiths, M., & Banyard, P. (2005). Prevalence of pathological Internet use among university students and correlations with self-esteem, the General Health Questionnaire (GHQ), and disinhibition. *CyberPsychology & Behavior*, *8*(6), 562–570.

Nilsson, P. M., Nilsson, J. Å., Hedblad, B., & Berglund, G. (2001). Sleep disturbance in association with elevated pulse rate for prediction of mortality–consequences of mental strain?. *Journal of Internal Medicine*, *250*(6), 521-529.

Nursalam, N., Octavia, M., Tristiana, D. & Efendi, F. (2018). Association between insomnia and social network site use in Indonesian adolescents. *Nursing Forum*, 1-8.

Nursalam, N., Octavia, M., Tristiana, R. D., & Efendi, F. (2019, April). Association between insomnia and social network site use in Indonesian adolescents. *Nursing Forum*, *54*(2), 149-156.

Nuutinen, T., Roos, E., Ray, C., Villberg, J., Välimaa, R., Rasmussen, M., ... & Tynjälä, J. (2014). Computer use, sleep duration and health symptoms: a cross-sectional study of 15-year olds in three countries. *International Journal of Public Health*, *59*(4), 619-628.

Ohayon, M. (1996). Epidemiological study on insomnia in the general population. *Sleep*, *19*(suppl_3), S7-S15.

Ohayon, M. M., & Hong, S. C. (2002). Prevalence of insomnia and associated factors in South Korea. *Journal of Psychosomatic Research*, *53*(1), 593-600.

Palfrey, J. G., & Gasser, U. (2011). *Born digital: Understanding the first generation of digital natives*. ReadHowYouWant. com.

Pallesen, S., Nordhus, I. H., Nielsen, G. H., Havik, O. E., Kvale, G., Johnsen, B. H., & Skjøtskift, S. (2001). Prevalence of insomnia in the adult Norwegian population. *Sleep*, *24*(7), 771-779.

Paska, L.M., & Yan, Z. (2011). Internet addiction in adolescence and emerging adulthood: A comparison between the United States and China. In H.O. Price. (Ed.). *Internet addiction*. New York: Nova Science Publishers

Peltzer, K., & Pengpid, S. (2019). Prevalence, social and health correlates of insomnia among persons 15 years and older in Indonesia. *Psychology, Health & Medicine,* 1–12.

Peukert, P., Sieslack, S., Barth, G., & Batra, A. (2010). Internet- and computer game addiction: Phenomenology, comorbidity, etiology, diagnostics and therapeutic implications for the addictives and their relatives. *Psychiatrische Praxis*, 37, 219–224.

Poli, R., & Agrimi, E. (2012). Internet addiction disorder: prevalence in an Italian student population. *Nordic Journal of Psychiatry*, *66*(1), 55–59.

Prasetyo, A. S., Soemarko, D. S., & Kusumadewi, I. (2018). Prevalence of insomnia symptoms and predictive factors among employees at central government. *Journal of Physics: Conference Series*, 1073(4), 042016.

Prensky, M. (2001) "Digital natives, digital immigrants Part 1", *On the Horizon*, *9*(5), 1-6.

Prensky, M., & Berry, B. D. (2001). Do they really think differently. *On the Horizon*, *9*(6), 1-9.

Randler, C., Wolfgang, L., Matt, K., Demirhan, E., Horzum, M. B., & Beşoluk, Ş. (2016). Smartphone addiction proneness in relation to sleep and morningness–eveningness in German adolescents. *Journal of Behavioral Addictions*, *5*(3), 465-473.

Reilley, P. (2012). Understanding and teaching generation Y. english teaching Forum, Number 1, 1-4. Mexico. https://americanenglish.state.gov/files/ae/resource_files/reilly_understanding_and_teaching_generation_y.pdf

Roth, T. (2007). Insomnia: Definition, prevalence, etiology, and consequences. *Journal of Clinical Sleep Medicine: Official Publication of the American Academy of Sleep Medicine*, *3*(5 Suppl), S7.

Salbiah, N. A. (2018, Maret 12). Indonesia tempati angka tertinggi insomnia di Asia, apa penyebabnya? *JawaPos.com.* retrieved from dari https://www.jawapos.com/kesehatan/health-issues/12/03/2018/indonesia-tempati-angka-tertinggi-insomnia-di-asia-apa-penyebabnya/.

Shonin, E., Van Gordon, W., & Griffiths, M. D. (2014). Mindfulness as a treatment for behavioural addiction. *Journal of Addiction Research & Therapy*, *5*(1), 1000e122-1000e123.

Simen, S., Hajak, G., Schlaf, G., Westenhöfer, J., Rodenbeck, A., Bandelow, B., ... & Rüther, E. (1995). Chronification of sleep disorders. Results of a representative survey in West Germany. *Der Nervenarzt*, *66*(9), 686-695.

Siomos, K. E., Dafouli, E. D., Braimiotis, D. A., Mouzas, O. D., & Angelopoulos, N. V. (2008). Internet addiction among Greek adolescent students. *CyberPsychology & Behavior*, *11*(6), 653-657.

Ström, L., Pettersson, R., & Andersson, G. (2004). Internet-based treatment for insomnia: a controlled evaluation. *Journal of Consulting and Clinical Psychology*, *72*(1), 113.

Sutton, D. A., Moldofsky, H., & Badley, E. M. (2001). Insomnia and health problems in Canadians. *Sleep*, *24*(6), 665-670.

Syamsoedin, W. K. P., Bidjuni, H., & Wowiling, F. (2015). Hubungan durasi penggunaan media sosial dengan kejadian insomnia pada remaja di sma negeri 9 manado. *Jurnal Keperawatan*, *3*(1), 1-10.

Tagaya, H., Uchiyama, M., Ohida, T., Kamei, Y., Shibui, K., Ozaki, A., ... & Takahashi, K. (2004). Sleep habits and factors associated with short sleep duration among Japanese high-school students: a community study. *Sleep and Biological Rhythms*, *2*(1), 57-64.

Tahiroglu, A. Y., Celik, G. G., Uzel, M., Ozcan, N., & Avci, A. (2008). Internet use among Turkish adolescents. *CyberPsychology & Behavior*, *11*(5), 537-543.

Tamura, H., Nishida, T., Tsuji, A., & Sakakibara, H. (2017). Association between excessive use of mobile phone and insomnia and depression among Japanese adolescents. *International Journal of Environmental Research and Public Health*, *14*(7), 701.

Tao, R., Huang, X., Wang, J., Zhang, H., Zhang, Y., & Li, M. (2010). Proposed diagnostic criteria for internet addiction. *Addiction*, *105*(3), 556-564.

Taylor, D., Gehrman, P., Dautovich, N. D., Lichstein, K. L., & McCrae, C. S. (2014). Clinical features of insomnia. In D. Taylor, P. Gehrman, N.D. Lichstein, C.S. McCrae. (Eds.). *Handbook of Insomnia* (pp. 1-9). Springer Healthcare, Tarporley.

The Ministry of Communication and Information. (2014). 98 persen anak dan remaja tahu internet. https://kominfo.go.id/index.php/content/detail/3836/98+Persen+Anak+dan+Remaja+Tahu+Internet/0/berita_satker

Vgontzas, A. N., Liao, D., Bixler, E. O., Chrousos, G. P., & Vela-Bueno, A. (2009). Insomnia with objective short sleep duration is associated with a high risk for hypertension. *Sleep*, *32*(4), 491-497.

Watkins, S. C. (2009). *The young and the digital: What the migration to social-network sites, games, and anytime, anywhere media means for our future*. Boston: Beacon Press.

Whang, L. S. M., Lee, S., & Chang, G. (2003). Internet over-users' psychological profiles: a behavior sampling analysis on internet addiction. *Cyberpsychology & Behavior*, *6*(2), 143-150.

Winkler, A., Dörsing, B., Rief, W., Shen, Y., & Glombiewski, J. A. (2013). Treatment of internet addiction: A meta-analysis. *Clinical Psychology Review*, *33*(2), 317-329.

Yang, C. K. (2001). Sociopsychiatric characteristics of adolescents who use computers to excess. *Acta Psychiatrica Scandinavica*, *104*(3), 217-222.

Yang, C. K., Kim, J. K., Patel, S. R., & Lee, J. H. (2005). Age-related changes in sleep/wake patterns among Korean teenagers. *Pediatrics*, *115*(Supplement 1), 250-256.

Yao, Y. W., Chen, P. R., Chiang-shan, R. L., Hare, T. A., Li, S., Zhang, J. T., ... & Fang, X. Y. (2017). Combined reality therapy and mindfulness meditation decrease intertemporal decisional impulsivity in young adults with Internet gaming disorder. *Computers in Human Behavior*, *68*, 210-216.

Yen, C. F., Ko, C. H., Yen, J. Y., & Cheng, C. P. (2008). The multidimensional correlates associated with short nocturnal sleep duration and subjective insomnia among Taiwanese adolescents. *Sleep*, *31*(11), 1515-1525.

Yeo, B. K., Perera, I. S., Kok, L. P., & Tsoi, W. F. (1996). Insomnia in the community. *Singapore Med J*, *37*(3), 282-284.

Yong S., T., & Gates, P. (2014). Born digital: Are they really digital natives?. *International Journal of e-ducation, e-Bussiness, e-Management and e-Learning*, *4*(2), 102-105.

Younes, F., Halawi, G., Jabbour, H., Osta, N. E., Karam, L., Hajj, A., & Khabbaz, L. R. (2016). Internet addiction and relationships with insomnia, anxiety, depression, stress, and self-esteem in university students: A cross sectional designed study. *Journal of Pharmacy*, *11*(9), 1-13.

Young, K. S. (1996). Internet addiction: The emergence of a new clinical disorder. *Cyber Psychology and Behavior*, *3*, 237–244.

Young, K. S. (1998a). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & behavior*, *1*(3), 237-244.

Young, K. S. (1998b). *Caught in the net: How to recognize the signs of internet addiction--and a winning strategy for recovery*. New York: John Wiley & Sons.

Young, K. S. (2017). The evolution of Internet addiction disorder. In *Internet addiction* (pp. 3-18). New York: Springer, Cham.

Young, K. S., & Abreu, C. N. D. (2011). *Internet addiction: A handbook and guide to evaluation and treatment.* New Jersey, USA: John Wiley & Sons, Inc.

Young, K.S., Yue, X.D. & Ying, L. (2011) Prevalence estimates and etiologic models of internet addiction. In K.S. K. S. Young, & C.N.D. Abreu. D. (Eds.). *Internet addiction: A handbook and guide to evaluation and treatment.* New Jersey, USA: John Wiley & Sons, Inc.

Zeitlhofer, J., Rieder, A., Kapfhammer, G., Bolitschek, J., Skrobal, A., Holzinger, B., ... & Kunze, M. (1994). Epidemiology of sleep disorders in Austria. *Wiener klinische Wochenschrift*, *106*(3), 86-88.

Zhang, M. W., Tran, B. X., Hinh, N. D., Nguyen, H. L. T., Tho, T. D., Latkin, C., & Ho, R. C. (2017). Internet addiction and sleep quality among Vietnamese youths. *Asian Journal of Psychiatry*, *28*, 15-20.