Original Article

Virtual Social Networks Addiction and High-Risk Group among Health Science Students in Iran: A Latent Class Analysis

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Abstract

Background and Purpose: Virtual social networks (VSNs) are among the most popular communication paths that have become an integral part of most people's lives, including students. This study aimed to investigate the prevalence of VSNs addiction and their related factors, and identify the patterns of addictive-related factors among the students in Kerman, Iran in 2019.

Materials and Methods:This cross-sectional study was conducted on 400 students from Kerman University of Medical Sciences. The study instrument was a standardized questionnaire. Descriptive analysis, logistic regression models, and latent class analysis were used to analyze the data. The data were analyzed using SPSS26, Stata12 and WinLTA (v. 3.1) software.

Results: 50% of the participants were male, staying in dormitory. The number of individuals in the levels of education in the four groups was equal. Around 0.5% of the students were addicted and 36.5% were at the risk of addiction to VSNs. The most commonly used VSNs was the Telegram (76.8%), and most students (28.8%) spent between 2-3 hours a day on VSNs. In the multivariate model, using 1-2 hours (AOR = 3.33, 95% CI: 1.07 - 10.19), 2-3 hours (AOR = 7.33, 95% CI: 2.50 - 21.52) and more than 3 hours a day (AOR = 18.54, 95% CI: 6.05 - 56.8) of VSNs were associated with an increased odds of being at the risk of VSNs addiction. The Latent Class Analysis showed that high-risk addictive factors including using Telegram for entertainment, providing accommodation in the dormitory, and having a graduate degree significantly influenced the classification.

Conclusion: More than one-third of Kerman college students were found to be at the risk of VSNs addiction. Providing appropriate interventions including alternative activities as well as raising knowledge especially for undergraduate students is urgently needed.

***Keywords*:** Social Networks; Internet Addiction Disorder; Students; Prevalence; Latent Class Analysis

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1. *Introduction*

During recent years, the overuse of the Internet and virtual social networks (VSNs) has turned into a public health concern especially among youth (1). It is estimated that in 2018, 2.65 billion people were using social media globally, and the number increased to 3.1 billion in 2021. (2). The increasing number of Internet users has resulted in a variety of social and health problems including the rising prevalence of VSNs addiction (3).

Internet addiction is described as the situation in which the use of the Internet and VSNs becomes addictive and problematic for the users (4, 5). Goldberg in 1996 defined Internet addiction based on the DSM-IV criteria of addiction. According to this definition, having at least three of the following criteria over a period of 12 months could be considered as Internet addiction: These criteria are tolerance, withdrawal, lack of control, recurrence, prolonged Internet use, negative social and personal consequences, and continued use without taking into account the resulting problems (6).

University students are supposed to be a group which is at higher risk of Internet addiction. Most students use the VSNs as the main route of interpersonal communication (7). Telecommunication, exchange of education materials and handouts, establishing social relations, having fun, and getting amused are the main benefits of using these networks among students (8). However, overuse of the Internet and addiction to VSNs may negatively affect the academic performance of students. Furthermore, adverse health consequences including overweight and obesity, sleep disorders, depression, neurological disorders (9, 10), behavioral problems (11, 12), and impaired interpersonal relationships are more common among VSNs addicted students (13). In a meta-analysis conducted on medical students of various countries, the prevalence of the Internet addiction reported to be 30.1% (14). The results of a national study conducted among Iranian students indicated that 24.5% of university students were addicted to the Internet (15). In another study conducted in Qom, Iran, the prevalence of Internet addiction among medical students was estimated to be 28.7% (16).

According to Statista, the monthly number of active social media users is 3.02 billion globally, which is about one-third of the world's entire population (17). A Smart Insights study in October 2021, revealed that nearly half (57.6%) of the global population were active on social media. This equals roughly 3.5 billion people. The study further suggested that this number has been growing since 2018 by an average of 9% annually (288 million) (18). The average person spends 2 hours and 32 minutes on social media per day. American teens hold the record with 9 hours on average per day spent browsing through various social media (19). In Iran, approximately 40 million individuals were active social media users in 2018, which showed an increase equal to 135%, and resulted in Iran being ranked fourth in the world after China, India, and Indonesia (20).

However, by the emergence and widespread use of new VSNs, such as WhatsApp and Telegram, during recent years, it is expected that more students to be exposed to VSNs addiction. Therefore, in this research, we studied the prevalence of addiction to VSNs, its related factors, and attempted to identify the patterns of

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addictive-related factors viva LCA among students in Kerman University of Medical Sciences.

2. *Materials and Methods*

This cross-sectional study was conducted at Kerman University of Medical Sciences, Kerman, Iran in 2019. According to a study conducted by Naseri et al. in 2015, the prevalence of the Internet use was found to be 53% (p) (21). With a 95% confidence level (Z = 1.96), an error of 0.1p (d = 0.1×0.5), the minimum sample size for this study was also estimated to be 383 people. Considering the participants' attrition, the sample size was considered to be 400 students voluntarily participating in the study using non-random sampling method. The study was conducted on campus and the questionnaires were filled out face-to-face.

A two-part questionnaire, including demographic information and VSNs_questionnaire, was used to collect the data. The validity and reliability of this questionnaire have already been confirmed in Iran (5). The VSNs questionnaire has 14 items which are assessed on a 5-grade Likert scale ("never = 1, slightly = 2, moderate = 3, high = 4 and very high =5" for questions 1 to 5 and "never =1, rarely = 2, sometimes =3, most often = 4 and always =5" for questions 6 to 14). The total score of the questionnaire ranges from 14 to 70, the range 14-33 shows no addiction to VSNs, 34-52 shows the ones at risk, and 53-70 shows addiction to VSNs (5).

Descriptive analysis (frequencies and percentages for categorical variables and mean and standard deviation (SD) for continuous variables), logistic regression models, and latent class analysis (LCA) were used to analyze the data. All independent variables were entered into the univariable, and variables with a p-value less than 0.2 were entered into the multivariable model. Sex, education, type of VSNs, and daily hours of VSN use were adjusted variables. The crude odds ratio (OR) and Adjusted OR (AOR) were calculated. P-value<0.05 was considered as the significant level. For AOR, the Bakward Method was used

The LCA divides the observed characteristics in heterogeneous populations into more homogeneous subtypes (22). Gender, degree (master and higher degrees), staying in a dormitory, having entertainment, using Telegram for three hours or more were used for definition of class. The G2, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) statistics were used to select the best model. The lower BIC and AIC score signals a better model (23). Item response probabilities of above 0.5 were used to label each latent class and describe its characteristics (24). The data were analyzed using SPSS 26, Stata12, and WinLTA (v. 3.1) Software.

The informed written consent was obtained from all recruited students. The ethics committee of Kerman University of Medical Sciences reviewed and approved the study protocol (Ethic approval Cod: IR.KMU.REC.1396.1806).

3. *Results*

Fifty percent of the participants were males staying in dormitories, and 100 participants were in each educational level. The main purpose of using VSNs among students was to be entertained (%60). 115 of the students (%28.75) used social networks for 2-3 hours a day, and the most common VSNs was Telegram (%76.75).

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Overall, 63% of the students (n = 252) were non-addicted to VSNs, 36.5 % (n = 146) were at the risk of addiction, and just 0.5% of them (n = 2) were addicted to VSNs. The prevalence of being at risk of VSNs addition was significantly higher among students who used Instagram (50%), and who used VSNs more than one hour a day. The prevalence was lower among girls (30.5% vs. 42.5%), PhD students (5% vs.50% in undergraduates), and the students who used VSNs mainly for learning (25% vs. 44.2%), WhatsApp users were less than other VSN users? (18.2%) compared to other VSNs (Table1).

Table1. Characteristic of medical science students (n=400) categorized by status of addiction to virtual social networks, 2019

Variable		Total N = 400		Not at risk of VSNs addiction N = 252		At risk of VSNs addiction N = 146		Bivariate Logistic Regression		Multivariate Logistic Regression	
		Frequency	Column %	Frequency	Row %	Frequency	Row %	Crude OR	95% Confidence interval	Adjusted OR	95% Confidence interval
Sex	Male	200	50.0	113	56.5	85	42.5	1	--	[a]--	--
	Female	200	50.0	139	69.5	61	30.5	0.67	(0.44, 1.03)	0.75	**(0.46, 1.22)**
Accommodation status	Dormitory	200	50.0	128	64.0	72	36.0	1	--	--	--
	Personal house	200	50.0	124	62.0	74	37.0	1.04	(0.66, 1.63)	--	--
Level of current education	Under Graduate	100	25.0	49	49.0	50	50.0	1	--	--	--
	Masters	100	25.0	58	58.0	42	42.0	0.59	(0.33, 1.05)	0.73	**(0.39, 1.36)**
	Medicine	100	25.0	51	51.0	48	48.0	.81	(0.46, 1.42)	0.92	**(0.49, 1.70)**
	PhD	100	25.0	95	95.0	5	5.0	0.06	(0.02, 0.16)	0.10	**(0.03, 0.29)**
Type of VSNs	Telegram	307	76.75	202	65.8	104	33.9	1	--	1	--
	WhatsApp	11	2.75	9	81.8	2	18.2	0.24	(0.03, 1.91)	0.18	**(0.02, 1.69)**
	Instagram	70	17.5	34	48.6	35	50	2.15	(1.26, 3.65)	1.67	**(0.91, 3.05)**
	Others	12	3.0	7	58.3	5	41.7	1.72	(0.53, 5.56)	1.39	**(0.38, 5.13)**
Daily hours of use	≤3	293	73.25	219	69.2	74	32.70	1	--	1	--
	3>	107	26.75	33	30.8	72	67.30	7.50	(4.59, 12.25)	5.24	**(3.11, 8.83)**
Main purpose of use	Hobby	240	60.0	133	55.4	106	44.2	1	--	--	--
	Education/Learning	160	40.0	119	74.4	40	25	0.55	(0.34, 0.89)	--	--

a: Excluded from final model

To preform the logistic regression analysis, we merged the stdudents who were addicted to VSNs and were at the risk of addiction to VSNs to be in the same category. In the multivariable model, using more than 3 hours a day (AOR = 5.24, 95% CI: 3.11 – 8.83) of VSNs compared to less than 3 hours a day was associated with an increased odds of being at risk of VSNs addiction. However, being a PhD student (AOR = 0.09, 95% CI: 0.03 - 0.26) was statistically and significantly associated with decreased odds of being at risk of VSNs addiction (Table 1).

Six binary variables were used to perform the LCA. To select the best model, an LCA was conducted from class one to seven (Table 2). The best model was chosen based on the G2, BIC, and AIC values, as well as the interpretability of the models. Finally, the 4-class model that had the lowest values was selected as the final model. The classes of the model are presented in Table 3. According to this table, the first class which experienced low risk, comprised around 42% of the students. Also, the second class (27%), third class (18%), and fourth class (13%) were at moderate downward-risk, moderate upward-risk, and high risk, respectively.

Latent class 1, very low risk, was characterized by a low probability of risk living in a dormitory and using Telegram, and latent class 4, high risk, was characterized by the high probability of all addictive factors. There were also two other latent classes that reflected different patterns of addictive factors. Latent class 2 at moderate downward-risk was

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characterized by the high probability of Male Gender and using for three hours or more. Latent class 3 at moderate upward risk was also characterized by the high probability of having a master's and higher degree, using for entertainment and, using of Telegram.

Table 2. Comparing information of different LCA[a] models in student, 2019 (n = 400)

Number of classes	Df	AIC[b]	BIC[c]	aBIC[d]	G2	Entropy	Maximum log-odds
1	57	81.59	81.59	73.23	69.52	1.00	-172.37
2	50	61.76	84.35	43.64	35.76	0.95	-155.45
3	43	67.00	101.75	39.12	27.00	0.88	-151.04
4	36	73.24	120.16	35.61	19.24	0.86	-147.19
5	29	83.20	142.28	35.81	15.20	0.82	-145.17
6	22	93.14	164.39	35.99	11.14	0.85	-143.14
7	15	106.66	190.07	39.76	10.66	0.87	-142.91

4. Discussion

The results of this study showed that more than one-third of medical science students in Kerman, Iran were at the risk of addiction to VSNs. Increasing the daily duration of VSNs use was associated with the increased odds of addiction. Four classes were defined by the LCA Method for addictive factors. The descriptive statistics of each class and their characteristics are shown in the table.

It was found that around one out of three students was at risk of addiction to VSNs, which is slightly higher than the prevalence reported by national and international studies. The result of a study in Myanmar, 2017, showed that 27.5% of the students were addicted to the Internet (25). In a study conducted on Chinese students in 2009, the prevalence of addiction to VSNs was estimated at 34% (26). A meta-analysis of descriptive studies in Iran revealed that 20% of the Iranian general population were addicted to the Internet and 26% were at the risk of Internet addiction. In that study, the prevalence of the Internet addiction among students was estimated to be 23 % (27). In another study in 2012, in Kerman, Iran, 21% of the students were addicted to the Internet (28). The difference between the results of the current study and previous studies in Iran could be because of the fact that previous studies were conducted before the advent of new VSNs (including Telegram and WhatsApp), and before the extensive use of smartphones.

The most common VSNs used by students was Telegram. Moreover, most of the students at the risk of addiction were using the Telegram. In line with our findings, the results of two previous studies conducted on Iranian students indicated that Telegram was the most common VSNs used (29, 30). Telegram is a very popular messenger with high level of security (31, 32). This messenger has some specific features that make it more applicable than other messengers. This messenger is used to send text messages (plain text messages) and non-textual messages (for the exchange of data of any kind, including contact information, geographical coordinates, various files, and etc.). In this VSN, each user has a unique ID that is related to the phone number of the individual. Each user can optionally specify a username that allows other users to find it through their telegram search. The secret chat in the telegram is

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one of the unique features of this messenger. The secret chat is a type of chat that is encrypted and is lost at the pre-specified time by the user. Creating and managing the channels and group and voice calls are other features of this messenger that has increased the popularity of the Telegram among users (32).

In the current study, most people spent 2-3 hours a day on virtual social networks. The result of a study conducted in Yazd, Iran indicated that 50% of university students were using social networks for 2-3 hours a day, and 14% of them were using such networks more than four hours a day (30). The average usage of social networks was 1.7 hours a day in the United States in 2015, 1.5 hours per day in the United Kingdom, and the highest daily usage rate was 3.7 in the Philippines. The use of VSNs has become one of the most important leisure activities of individuals, and it allows them to use it regardless of the time and place constraints (33). However, we showed that an increase in the hours of VSNs use significantly increased the chance of addiction to the Internet. The relationship between the amount of time spent on the Internet and increased chance of addiction to it has been proven in various studies. It seems that similar to other types of addiction, due to the phenomenon of tolerance, many users may gradually increase the use of VSNs to achieve the desired effect (27, 34).

In this study, the prevalence of VSNs use was lower among female participants (30.5% vs. 42.5%). Males has been repeatedly claimed to be a risk factor for Internet addiction (35, 36). Serval previous investigations showed that males had a higher prevalence of mild and severe Internet addiction than females (37-39). The higher prevalence of Internet addiction in boy students may be due to less limitation and supervision from parents. Furthermore, boys have more skill to use the Internet and they have more tendency to use it (40). Also, this could be because males experience higher motivational drives than females in Internet use, rendering them more likely to learn reward values (41). In the present study, in line with the results of a study conducted by ElSalhy in Japan in 2019 (42), it was found that having a higher level of education significantly decreased the chance of addiction to VSNs.

In our study, using the LCA Model, four classes of addiction to VSNs were presented as including low risk, moderate downward-risk, moderate upward-risk, and high risk. The high-risk latent class was characterized by the high probability of risk for males, living in dormitory, having master's and higher degrees, using VSNs for three hours or more, using them for entertainment purposes, and using Telegram. Lee et al. in 2018, used the LCA Model for the classification of the Internet and smartphone-related problems among adolescents. Four subtypes were identified: dual-problem users, problematic Internet users, problematic smartphone users, and “healthy” users. 49.5% of the participants were diagnosed described by dual-problem that had scored the highest for addictive behaviors and other psychopathologies (43).

Our findings were subject to several limitations: Because of the cross-sectional nature of the study, it was not possible to investigate the causality. While acknowledging the limitations of the study, it was also asserted that there were very few studies in Iran about VSNs

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addiction among young people and students, and most studies have only addressed the Internet addiction and were conducted before the advent of VSNs. So, the findings could be used to design comprehensive interventions to prevent VSNs addiction among youth. Moreover, the anonymous nature of data collection may bring about higher validity of the responses.

With the advent of innovative VSNs and the increasing use of these networks among young people, policies and resources should be urgently directed toward the prevention of VSNs addiction in this population. Providing appropriate infrastructures for alternative activities as well as raising knowledge and targeting significant people including peers, teachers, parents, and colleagues are the keys for this purpose. Since most Internet addiction is among dormitory students and in connection with Telegram and VSNs, most students use them to fill their free time. It is necessary to take interventions to fill students' free time and prevent their addiction to the Internet and other VSNs.

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Conflicts of interest

None declared.

References

1. Luna-Cortés G, López-Bonilla JM, López-Bonilla LM. Self-congruity, social value, and the use of virtual social networks by generation y travelers. Journal of Travel Research. 2019;58(3):398-410.
2. Clement J. Number of global social network users 2010-2021 2019 [Available from: https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/.
3. Tateno M, Teo AR, Ukai W, Kanazawa J, Katsuki R, Kubo H, Kato TA. Internet Addiction, Smartphone Addiction, and Hikikomori Trait in Japanese Young Adult: Social Isolation and Social Network. Front Psychiatry. 2019 Jul 10;10:455.
4. Chebbi P, Koong KS, Liu L, Rottman, R. Some Observations on Internet Addiction Disorder Research. Journal of Information Systems Education. 2000; 11(3-4): 97-104.
5. Torkian S, Shahesmaeili A, Malekmohammadi N, Khosravi V. Content Validity and Test-Retest Reliability of a Questionnaire to Measure Virtual Social Network Addiction Among Students. International Journal of High Risk Behaviors and Addiction. 2020;9(1):e92353.
6. Kim K, Ryu E, Chon M-Y, Yeun E-J, Choi S-Y, Seo J-S, Nam B-W. Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: A questionnaire survey. International Journal of Nursing Studies. 2006;43(2):185-92.
7. Heiberger G, Harper R. Have you Facebooked Astin lately? Using technology to increase student involvement. New directions for student services. 2008;2008(124):19-35.
8. Rahman SHA. Can't live without my FB, LoL: The influence of social networking sites on the communication skills of TESL students. Procedia-Social and Behavioral Sciences. 2014;134:213-9.
9. Kim SH, Baik S-H, Park CS, Kim SJ, Choi SW, Kim SE. Reduced striatal dopamine D2 receptors in people with Internet addiction. Neuroreport. 2011;22(8):407-11.
10. Kühn S, Gallinat J. Brains online: structural and functional correlates of habitual Internet use. Addiction biology. 2015;20(2):415-22.
11. Sun P, Johnson CA, Palmer P, Arpawong TE, Unger JB, Xie B, Rohrbach LA, Spruijt-Metz D, Sussman S. Concurrent and predictive relationships between compulsive Internet use and substance use: Findings from vocational high school students in China and the USA. International Journal of Environmental Research and Public Health. 2012;9(3):660-73.

[DOI: 10.18502/jhs.v10i1.9105]

12. Lam LT, Peng Z, Mai J, Jing J. The association between internet addiction and self-injurious behaviour among adolescents. Injury prevention. 2009;15(6):403-8.
13. Krueger RA. Focus groups: A practical guide for applied research: Sage publications; Fifth Edition, 2014; 117-18.
14. Zhang MWB, Lim RBC, Lee C, Ho RCM. Prevalence of Internet Addiction in Medical Students: a Meta-analysis. Academic Psychiatry. 2018;42(1):88-93.
15. Poorolajal J, Mohammadi Y, Soltanian AR, Ahmadpoor J. The top six risky behaviors among Iranian university students: a national survey. Journal of public health (Oxford, England). 2019;41(4):788-97.
16. Mohammadbeigi A, Valizadeh F, Mirshojaee SR, Ahmadli R, Mokhtari M, Ghaderi E, et al. Self-rated Health and Internet Addiction in Iranian Medical Sciences Students; Prevalence, Risk Factors and Complications. International journal of biomedical science. 2016;12(2):65-70.
17. Statista. Social media - Statistics & Facts 2021 [updated Feb 25, 2021. Available from: https://www.statista.com/topics/1164/social-networks/.
18. Chaffey D. Global social media statistics research summary 2022 2021 [updated 06 Dec, 2021. Available from: https://www.smartinsights.com/social-media-marketing/social-media-strategy/new-global-social-media-research/.
19. FAMEMASS. Latest Social Media Addiction Statistics of 2021 [NEW DATA] 2021 [Available from: https://famemass.com/social-media-addiction-statistics/.
20. Alimoradi Z, Lin C-Y, Imani V, Griffiths MD, Pakpour AH. Social media addiction and sexual dysfunction among Iranian women: The mediating role of intimacy and social support. Journal of behavioral addictions. 2019;8(2):318-25.
21. Naseri L, Mohamadi J, Sayehmiri K, Azizpoor Y. Perceived Social Support, Self-Esteem, and Internet Addiction Among Students of Al-Zahra University, Tehran, Iran. Iranian journal of psychiatry and behavioral sciences. 2015;9(3):e421.
22. Ale-Ebrahim J, Janani L, SeyedAlinaghi SA, Farhoudi B, Abbasi-Ghahramanloo A, Sajadipour M, Motevalian SA. Patterns of high-risk behaviors associated with HIV among male prisoners: A latent class analysis. Medical Journal of The Islamic Republic of Iran. 2020;34(1):747-51.
23. Ward EJ. A review and comparison of four commonly used Bayesian and maximum likelihood model selection tools. Ecological Modelling. 2008;211(1-2):1-10.
24. Abbasi-Ghahramanloo A, Janani L, Malakouti SK, Rabetian M, Rimaz S. Risk taking behaviors in relation to Attention Deficit and Hyperactivity Disorder in Iranian male workers: a latent class analysis. Neuropsychiatric disease and treatment. 2019;15:2513.
25. Win KS, Maung TM, Win TT, Soe K, Sein TT. Social network addiction related to anxiety among students at Kyaukse University, Mandalay Region, Myanmar. South East Asia Journal of Public Health.7(1):23-8.
26. Wan C. Gratifications & Loneliness as Predictors of Campus-Sns. The Chinese University of Hong Kong, Hong Kong. 2009.
27. Modara F, Rezaee-Nour J, Sayehmiri N, Maleki F, Aghakhani N, Sayehmiri K, Rezaei-Tavirani M. Prevalence of Internet Addiction in Iran: A Systematic Review and Meta-analysis. Addiction and Health. 2018;9(4):243-52.
28. Mazhari S. The prevalence of problematic internet use and the related factors in medical students, Kerman, Iran. Addiction & health. 2012;4(3-4):87.
29. Salehi Omran E, Azizi Shomami M, Keshavarz K. The Relationship between Internet Addiction and Depression among Secondary Secondary School Students in Kordkuwi with Emphasis on the Type of Virtual Network. Journal of Education and Community Health. 2018;5(1):12-9.
30. Khazir Z, Abdolkarimi M, Rahimi T. Assessing the Predictors of Intention and Behavior in Using Virtual Social Networks Among Students of the Yazd University of Medical Sciences Based on the Theory of Planned Behavior. Journal of Community Health Research. 2017;6(2):93-101.
31. Wu S, Zhang Y, Wang X, Xiong X, Du L. Forensic analysis of WeChat on Android smartphones. Digital investigation. 2017;21:3-10.

[DOI: 10.18502/jhs.v10i1.9105]

32. Anglano C, Canonico M, Guazzone M. Forensic analysis of telegram messenger on android smartphones. Digital Investigation. 2017;23:31-49.
33. Kuss DJ, Griffiths MD. Social networking sites and addiction: Ten lessons learned. International journal of environmental research and public health. 2017;14(3):311.
34. Wang H, Zhou X, Lu C, Wu J, Deng X, Hong L. Problematic Internet use in high school students in Guangdong Province, China. PloS one. 2011;6(5):e19660.
35. Leung L, Lee PS. The influences of information literacy, internet addiction and parenting styles on internet risks. New media & society. 2012;14(1):117-36.
36. Tsai HF, Cheng SH, Yeh TL, Shih C-C, Chen KC, Yang YC, Yang YK. The risk factors of Internet addiction—a survey of university freshmen. Psychiatry research. 2009;167(3):294-9.
37. Ko C-H, Yen J-Y, Yen C-F, Chen C-S, Chen C-C. The association between Internet addiction and psychiatric disorder: a review of the literature. European Psychiatry. 2012;27(1):1-8.
38. Adiele I, Olatokun W. Prevalence and determinants of Internet addiction among adolescents. Computers in Human Behavior. 2014;31:100-10.
39. Mak K-K, Lai C-M, Watanabe H, Kim D-I, Bahar N, Ramos M, and et al. Epidemiology of internet behaviors and addiction among adolescents in six Asian countries. Cyberpsychology, Behavior, and Social Networking. 2014;17(11):720-8.
40. Asghari BA. Relationship between internet addiction and dependency virtual social networks with loneliness in adolescents. Journal of Research and Health. 2018;8(5):442-50.
41. Xin M, Xing J, Pengfei W, Houru L, Mengcheng W, Hong Z. Online activities, prevalence of Internet addiction and risk factors related to family and school among adolescents in China. Addictive Behaviors Reports. 2018;7:14-8.
42. ElSalhy M, Miyazaki T, Noda Y, Nakajima S, Nakayama H, Mihara S, et al. Relationships between Internet addiction and clinicodemographic and behavioral factors. Neuropsychiatric disease and treatment. 2019;15:739.
43. Lee S-Y, Lee D, Nam CR, Kim DY, Park S, Kwon J-G, et al. Distinct patterns of Internet and smartphone-related problems among adolescents by gender: Latent class analysis. Journal of behavioral addictions. 2018;7(2):454-65.

[DOI: 10.18502/jhs.v10i1.9105]