Prevalence and related factors of internet addiction among undergraduate university students in Ethiopia. A community university-based cross-sectional study

Yosef Zenebe (✉ yosef.zenebe79@gmail.com)

Wollo University <https://orcid.org/0000-0002-0138-6588>

Kunuya Kunno

Wollo University

Meseret Mekonnen

Wollo University

Ajebush Bewuket

Wollo University

Mengesha Birkie

Wollo University

Mogesie Necho

Wollo University

Muhammed Seid

Wollo University

Million Tsegaw

Wollo University

Baye Akele

Wollo University

Primary research

Keywords: Internet addiction, Mental disorders, Students, Ethiopia

Posted Date: May 12th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-27380/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background Globally, more than three billion people use the internet daily with young people being the most common users. Internet addiction among university students in Ethiopia has not been studied.

Objectives The main objective of this study was to assess the prevalence and related factors of internet addiction among Wollo university students in Ethiopia.

Methods A community university-based cross-sectional study was conducted among Wollo University students from April 10 to May 10, 2019. A total of six hundred three students were participated in the study using a pilot tested and self-administered structured questionnaire. A multistage cluster sampling was adopted for this study. In the first stage, by the use of lottery method, two colleges (College of medicine and health sciences, and College of natural sciences, and one school (school of law)) were selected. In the second stage, 18 departments were selected from the colleges and school. The Young's Internet Addiction Test instrument was used to assess the level of internet addiction.

Results Generally, the prevalence of internet addiction (IA) among the current internet users was 85% (n=466) with 55.7%(n=305) mild internet addiction, 27.9% (n=153) moderate internet addiction and 1.5% (n= 8) severe internet addiction. In multivariable logistic regression analysis, spending more time on the internet (adjusted odds ratio (AOR) = 10.13, 95%CI: 1.33-77.00)), having mental distress (AOR = 2.69, 95%CI: 1.02-7.06), playing online games (AOR = 2.40, 95%CI: 1.38-4.18), current khat chewing (AOR = 3.34, 95%CI: 1.14-9.83) and current alcohol use (AOR = 2.32, 95%CI: 1.09-4.92) were positively related to internet addiction. Using the internet for more than twelve months (AOR = 0.42, 95%CI: 0.18-0.96) and using the internet by mobile internet (AOR = 0.40, 95%CI: 0.20-0.83) were negatively related to internet addiction.

Conclusions The current study documents a high prevalence of internet addiction among Wollo University students. Factors independently associated with internet addiction were using the internet greater than five hours daily, having mental distress, playing online games, current khat chewing and current alcohol use. So, we advise that higher institutions should establish prevention programs focus on educating students about emotional regulation skills and the harmful effects of substance use to minimize internet addiction.

Background

Globally, more than three billion people use the Internet daily with young people being the most common users (1). In the field of medicine and healthcare, it helps in the practice of evidence-based medicine, research and learning, access to medical and online databases, handling patients in remote areas, and academic and recreational purposes(2, 3). Relaxed access and social networking are two of the several aspects of the Internet development of addictive behaviour(4). Internet addiction in puberty can negatively impact personality information and may negatively affect cognitive functioning, lead to poor academic performance and engagement in hazardous activities, and inculcate poor dietary habits (5). Problematic internet use is also related to anxiety and stress(6). It has been found that paranoid ideation, hostility, anxiety, depression, interpersonal sensitivity, and obsessive-compulsive average scores are higher in people with high internet addiction scores than those without internet addiction(7, 8).

College students are especially susceptible to developing a dependence on the Internet, more than most other segments of society. This can be qualified to numerous factors including the following: Availability of time; ease of use; unlimited access to the Internet; the psychological and developmental characteristics of young adulthood; limited or no parental supervision; an expectation of Internet/computer use covertly if not obviously, as some courses are Internet-dependent, from assignments and projects to link with peers and mentors; the Internet offering a way of escape from exam anxiety, age, making new friendships online, getting into relationships online, being sexual inactive, failure in academic performance, gender, low self-esteem, anxiety, depression, insomnia, attention deficient disorder and hyperactivity symptoms, smoking, visiting pornographic sites, playing online games and potential addictive personal habits of, drinking alcohol or coffee, and taking drugs, duration of internet use and mental distress (9–18).

Internet addiction is now becoming a serious mental health problem among Chinese adolescents. The researchers identified 10.6–13.6% of Chinese college students as Internet addicts(19, 20) .A study conducted among Taiwan college students reported that the prevalence of Internet addiction was 15.3% (17).

The prevalence of problematic internet use (PIU) was greater among university students. For instance, the prevalence was 36.9 to 81% in Malaysian medical students(21, 22), 16.8% in American medical students(10), 25.1% in American community university students(23), 40.7% in Iranian university students(24), 38.2–63.5% IA in Japanese university students(14, 25), 16.8% IA in Lebanon University students (10), 35.4% IA in Nepal undergraduate students(16),40% IA in Jordan University students (15),19.85–42% IA in various parts of India (11, 13, 18), 12% IA to 34.7% (PIU) in Greek University students (12), 1.6% IA in Turkey students (26). Internet addiction among university students in Ethiopia has not been studied. The current study aims to explore the prevalence and related factors of internet addiction among undergraduate university students in Ethiopia.

Methods And Materials

Study area and period

The study was done at Wollo University, Dessie campus that is found in South Wollo Zone, Amhara Regional State which is 401 kilometres far from Addis Ababa, Northeastern Ethiopia. It had 5 colleges and 2 schools and a total of 62 departments. The number of regular students in 2018/2019 is 7248; among these 4009 are males and 3239 are females. The study was conducted from April 10 to May 10/ 2019. The sample size was determined using single population proportion formula, taking 50% prevalence of internet addiction with the following assumption: 95% CI, 5% margin of error, 10% non-response rate and a design effect of 1.5. So, the final sample size was 603.

Sampling technique and procedure

A multistage cluster sampling technique was adopted for this study. In the first stage, by the use of lottery method, two colleges (College of medicine and health sciences, and College of natural sciences, and one

school (school of law)) were selected. In the second stage, 18 departments (9 from college of medicine and health science, 8 from college of natural science and 1 from school of law) were selected. Students were selected proportionally from the given departments based on the number of students of a particular.

Study design

A community university-based cross-sectional study was carried out to assess the prevalence and related factors of internet addiction among undergraduate students at Wollo University, Amhara Region, Ethiopia. Age of participants ranges from 18 to 30 years.

Study instruments

Self-administered, well-structured and organized English version questionnaire was disseminated to students and data were collected from the individual student. The questionnaire comprised six parts, the first part consisted of socio-demographic details, the second part consists of Young's Internet Addiction Test (YIAT). The Internet Addiction Test(27) is the most commonly used measure of Internet addiction(28). It includes 20 questions with a scoring of 1–5 for each question and a total maximum score of 100. Based on scoring subjects would be classified into normal users (0–30), mild (31–49), moderate (50–79) and severe (80–100) internet addiction groups. Mild addiction, moderate addiction, and severe addiction were considered as having an internet addiction (29–31). YIAT20 showed that it is more reliable in University students. The Generally Cronbach α in the present study was 0.89, the third part time-related factors, the fourth part reasons for internet use, the fifth part psychoactive substance use-related factors and the last part mental health problem-related factors and it was assessed by Kesler10. The Kessler Psychological Distress Scale (K10)(32) is a simple measure of psychological distress. The K10 scale involves 10 questions about emotional states each with a five-level response scale. The measure can be used as a brief screen to identify levels of distress. Scores will range from 10 to 50. A score under 20 is likely to be well, a score of 20–24 is likely to have a mild mental disorder, a score of 25–29 are likely to have a moderate mental disorder and a score of 30 and over are likely to have a severe mental disorder. Study participants with a score of 20 or more points on the Kesler-10 Likert scale were considered as having mental distress(33).

Data quality control

A structured self-administered questionnaire was developed in English and would be translated to Amharic language and again translated back into English to ensure consistency. Data collectors and supervisors would be trained for two days on the objective of the study, the content of the questionnaire and the data collection procedure. Data would be pilot tested on 5% of the total sample size outside the study area and based on feedback obtained from the pilot test, the necessary modification would be done. During the study period, the collected data would be checked continuously daily for completeness by principal investigator and supervisor in the respective departments.

Data processing and analysis

Quantitative data would be cleaned, coded and entered into Epi-data 3.1 and exported to SPSS version 25 for analysis. Descriptive data would be presented by a table, graphs, charts, and means. Multicollinearity was checked by using standard error and there was no correlation between independent variables. The association between independent variables and internet addiction would be made using a binary logistic regression model and all independent variables having p-value ≤ 0.25 would be included in multiple logistic regression models. A P-value less than 0.05 and Adjusted Odds Ratio (AOR) with 95% Confidence Interval (CI) not inclusive of one would be considered as statically significant and would be used to determine predictors of internet addiction in the final model. Hosmer-Lemeshow test was done to check model fitness and the model was fit.

Results

Socio-demographic characteristics of study participants

A total of 603 respondents were participated in this study, of them 548 providing information which makes a response rate of 90.9%. However, fifty-five (n = 55) participants were excluded.

The mean age of the respondents was 21.4 (SD 1.8) years, ranging from 18 to 30 years, and also more than half of, 291 (53.1%) of respondents were males. Likewise, 245 (44.7%) of the respondents attending the place of worship daily. Many of the study participants had a practice of using the internet for more than twelve months, 321 (58.6%). About 501 (91.4%), 268 (48.9%), 433 (79%) were using the internet less than five hours per day, most common mode of internet access Wi-Fi and log in and off occasionally during the day respectively. The study participants with current khat use, current cigarette smoking, current alcohol use, and current cannabis use were 19.0%, 11.3%, 25.4%; and 4.0% respectively. About 19.3% of the participants had mental distress (Table 1).

Prevalence of Internet addiction

The frequency of IA was 466 (85%) of them 305(55.6%), 153(27.9%), 8(1.5%) mild, moderate and severe internet addiction respectively. Nevertheless, the remaining 82 (15%) are free from internet addiction (Fig. 1).

Participants who login permanently had a greater figure of addiction of the internet than those who log in and off occasionally during the day (92.2% versus 83.1%). Those who used the internet for about six months had a greater prevalence of internet addiction than those who used greater than twelve months (91.6% versus 84.1%) (Table 2).

Factors related to internet addiction

On univariable analysis, internet addiction was associated with using the internet for more than 12 months (OR = 0.49; CI: 0.24–0.96). Those who were using the internet for more than 5 hours per day were more likely to develop internet addiction than those who were using less than 5 hours (OR = 8.87; CI: 1.21–65.25). Mode of internet access was related to internet addiction i.e. those who used mobile

internet were 45% lower risks of having internet addiction than those who used data cards (OR = 0.55; 95% CI: 0.28–1.07). Those who were permanently online were most likely to have internet addiction than those who were not (OR = 2.39; 95% CI: 1.16–4.93). Study participants who played mobile games online were more likely to develop internet addiction than those who were not played mobile games (OR = 2.67; 95% CI: 1.57–4.52). Those who downloaded music or videos were higher risks of having internet addiction than those who didn't (OR = 1.62; 95% CI: 1.00-2.61). Study participants who watched video online were most likely to have internet addiction than those who didn't watch (OR = 1.94; 95% CI: 1.21–3.12). Those who chewed khat currently were higher odds of having internet addiction than those who were not (OR = 5.33; 95% CI: 1.90-14.91). Those who smoked cigarettes currently were more likely to have internet addiction than their counterparts (OR = 12.20; 95% CI: 1.67–89.28). Those who used alcohol currently were greater risks of having internet addiction than those who hadn't (OR = 2.76; 95% CI: 1.38–5.51). Study participants who had mental distress were four times more likely to develop internet addiction than those who didn't have mental distress (OR = 4.26; 95% CI: 1.68–10.81) (Table 2).

In the final model, spending more time on the internet, having mental distress, playing online games, current khat chewing and current alcohol use were positively related to internet addiction. Using the internet for more than twelve months and using the internet by mobile internet were negatively related with internet addiction (Table 2).

Reasons for internet use among Wollo University students

The furthestmost frequent reasons for IA among Wollo University undergraduate students were using the internet for courses / assignments (93.6%), for social networks (Facebook, etc.)(85.6%), for reading / posting news (76.6%), for getting into relationships online (66.6%),for playing mobile games(44.5%), for downloading music or videos (65.7%), for watching videos (57.8%),for retrieving sexual information (22.8%), for chat rooms (47.6%) and for e-mail (reading, writing) (49.8%) (Fig. 2).

Discussions

The current study documents a high prevalence of internet addiction among Wollo University students. In the final model, factors independently associated with internet addiction were spending more time on the internet, having mental distress, playing online games, current khat chewing and current alcohol use.

The prevalence of internet addiction in the present study was higher than the prevalence of internet addiction that was done in different universities such as three medical schools across three countries 49.7% (31), Malaysian 36.9–81% (21, 22), American medical students 16.8%(10), American community 25.1% (23), Iran 12.5 to 40.7%(24, 34, 35), Japan 63.5%(25), Greek 12–30.1%(30, 36), Jordan 40% (15), Lebanon 16.8% (10), Nepal 35.4% (16) and north India 25.3% (18). The discrepancy might be due to the cut-off point of YIAT-20, instrument difference, mental health policy, cultural difference like time utilization, the difference in study participants such as in our study the participants were from two colleges and one school, and all participants were internet users, sample size and the time difference

between the studies. The study in Malaysian University was conducted among medical students only and focusing on mild internet addiction and moderate internet addiction and not on severe internet addiction.

In our study spending more time on the internet were 10 times more likely to develop internet addiction than those who are spending less time. The finding of this study in line with similar studies done on college students in Taiwan and three medical schools across three countries (17, 31). The possible explanation for the association between Internet usage time and Internet addiction is that it might be as much a symptom as it is a cause. However, this study design was cross-sectional and no causal relationship can be clarified, further studies ought to examine whether Internet usage time is an essential factor for determining Internet addiction. Likewise, students who had mental distress were 2.7 times more likely to develop internet addiction as compared to their counterparts. Study findings in these areas showed that students who had mental distress were related to higher levels of internet addiction than students who hadn't mental distress (10, 13–15, 18, 26). This could be due to the Khantzian's(37) self-medication hypothesis, indicating that mentally distressed university students might come to rely on the Internet as a method for coping with their mental distress. Hence, they will devote more and more time on the Internet and headway toward addiction if their mental distress symptoms are not cured(38).

Students who had playing online games were 2.4 times higher to have internet addiction than their counterparts. A similar finding was also reported in Greek University(12, 30). Furthermore, students who chewed khat currently were three times most likely to develop internet addiction than students who reported no current khat chewing which is in line with the study finding in Greek University students (12). In this study, students who drank alcohol currently were 2.3 times most likely to have internet addiction as compared with students who didn't drink alcohol.

Other studies reported a similar finding (12). Probable reasons involve either common forerunner factors that encourage liability to the co-occurrence between drug use or the existence of other personal habits/dependencies and internet addiction, and that they represent different conditions along a spectrum of related disorders of addiction. Nevertheless, susceptibility factors relating to internet addiction and substance use disorders persist obscure. This coexistence of internet addiction with other personal habits/dependencies is a similar pattern to that observed in the coexistence of pathological gambling and substance abuse. Though this comparison might be unequal, it is valuable to pull upon it as an example, to pursue aetiological factors(39).

Students who used the internet by mobile internet were 60% of lower risks of having internet addiction as compared to those students who used data cards. This might be due to inadequate finance to use the internet on mobile internet. So, the students may refrain from using the internet through mobile internet. Students who used the internet for more than 12 months were 52% less likely to have internet addiction than their counterparts. The current finding is not supported by other studies in the world. The alpha inflation from multiple testing. Another limitation is that the analysis did not account for the complex sampling strategy in adjusting the standard errors.

Conclusions

The current study documents a high prevalence of internet addiction among Wollo University students. Factors independently associated with internet addiction were using the internet greater than five hours daily, having mental distress, playing online games, current khat chewing and current alcohol use. So, we advise that higher institutions should establish prevention programs focus on educating students about emotional regulation skills and the harmful effects of substance use to minimize internet addiction.

Abbreviations

ADHD: Attention deficit hyperactivity disorder; CGPA: Cumulative grade point average; CI: Confidence interval; DSM_V: Diagnostic and statistical manual fifth edition; IA: Internet addiction; PIU: Problematic internet use; SPSS: Statistical package for social science; YIAT: Young's internet addiction test.

Declarations

Ethics approval and consent to participate

The study was conducted after getting ethical clearance from Wollo University College of medicine and health science institutional review board. A formal letter of permission was obtained from the student service directorate of Wollo University. The respondents were informed about the aim of the study. Confidentiality and privacy of the respondents were maintained. Written consent was obtained from each participant before administering the questionnaire.

Consent for publication

Not applicable

Availability of data and materials

The dataset supporting the conclusions of this article is available with the corresponding author and will be made available on reasonable request.

Competing interests

The authors report no conflicts of interest in this work

Funding

Not applicable

Authors' contributions

YZ and KK designed and supervised the study, carried out the analysis, and interpreted the data; **MM, AB, MB, MNA, MS, MT and BA** assisted in the design, analysis, and interpretation of the data; and **YZ** wrote the manuscript. All authors contributed toward data analysis, drafting and critically revising the paper and agree to be accountable for all aspects of the work.

Acknowledgments

We thank the Department of Psychiatry, College of Medicine and Health Sciences, Wollo University for supporting the research in different ways. We extend our heartfelt thanks to the student service directorate office for providing us the necessary information. We are grateful to all the students who participated in the study.

Author Information

1. Yosef Zenebe, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: zenebe79@gmail.com or yosef.zenebe@wu.edu.et
2. Kunuya Kunno, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: kunuyak@gmail.com
3. Meseret Mekonnen, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: meseretm202@gmail.com
4. Ajebush Bewuket, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: wllthanabt@gmail.com
5. Mengesha Birkie, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: mengeshasun@gmail.com
6. Mogesie Necho, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: nechomoges2014@gmail.com
7. Muhammed Seid, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: wusmndahn2008@gmail.com
8. Million Tsegaw, Department of Psychiatry, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: milliontse2@gmail.com
9. Baye Akele, Department of Pharmacy, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia. Email: bayebusam@gmail.com

References

1. Bremer J. The internet and children: advantages and disadvantages. *Child and Adolescent Psychiatric Clinics*. 2005;14(3):405-28.
2. Swaminath G. Internet addiction disorder: fact or fad? Nosing into nosology. *Indian journal of Psychiatry*. 2008;50(3):158.
3. Dargahi H, Razavi S. Internet addiction and its related factors: A study of an Iranian population. 2007.
4. Kuss DJ, Griffiths MD. Online social networking and addiction—a review of the psychological literature. *International journal of environmental research and public health*. 2011;8(9):3528-52.
5. Pfaff DW, Volkow ND. *Neuroscience in the 21st century: from basic to clinical*: Springer; 2016.
6. Panicker J, Sachdev R. Relations among loneliness, depression, anxiety, stress and problematic internet use. *International Journal of Research in Applied, Natural and Social Sciences*. 2014;2(9):1-10.
7. Xiuqin H HZ, Mengchen L, Jinan W, Ying Z, Ran T. . Mental health, personality, and parental rearing styles of adolescents with Internet addiction disorder. . *Cyberpsychol Behav Soc Netw* 2010;13(4):401-6.
8. Alavi SS AH, Maracy MR, Jannatifard F, Eslami M, Ferdosi M. Impact of addiction to internet on a number of psychiatric symptoms in students of Isfahan universities, Iran,. *Int J Prev Med* 2012;3;(2):122-7.
9. Kandell JJ. Internet addiction on campus: The vulnerability of college students. *Cyberpsychology & behavior*. 1998;1(1):11-7.
10. Younes F, Halawi G, Jabbour H, El Osta N, Karam L, Hajj A, et al. Internet addiction and relationships with insomnia, anxiety, depression, stress and self-esteem in university students: A cross-sectional designed study. *PloS one*. 2016;11(9):e0161126.
11. Krishnamurthy S, Chetlapalli SK. Internet addiction: Prevalence and risk factors: A cross-sectional study among college students in Bengaluru, the Silicon Valley of India. *Indian journal of public health*. 2015;59(2):115.
12. Frangos CC, Frangos CC, Sotiropoulos I. Problematic internet use among Greek university students: an ordinal logistic regression with risk factors of negative psychological beliefs, pornographic sites, and online games. *Cyberpsychology, Behavior, and Social Networking*. 2011;14(1-2):51-8.
13. Gedam SR, Ghosh S, Modi L, Goyal A, Mansharamani H. Study of internet addiction: Prevalence, pattern, and psychopathology among health professional undergraduates. *Indian Journal of Social Psychiatry*. 2017;33(4):305.
14. Kitazawa M, Yoshimura M, Murata M, Sato-Fujimoto Y, Hitokoto H, Mimura M, et al. Associations between problematic Internet use and psychiatric symptoms among university students in Japan. *Psychiatry and clinical neurosciences*. 2018;72(7):531-9.
15. Al-Gamal E, Alzayyat A, Ahmad MM. Prevalence of I nternet Addiction and Its Association With Psychological Distress and Coping Strategies Among University Students in J ordan. *Perspectives in*

- psychiatric care. 2016;52(1):49-61.
16. Bhandari PM, Neupane D, Rijal S, Thapa K, Mishra SR, Poudyal AK. Sleep quality, internet addiction and depressive symptoms among undergraduate students in Nepal. *BMC psychiatry*. 2017;17(1):106.
 17. Lin M-P, Ko H-C, Wu JY-W. Prevalence and psychosocial risk factors associated with Internet addiction in a nationally representative sample of college students in Taiwan. *Cyberpsychology, Behavior, and Social Networking*. 2011;14(12):741-6.
 18. Gupta A, Khan AM, Rajoura O, Srivastava S. Internet addiction and its mental health correlates among undergraduate college students of a university in North India. *Journal of family medicine and primary care*. 2018;7(4):721.
 19. Chou C, Hsiao M-C. Internet addiction, usage, gratification, and pleasure experience: the Taiwan college students' case. *Computers & Education*. 2000;35(1):65-80.
 20. Yang T, Yu L, Oliffe JL, Jiang S, Si Q. Regional contextual determinants of internet addiction among college students: a representative nationwide study of China. *The European Journal of Public Health*. 2017;27(6):1032-7.
 21. Ching SM, Awang H, Ramachandran V, Lim S, Sulaiman W, Foo Y, et al. Prevalence and factors associated with internet addiction among medical students-A cross-sectional study in Malaysia. *Med J Malaysia*. 2017;72(1):7-11.
 22. Haque M, Rahman NAA, Majumder MAA, Haque SZ, Kamal ZM, Islam Z, et al. Internet use and addiction among medical students of Universiti Sultan Zainal Abidin, Malaysia. *Psychology research and behavior management*. 2016;9:297.
 23. Jelenchick LA, Becker T, Moreno MA. Assessing the psychometric properties of the Internet Addiction Test (IAT) in US college students. *Psychiatry research*. 2012;196(2-3):296-301.
 24. Bahrainian SA, Alizadeh KH, Raeisoon M, Gorji OH, Khazaei A. Relationship of Internet addiction with self-esteem and depression in university students. *Journal of preventive medicine and hygiene*. 2014;55(3):86.
 25. Tateno M, Teo AR, Shirasaka T, Tayama M, Watabe M, Kato TA. Internet addiction and self-evaluated attention-deficit hyperactivity disorder traits among Japanese college students. *Psychiatry and clinical neurosciences*. 2016;70(12):567-72.
 26. Seyrek S, Cop E, Sinir H, Ugurlu M, Şenel S. Factors associated with Internet addiction: Cross-sectional study of Turkish adolescents. *Pediatrics international*. 2017;59(2):218-22.
 27. Young KS. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & behavior*. 1998;1(3):237-44.
 28. Frangos CC, Frangos CC, Sotiropoulos I, editors. A meta-analysis of the reliability of young's internet addiction test. *Proceedings of the World Congress on Engineering; 2012: World Congress on Engineering London, United Kingdom*.
 29. Young KS. Internet addiction test. *Center for on-line addictions*. 2009.

30. Tsimtsiou Z, Haidich A-B, Spachos D, Kokkali S, Bamidis P, Dardavesis T, et al. Internet addiction in Greek medical students: an online survey. *Academic Psychiatry*. 2015;39(3):300-4.
31. Balhara YPS, Gupta R, Atilola O, Knez R, Mohorović T, Gajdhar W, et al. Problematic internet use and its correlates among students from three medical schools across three countries. *Academic Psychiatry*. 2015;39(6):634-8.
32. Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, et al. Screening for serious mental illness in the general population. *Archives of general psychiatry*. 2003;60(2):184-9.
33. Andrews G, Slade T. Interpreting scores on the Kessler psychological distress scale (K10). *Australian and New Zealand journal of public health*. 2001;25(6):494-7.
34. Arbabisarjou A, Gorgich EAC, Barfroshan S, Ghoreishinia G. The Association of Internet Addiction with Academic Achievement, Emotional Intelligence and Strategies to Prevention of them from Student's Perspectives. *International Journal of Humanities and Cultural Studies (IJHCS)* ISSN 2356-5926. 2016;3(1):1656-66.
35. Gorgich EAC, Moftakhar L, Barfroshan S, Arbabisarjou A. Evaluation of internet addiction and mental health among medical sciences students in the southeast of Iran. *Shiraz E Medical Journal*. 2018;19(1).
36. Frangos CC FC, Sotiropoulos I. A meta-analysis of the reliability of young's internet addiction test. . A meta-analysis of the reliability of young's internet addiction test. *WCE*. 2012;1:368-71.
37. Khantzian EJ. The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard review of psychiatry*. 1997;4(5):231-44.
38. Yen J-Y, Ko C-H, Yen C-F, Wu H-Y, Yang M-J. The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of adolescent health*. 2007;41(1):93-8.
39. Hall GW, Carriero NJ, Takushi RY, Montoya ID, Preston KL, Gorelick DA. Pathological gambling among cocaine-dependent outpatients. *American Journal of psychiatry*. 2000;157(7):1127-33.

Tables

Table 1: Sociodemographic characteristics of study participants in Ethiopia, 2019 (n=548)

	Variables	Frequency	Percentage
Age	Below mean	205	37.4
	Above mean	343	62.6
Sex	Male	291	53.1
	Female	257	46.9
Frequency of attending a place of worship	Daily	245	44.7
	2-3 times per week.	144	26.3
	Once a week.	70	12.8
	Less than weekly.	59	10.8
	Never	30	5.5
Internet use experience (in months)	0 to 6 months	131	23.9
	6 to 12 months	96	17.5
	12 or more months	321	58.6
Internet use per day (in hours)	Less than 5 hours	501	91.4
	Greater than or equal to 5 hours	47	8.6
The most common mode of Internet access	Wi-Fi	268	48.9
	Broadband	16	2.9
	Mobile internet	124	22.6
	Data card	140	25.5
Login status	Log in and off occasionally during the day	433	79.0
	Permanently online	115	21.0
Current Khat chewer	Yes	104	19.0
	No	444	81.0
Current cigarette smoker	Yes	62	11.3
	No	486	88.7
Current alcohol Drunker	Yes	139	25.4
	No	409	74.6
Current cannabis use	Yes	22	4.0
	No	526	96.0

Mental Distress	Yes	106	19.3
	No	442	80.7

Table 2: Multivariable analysis of factors related to Internet addiction among undergraduate university students in Ethiopia, 2019 (n=548)

Variables		Internet addiction		COR (95% CI.)	AOR (95% CI.)	P-value
		Yes; N (%)	No; N (%)			
Frequency of attending a place of worship	Daily	204(83.3%)	41(16.7%)	1	1	
	2-3 times per week.	123(85.4%)	21(14.6%)	1.18(0.67, 2.09)		
	Once a week.	58(82.9%)	12(17.1%)	0.97(0.48, 1.97)		
	Less than weekly.	53(89.8%)	6(10.2%)	1.78(0.72, 4.40)		
	Never	28(93.3%)	2(6.7%)	2.81(0.65, 12.28)		
Internet use experience (in months)	0 to 6 months	120(91.6%)	11(8.4%)	1	1	
	6 to 12 months	76(79.2%)	20(20.8%)	0.35(0.16, 0.77)	0.42(0.18, 0.96)	0.040*
	12 or more months	270(84.1%)	51(15.9%)	0.49(0.24, 0.96)	0.48(0.24, 0.99)	0.046*
Internet use per day (in hours)	Less than 5 hours	420(83.8%)	81(16.2%)	1	1	
	Greater than or equal to 5 hours	46(97.9%)	1(2.1%)	8.87(1.21, 65.25)	10.13(1.33, 77.00)	0.025*
Most common mode of Internet access	Wi-Fi	230(85.8%)	38(14.2%)	0.84(0.45, 1.54)	0.84(0.44, 1.60)	0.596
	Broadband	14(87.5%)	2(12.5%)	0.97(0.20, 4.63)	0.84(0.16, 4.35)	0.834
	Mobile internet	99(79.8%)	25(20.2%)	0.55 (0.28, 1.07)	0.40(0.20, 0.83)	0.014*
	Data card	123(87.9%)	17(12.1%)	1	1	
Login status	Log in and off occasionally during the day	360(83.1%)	73(16.9%)	1	1	
	Permanently online	106(92.2%)	9(7.8%)	2.39(1.16, 4.93)		
Getting into relationships online	Yes	318(87.1%)	47(12.9%)	1.60 (0.99, 2.58)		
	No	148(80.9%)	35(19.1%)	1	1	
Playing mobile games	Yes	223(91.4%)	21(8.6%)	2.67(1.57, 4.52)	2.40(1.38, 4.18)	0.002*
	No	243(79.9%)	61(20.1%)	1	1	
Downloading music or videos	Yes	314(87.2%)	46(12.8%)	1.62(1.00, 2.61)		
	No	152(80.9%)	36(19.1%)	1	1	
Watching videos	Yes	281(88.6%)	36(11.4%)	1.94(1.21, 3.12)		
	No	185(80.1%)	46(19.9%)	1	1	
For retrieving sexual information	Yes	112(89.6%)	13(10.4%)	1.68(0.90, 3.15)		
	No	354(83.7%)	69(16.3%)	1	1	
Chat rooms	Yes	228(87.4%)	33(12.6%)	1.42(0.88, 2.29)		
	No	238(82.9%)	49(17.1%)	1	1	
Current Khat chewer	Yes	100(96.2%)	4(3.8%)	5.33(1.90, 14.91)	3.34(1.14, 9.83)	0.028*
	No	366(82.4%)	78(17.6%)	1	1	
Current cigarette smoker	Yes	61(98.4%)	1(1.6%)	12.20(1.67, 89.28)		
	No	405(83.3%)	81(16.7%)	1	1	
Current alcohol Drunker	Yes	129(92.8%)	10(7.2%)	2.76 (1.38, 5.51)	2.32(1.09, 4.92)	0.029*
	No	337(82.4%)	72(17.6%)	1	1	
Mental Distress	Yes	101(95.3%)	5(4.7%)	4.26(1.68, 10.81)	2.69(1.02, 7.06)	0.045*
	No	365(82.6%)	77(17.4%)	1	1	

Figures

Figure 1

Internet addiction by severity among undergraduate university students in Ethiopia, 2019 (n =548)

Figure 2

Reasons for internet use among undergraduate university students in Ethiopia, 2019 (n=548)