

Internet utilization for health information and its associated factors among undergraduate students in Addis Ababa University, Ethiopia - A cross sectional study

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Abstract

Background: Utilization of Internet is critical to retrieve health information particularly for countries where health care delivery system is incongruent with its population otherwise it could be difficult to address all health problems of the people with limited health professionals. This study sought to determine the magnitude of the Internet use for health information and its associated factors.

Objective: The aim of this study was to assess the status of Internet utilization to access health information and its associated factors among the undergraduate students in Addis Ababa University, Ethiopia.

Methods: A facility based cross-sectional study was conducted among 845 undergraduate students who were selected by Stratified multi-stage sampling from 19 randomly selected departments of Addis Ababa University. Data were collected from March to April 2019 using a pretested structured interviewer-administered questionnaire. The data were entered in to Epi-Info version 7 and exported to the SPSS version 23 for analysis. A binary logistic regression analysis was conducted to assess the association between the study and outcome variables.

Result: Almost all 761 (98.8%) of the University students have ever used the Internet for general purposes. Among these the proportion of Internet use, about 59.1% (95% CI: 55.5-62.7) of them used the Internet for health information. Adjusting for all other factors in the final model, Digital health literacy (AOR=1.656, 95% CI: (1.143, 2.397), field of study (AOR= 0.025, 95% CI: (0.007, 0.087), year of study (AOR= 1.609, 95% CI: (1.130, 2.290), and computer device ownership (AOR= 2.314, 95% CI: (1.392, 3.844) were found to be significantly associated with the Internet use for health information.

Conclusion: The proportion of Internet use for health information was found to be lower. Digital health literacy, being health science student, year of study and computer ownership were found to be important predictors.

Background

The Internet is a global network of networks that enables computers of all kinds to directly and transparently communicate throughout the world; it affords healthcare practitioners unique access to huge volume, high quality, current and relevant health care information{Ajuwon, 2015 #11;Omotayo, 2006 #2}. Among currently available technologies only the Internet has the potential to deliver universal access to up-to-date health care information. The number of Internet users has been dramatically increased worldwide it reaches an estimated 3.89 billion people and this growth has represented a seven fold increase from the year 2000 to 2015[1]. In the year 2011, about 88% of the US people use the Internet service which is considerably high compared to 55% in the year 2000. More than 100,000 websites distribute health information globally[2].

In the meantime Governments and stakeholders across the continent are vigorously extracting new and innovative methods of safeguarding basic healthcare services like introduction of the ICT in the educational program, due to its ability to serve as a medium in addressing the health issues of its consumers regardless of its place, provided there is Internet access available [3]. Even though evidence suggests that recent advancements and infiltrations of ICT have resulted in use of the Internet for health information purposes in Sub-Saharan Africa, few studies have examined these developments, however using internet for health purpose in Ethiopia is still not studied [4]. Based on the Internet world statistics December 2017, Ethiopia has an Internet

penetration rate of 15.3%, while African average penetration rate is 35.2 % [5]. Findings shows that population structure of the country is below 30 years which is estimated to be 71% who has frequent exposure for the Internet even though there is no findings which show the exact figure of the Internet users for health information in the country [6]. Despite a rapid increment of the Internet use, its use to retrieve health and health related information is very limited. Findings show the number of the Internet users has been dramatically increased worldwide. By June 2017, the total number of Internet users worldwide had nearly four billion people with a cover rate of nearly 52%, however only 50 million people worldwide need health information online which is very few compared to the total number of the Internet users [7].

Ethiopia is possessing about 9% of African population, but it accounts only less than 1% of African Internet access [8]. In terms of density of healthcare staff, Ethiopia ranked in the lowest quintile among African nations with 0.3 physicians and 2 nurses per 10, 000 population [9]. There is also a problem of uneven distribution of the limited health staff among and within localities and an incorrect use of available skill, resulted in a major increase in human resources for health. With the health extension workers, Ethiopia had 11 health workers per 10, 000 population by 2011[10]. 144 hospitals, 3547 health centers and 16440 health posts in 2015, which is incongruent with the rapidly growing population, so that this study investigated that the Internet can be used as a source for health information [11].

Access to basic health service has been the goal of the ministry of health which is the basic right of every Ethiopian. However certain factors serving as difficulties to meet this goal, they include the inadequate number of health care professionals to citizen ratio, misuse of funds and brain drain the so-called migration of health workers to developed countries [9]. Therefore, devising strategies to alleviate the health concerns of the society is very important to yield healthy society which in turn facilitates the growth of the country, since building a healthy society is a prerequisite for development of the country and one of the strategy to handle the problem effectively could be by enabling the society to use the Internet as a source of health information in addition to visiting health facility for every moment which in turn save time, money and energy of the population [12].

Currently, the Ministry of Health of Ethiopia has adopted eHealth strategies to improve the healthcare delivery system of the country and its application brings promising results [13]. A preliminary situation assessment indicates that eHealth initiatives in Ethiopia is characterized as small-scale, duplication of efforts isolated and unable to effectively communicate with each other [14].

Now a days, FMOH has advocating information use in the health care industries which is one of the element of transformation agenda [15]. This study was aimed to investigate the ways in which the Internet can contribute to the country's health care delivery approach, using regular undergraduate students at the University level.

Methods

The study was conducted in Addis Ababa University (AAU). The University is established in 1950. This makes the oldest and largest higher education institution in Ethiopia. It has three main functions that includes teaching, conducting problem solving research and providing community services. The University has 65 undergraduate and 220 graduate programs (of which 69 are PhD) in 14 campuses. Currently it has 48,673 regular students of these 33,940 undergraduate, 13,000 Master's and 1733 PhD [16].

Study Design

Institution based cross sectional study design was conducted.

Study Population

The source population includes all undergraduate students currently learning at AAU and a study population includes all undergraduate students who are learning in the selected departments of AAU.

Data Collection Tools & Procedures

Data was collected using structured Interviewer administered Amharic version questionnaire which is comprised from demographic, socio-economic, technological and eHealth literacy factors. The questionnaires were first adapted in English after reviewing literatures and then translated in to Amharic language version for appropriateness and easiness in approaching the study participants and back to English by language experts to check its consistency of meaning. Reliability test was checked using SPSS and was found 0.79 cronbach's alpha. One MSc and four BSc graduates for supervisor and as field data collector were recruited and involved for the data collection process respectively. Individual data was collected using a pre-tested and structured Interviewer-administered questionnaire between February 15–2019 and March 15/2019 G. C.

Data quality control

Two days training were given for data collectors and supervisor on objective of the study, data collection procedures and data collecting tools, respondents approach, data confidentiality and respondent's right prior to the data collection date. The completeness of the questionnaires was checked every day by the supervisor and the principal investigator. Before the actual data collection, pretesting of the questionnaire was done on 5% of the total sample from undergraduate students of University of Gondar by random selection, then after the necessary corrections like edition and arranging questions by order were made based on findings. Finally the actual data for the study was collected from AAU.

Data Management & analysis

Data collected from respondents was cleaned manually before entered in to the computer. Data entry template was created based on study variable on Epi-Info version 7 and the manually edited data were entered to the software for further editing and exported to SPSS version 23 for further analysis. SPSS was used to generate descriptive statistics of the collected data to describe variables in the study using statistical measurements. Binary logistic regression is used to analyze the association between the independent variables to the dependent variable. The dependent variable was designed as (1 = 'Yes' if participants use the Internet for health and 0 = 'No' if not). Variables found to have an association with the dependent variable less than 0.2 p-value was entered in to multivariable analysis of logistic regression using Enter method in order to control the possible effects of confounders and finally the variables which have significant statistical association was identified based on

Odds Ratio (OR), with 95% CI and p-value <0.05 to fit in to the final regression model. The model fitness of multivariable analysis was checked by Hosmer and Lemeshow test and it was found to be 0.06 p-values.

Results

A total of 770 were participated in this study out of 845 sampled students with a response rate of 91.1%.

Socio demographic characteristics

From the total (n = 770) respondents about half 388(50.4%) of them came from the rural areas and nearly all 721(93.6%) live in the university dormitory. Participants in this study were aged between 18 and 29 years, with an average age of 21 years (SD 1.84years). For the age groups, the majority of them 396 (51.4%) belonged to the 20–24 age category, followed by those aged below 20 years (43.8%).

As shown in table 1, fifty one percent of the respondents were females. And of all the respondents 315 (40.9%) were Orthodox and 181 (23.5%) were Muslim religion followers.

By the field of study, applied science students share the majority (n = 196, 25.5%), followed by others 184 (23.95%), health science 147(19.1%), FBE 130 (16.9%) and social science 113(14.7%) respectively. About thirty two percent of the respondents were second year students and also first and third year accounted for 31.7% and 26.6% of the total (Table 1).

Students' access and utilization of the Internet

Almost all 761(98.8%) of the respondents confirmed that they have an access for the Internet, besides the majority 491(64.5%) of respondents reported they use Internet more than one time in the past six months. As shown in Table 2, about 69% of the students access the Internet using mobile data bundles and the rest use institutional or campus Wi-Fi 236(31%). Fifty five percent of, the respondents' access the Internet using smart phones (Figure 1).

The following table represents the proportion of the Internet utilization and Internet access of students in Addis Ababa University (Table 2).

Students' eHealth literacy

Students' eHealth literacy was measured using eHEALS measurement scale. Details of results are presented in table 3. In this study students were categorized in to two groups (having adequate eHealth literacy and limited eHealth literacy level) based on the median value they score; those who score above the median were categorized as having adequate eHealth literacy while students score below median are categorized as having Limited eHealth literacy. Out of the total 770 students more than three fourth 592(76.9%) have scored above the median value (≥ 32) and the rest 178 (23.1%) score below the median with a mean score of 29.59 (SD 5.418) having the maximum score 39 and the minimum value of 9.

Students Internet utilization for retrieving health information

Students were asked about their extent of utilization of the Internet for health and health related purposes. The result of using the Internet for health purpose is presented in table 3. From 761 Internet users more than half 455(59.1%) of the students use the Internet for retrieving health information and on the frequency of the Internet utilization from the entire users 455 students more than half 276 (60.7%) of them use three or more times in the past six months. The students use online health information to take several essential decisions and actions in relation to their health condition. Out of all the participants nearly three fourth 522(67.8%) were interact with the health professionals in the health care facility before they started using the Internet for health purpose. Four hundred forty (42.9%) of students had participate in forums or self-groups aiming on health and sickness through the Internet. Four hundred twenty two (54.8%) of the students read health and illness information from the Internet.

Three hundred fourteen (40.8%) of the students use the Internet to find health information that can help to decide whether to consult a health professionals and two hundred eighty five (37%) of students use the Internet to find HI by using the Internet earlier to a medical appointment and after an appointment. Out of 770 only 175(22.7%) use email and nearly three fourth 543(70.5%) of students use social media for sharing health information. One fourth 193(25.1%) of students use online browsing apps on their smart phones and tabs and also few 78 (10.1%) of students use Hospital website and or eHealth websites for searching health information.

One hundred thirty (16.9%) of the students discuss the health information sourced from the Internet with health professional. Based on the information gained from the Internet less than a quarter 155(20.1%) of the students request diagnosis and treatment by health professionals. Very few 46(6%) of students change medication prescribed by professionals without discussing it with health professional using the information gained from the Internet. One third 266(34.5%) of the students change their life style due to the health information gained from the Internet. Almost half 396(51.4%) of the students preferred information most from the Internet were Audio-video followed by text information 243(30.4%). General purpose search engines like Google and yahoo, remains the most preferred search engine which accounts 88.3% for participants to search for health information. Health specific search engines (e.g. WebMD, Medline Plus, Health finder and Health line) are rarely used (see table 4).

Factors associated with Internet utilization for health information

The multivariable analysis of logistic regression pointed out that students eHealth literacy, students field of study, students year of study and device ownership were significantly associated with the Internet utilization for health information purpose. On the other hand the socio-demographic factors like (sex, age, religion and ethnicity), prior residence which is being from rural or urban, students' current resident status (live in the University campus dormitory or out of campus) and monthly income of the students were not significantly associated with Internet use for health purpose. With regard to eHealth literacy, students who have adequate eHealth literacy levels are 1.6 times more likely to use the Internet for health information purpose compared to those who have limited eHealth literacy [(AOR = 1.656, CI: (1.143, 2.397)].

The odds of being a social science student was 97.5% less likely to use the Internet for HI purpose compared to that of health science students [(AOR = 0.025, 95% CI: (0.007, 0.087)], the odds of being Applied science student was 97.8% less likely to use the Internet for HI purpose compared to that of health science students (AOR = 0.022, 95 % CI: 0.007, 0.072), the odds of being Civil engineering, Computer science and ICT student is 98% less likely to use the Internet for HI purpose than their counterparts (AOR = 0.021, 95 % CI: 0.006, 0.068) and the odds of being FBE student is 98% less likely to utilize the Internet for HI compared to that of health science students [(AOR = 0.017, 95% CI: (0.005, 0.059)]

In addition second year and above students was 1.6 times more likely to use the Internet for health information purpose than first year students [(AOR = 1.609, 95% CI: (1.130, 2.290)]. The fourth variable having a significant association with Internet use for health is device ownership. Those students who have either of smart phones, tabs, laptop or desk top computers are two times more likely to use the Internet for HI purpose compared to those students who have other type of devices [(AOR = 2.314, 95% CI: (1.392, 3.844)].

Discussion

This study showed that about 98.8% of the Addis Ababa University students have an access to the Internet. The possible reason for this could be most of the universities now a day provide students with free Internet connection (Wi-Fi) in the campus residence such as in the Computer lab and library and also the availability of smart phones and other devices. Among these 59.1% (95% CI: 55.5–62.7) of the students use the Internet for health information purpose. About three fourth 67.8% of students were interacting with the health professionals in the health care facility before they started using the Internet for health information purpose.

General purpose search engines like Google and yahoo, remains the most preferred search engine which accounts 88.3%. However, health specific search engines (e.g. WebMD, Medline, Health finder and Health line) are rarely used. This is predominantly due to lack of awareness on health specific search engines. Similar finding was observed from other studies in developing countries such as Ghana [3] and Southeast Asia [17] which specify Google as the main search engine used for health information.

Similarly a study conducted in Ghana on the Internet use for health information seeking among University students demonstrated 67.7% [3] and another study done among in-school and out of school adolescents in similar place revealed that 53% [18] which is comparable with our finding however a study among health science students indicated 98.6% [19] which is higher. It was also in line with the past studies done in Kuwait 62.9% [20]. In Japan it was nearly 30% [21] which is lower it is due to the difference in population, the operational definition used and the time in which the study conducted and in Islamabad 43.4%[22] which was lower compared to this study. However it was found to be 80% in Malaysia [17] and 92.7% in Jeddah[23]. Which was higher compared to this study, the possible reason for the gap or discrepancy could be due to the Internet penetration rate, the difference in population and the difference in study area set ups, time and sample size.

In addition to that this study have got four major predictor variables for Internet utilization for health information purpose such as eHealth literacy, students field of study, year of study, and device ownership were found to be the most statistical significant predictor variables.

This finding showed that, students field of study was one of the main predictor for the Internet use for health information purpose. The odds of being a social science student was 97.5% less likely to use the Internet for

health information compared to that of health science students, the odds of being Applied science student is 97.8% less likely to use the Internet for HI purpose compared to that of health science student, the odds of being Civil engineering, Computer science and ICT student is 98% less likely to use the Internet for HI purpose compared to that of the health science students and the odds of being FBE student is 98% less likely to utilize the Internet for health information compared to that of health science students. With regard to this variable, findings appeared to be consistent with studies done in Botswana [24].

Another significant statistical association was identified between eHealth literacy and Internet use for health information. The odds of using the Internet for health information is 1.6 times higher among students having adequate eHealth literacy compared to that of students who have limited e-health literacy. In relation to this variable, findings appeared to be consistent with studies done in United kingdom[25], Israel [26], and North Florida [27]. The possible reason could be people who have highly-health literate gain more positive outcome from the information search in terms of cognitive, instrumental, self-management health care needs, health behavior and interpersonal gain from the Internet. Therefore eHealth literacy levels are an essential first step that could have association with students' online health information utilization.

On top of that students year of study (level of education) were also identified significant statistical association with Internet use for health information. The odds of using the Internet for health information is 1.6 times higher among second year and above students compared to that of first year students. This finding is consistent with previous study done in Botswana which is listed above in field of study section and also it is supported by another study conducted in Kuwait [20] and Japan[21]. With regard to computer device ownership, the odds of using the Internet for health information is 2.3 times higher among students who have either of smart phones, tabs, lap tops or desk top computers compared to that of the students having other types of devices.

Conclusion

This study revealed the undergraduate students at AAU were active in Internet utilization however; use of Internet for Health information purpose is lower. Based on this study the major factors associated with Internet use for health were: Field of study, year of study, Digital health literacy and computer ownership. Therefore this study conclude that Internet has more essential role in the lives of the young population particularly students in higher education institutions and that its use is not only limited to purely for academic and leisure purpose, but also life support and sustaining purposes including searching for HI. There is consequently a need to promote eHealth in the country as a feasible platform for health interventions and health care. This would among other benefits provide quick, accessible and affordable access to health care and HI and also ease the pressure and congestion that characterize physical health care services in the country, leading to overall improvement in healthcare delivery system.

List Of Abbreviations

AAU

Addis Ababa university

eHEALS

Electronic health literacy scale

eHealth

FMOH

Electronic health

Federal ministry of health

HISBS

HPs

Health information seeking behaviors

Health Professionals

ICT

Information communication technology

IPH

Institute of Public Health

IRB

Institutional review board

LAN

Local area network

OHIU

Online health information utilization

SPSS

Statistical package for social science

UOG

University of Gondar

WHO

World health organization

WI-FI

Declaration

Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board (IRB) of the University of Gondar. Communication with different official administrators was made through formal letter obtained from University of Gondar. Written consent was obtained from the study participants after telling the objective of the study. They were also be informed the benefits of the study. If they feel discomfort on the interview they were informed that they can stop any time. In order to keep confidentiality was assured to the study participants on any information provided by them. The data collection procedure was anonymous and their privacy was kept safe..

Consent for publication

All authors agreed and agreed for publication

Availability of data and material

Competing interests

There are no competing interests among authors

Funding

The authors received no specific funding for this work

Authors' contributions

MH designed the study, collected the required data and plays a vital role in acquisition of funding, write up the draft thesis, analysis and interpretation of the research. *KD, TM* participated in analysis and interpretation of the research, write up and critical revision of the manuscript and general supervision of the research group. *BA, AG*, and *DS* participated in data collection, revision of research and manuscript. All authors reviewed and approved the final manuscript.

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Reference

- 1.Yeung, E., et al., Internet use among community-based rehabilitation workers in Bosnia and Herzegovina: a cross-sectional survey. *Physiotherapy Canada*,2011. 63(4): p. 445–452.
- 2.Takahashi, Y., et al., Internet use for health-related information via personal computers and cell phones in Japan: a cross-sectional population-based survey. *Journal of medical internet research*,2011. 13(4).

- 3.Osei Asibey, B., S. Agyemang, and A. Boakye Dankwah, The internet use for health information seeking among Ghanaian university students: a cross-sectional study. *International journal of telemedicine and applications*, 2017. 2017.
- 4.Atnafu, S., Local Internet Content: the Case of Ethiopia.
- 5.Leslie, M., The Internet and democratization, in *Media and democracy in Africa*. 2017, Routledge. p. 107–128.
- 6.Megquier, S. and K. Belohav, Ethiopia's key: Young people and the demographic dividend. *Population Reference Bureau*: December, 2014. 18.
- 7.Telecommunications, S. I. U.a., Internet World Stats. 20 Dec. 2018.
- 8.Atnafu, S. Local Internet Content: the Case of Ethiopia. in 12th Globelics International Conference, Addis Ababa, Ethiopia. 2014.
- 9.Kessy, F. L., Financing reproductive and child health services at the local government level in Tanzania. *African Journal of Economic Review*, 2014. 2(1): p. 48–72.
- 10.Afework, M. F., et al., Effect of an innovative community based health program on maternal health service utilization in north and south central Ethiopia: a community based cross sectional study. *Reproductive health*, 2014. 11(1): p. 28.
- 11.Teklehaimanot, H. D. and A. Teklehaimanot, Human resource development for a community-based health extension program: a case study from Ethiopia. *Human resources for health*, 2013. 11(1): p. 39.
- 12.Zickuhr, K. and M. Madden, Older adults and internet use. *Pew Internet & American Life Project*, 2012. 6.
- 13.Shiferaw, F. and M. Zolfo, The role of information communication technology (ICT) towards universal health coverage: the first steps of a telemedicine project in Ethiopia. *Global health action*, 2012. 5(1): p. 15638.
- 14.Alwan, K., T. Awoke, and B. Tilahun, Knowledge and utilization of computers among health professionals in a developing country: a cross-sectional study. *JMIR human factors*, 2015. 2(1).
- 15.Donnely, J., Ethiopia gears up for more major health reforms. *The Lancet*, 2011. 377(9781): p. 1907–1908.
- 16.Teferra, D., Charting African higher education: Perspectives at a glance. *International Journal of African Higher Education*, 2014. 1(1).
- 17.Inthiran, A. and I. Soyiri. Searching for health information online for my child: a perspective from South East Asia. in *International Conference on Asian Digital Libraries*. 2015: Springer.
- 18.Borzekowski, D. L., J. N. Fobil, and K. O. Asante, Online access by adolescents in Accra: Ghanaian teens' use of the internet for health information. *Developmental psychology*, 2006. 42(3): p. 450.
- 19.Kwabia, E., Assessing the use of the Internet for health purposes among students at the University of Ghana. 2015, UiT Norges arktiske universitet.

20. Alkhatlan, H. M., K. F. Rahman, and B. H. Aljazzaf, Factors affecting seeking health-related information through the internet among patients in Kuwait. *Alexandria journal of medicine*, 2018. 54(4): p. 331–336.
21. Takahashi, Y., et al., Internet use for health-related information via personal computers and cell phones in Japan: a cross-sectional population-based survey. *Journal of medical Internet research*, 2011. 13(4): p. e110.
22. Shaikh, I. A., et al., Internet access and utilization for health information among university students in Islamabad. *J Ayub Med Coll Abbottabad*, 2008. 20(4): p. 153–156.
23. Alghamdi, E., et al., Use of Internet Health Information Among Students in Jeddah, Saudi Arabia: A Cross-Sectional Study. Vol. 11. 2019. 51.
24. Ajiboye, J. O. and A. Tella, University Undergraduate Students' Information Seeking Behaviour: Implications for Quality in Higher Education in Africa. *Turkish Online Journal of Educational Technology-TOJET*, 2007. 6(1): p. 40–52.
25. Estacio, E. V., R. Whittle, and J. Protheroe, The digital divide: examining socio-demographic factors associated with health literacy, access and use of internet to seek health information. *Journal of health psychology*, 2017: p. 1359105317695429.
26. Neter, E. and E. Brainin, eHealth literacy: extending the digital divide to the realm of health information. *Journal of medical Internet research*, 2012. 14(1).
27. Park, H., et al., Identifying health consumers' ehealth literacy to decrease disparities in accessing ehealth information. *CIN: Computers, Informatics, Nursing*, 2016. 34(2): p. 71–76.

Tables

Table 1: Socio-demographic characteristics of students in Addis Ababa University Ethiopia, May 2019 (n=770)

Variable	Category	Number	Percent
Sex	Female	394	51.2
	Male	376	48.8
Age	<20	337	43.8
	20-24	396	51.4
	>=25	37	4.8
Religion	Orthodox	315	40.9
	Muslim	181	23.5
	Protestant	93	12.1
	Catholic	27	3.5
	Others	154	20
Ethnicity	Amhara	260	33.8
	Oromo	274	35.6
	Tigrey	40	5.2
	Guragey	103	13.4
	Others	93	12.1
Field of study	Health science	147	19.1
	Social science	113	14.7
	FBE	130	16.9
	Applied science	196	25.5
	C.engineering, ICT, Computer science	184	23.9
Year of study	First year	244	31.7
	Second & above	526	68.3
Prior residence	Urban	382	49.6
	Rural	388	50.4
Residence status	In campus	721	93.6
	Out of campus	49	6.4
Family monthly income	<1500	273	35.5
	1501-3000	375	48.7
	>=3001	122	15.8

**Health science includes Nursing, Midwifery, and Medical laboratory. Social science includes Geography, Civics, Art and Sociology. FBE includes Economics, Management, Accounting and Business Administration. Applied

science includes Biology, Chemistry, Physics, Maths and Statistics. Others include Civil Engineering, ICT and Computer science.

Table 2: Internet access and utilization status by students

Variables	Category	Frequency	Percent
Internet utilization status	No	9	1.2
	Yes	761	98.8
Type of Internet use	Mobile data	534	69.4
	Campus WI-FI	236	30.6

Table 3: Students e-health literacy frequency distribution in Addis Ababa University Ethiopia, May 2019 G.C

Students eHealth literacy score	Frequency	Percent	Cumulative Percent
10	1	0.1%	1.2
11	1	0.1%	1.3
12	2	0.3%	1.6
14	2	0.3%	1.8
15	4	0.5%	2.3
16	12	1.6%	3.9
17	2	0.3%	4.2
18	3	0.4%	4.5
19	6	0.8%	5.3
20	11	1.4%	6.8
21	3	0.4%	7.1
22	16	2.1%	9.2
23	48	6.2%	15.5
24	30	3.9%	19.4
25	14	1.8%	21.2
26	15	1.9%	23.1
27	25	3.2%	26.4
28	24	3.1%	29.5
29	34	4.4%	33.9
30	34	4.4%	38.3
31	31	4.0%	42.3
32	287	37.3%	79.6
33	35	4.5%	84.2
34	24	3.1%	87.3
35	15	1.9%	89.2
36	72	9.4%	98.6
37	10	1.3%	99.9
39	1	0.1%	100.0

Total 770 100 %

Table 4: Students' use of the Internet for health information purpose

Variable	Category	Frequency	Percentage
Internet use for health	No	315	40.9
	Yes	455	59.1
Internet use in the last 6 months	Once	173	22.5
	Twice	76	9.9
	Three or more	242	31.4
Using social media	No	227	29.5
	Yes	543	70.5
Using mobile based online apps	No	577	74.9
	Yes	193	25.1
Using e-health or hospital database	No	692	89.9
	Yes	78	10.1
Using email	No	595	77.3
	Yes	175	22.7
Using Virtual channels	No	260	33.8
	Yes	510	66.2
Using general search engines	Yes	680	88.3
	No	90	11.7

Note:- All numbers for an item may not sum to 770 because of missing values

Table 5: Bi-variable and Multi-variable analysis of factors associated with Internet utilization for health Information among undergraduate students in Addis Ababa University, Ethiopia May 2019. (n=770)

Variable	Internet use				COR (95% CI)	AOR(95% CI)
	Yes		No			
eHealth Literacy						
>=32	381(64.4%)	211(35.6%)	211(35.6%)	211(35.6%)	2.538 (1.802, 3.573)	1.656(1.143, 2.397)**
<= 31	74(41.6%)		104(59.4%)		1	1
Field of study						
Health science	144(98.4)		3(2.0%)		1	1
Social science	62(54.9%)		51(45.1%)		0.025(0.08, 0.084)	0.025(0.007, 0.087)***
FBE	62(47.7%)		68(52.3%)		0.019(0.06, 0.063)	0.017(0.005, 0.059)***
Applied science	97(49.5%)		99(50.5%)		0.020(0.06, 0.066)	0.022(0.007, 0.072)***
C.engineering, ICT, Cs	90(48.9)		94(51.1%)		0.020(0.06, 0.065)	0.021(0.006, 0.068)***
Year of study						
First year	326 (71.6)		200 (63.5%)		1.453 (1.069, 1.975)	1.609(1.130,2.290)**
Second and above	129 (28.4%)		115 (36.5%)		1	1
Device ownership						
Smart, Tab, Laptop and desktop	399 (87.7%)		256 (81.3%)		1.642 (1.103, 2.445)	2.314(1.392, 3.844)***
Other	56 (12.3%)		59 (18.7%)		1	1
Age						
< 20 years	204 (44.8%)		133 (42.2%)		0.649 (0.310, 1.357)	1.088 (0.455, 2.599)

20-24 years	225 (49.5%)	171 (54.3%)	0.557 (0.268, 1.158)	0.792 (0.336, 1.866)
>=25 years	26 (5.7%)	11 (3.5%)	1	
Sex				
Female	239 (52.5%)	150 (47.6%)	1.218(0.914, 1.624)	1.266 (0.918, 1.747)
Male	216 (47.5%)	165 (52.4%)	1	
Residential status				
In campus	433 (95.2%)	288 (91.4%)	1.845(1.031, 3.303)	1.600(0.838, 3.055)
Out of campus	22 (4.8%)	27 (8.6%)	1	
Monthly family income				
<1500 ETB	151 (33.2%)	122 (38.7%)	0.698 (0.450, 1.084)	0.665(0.402, 1.102)
1501-300 ETB	226 (49.7)	149 (47.3%)	0.856 (0.560, 1.307)	0.743 (0.462, 1.196)
>3001 ETB	78 (17.1%)	44 (14%)	1	

Note: - 1 = Reference. **P-value <0.05 for multi-variate analysis. ***P-value <0.001 CI: Confidence Interval, AOR: Adjusted odds ratio, COR: Crude odds ratio. Cs: Computer science, ICT: Information communication technology

Figures

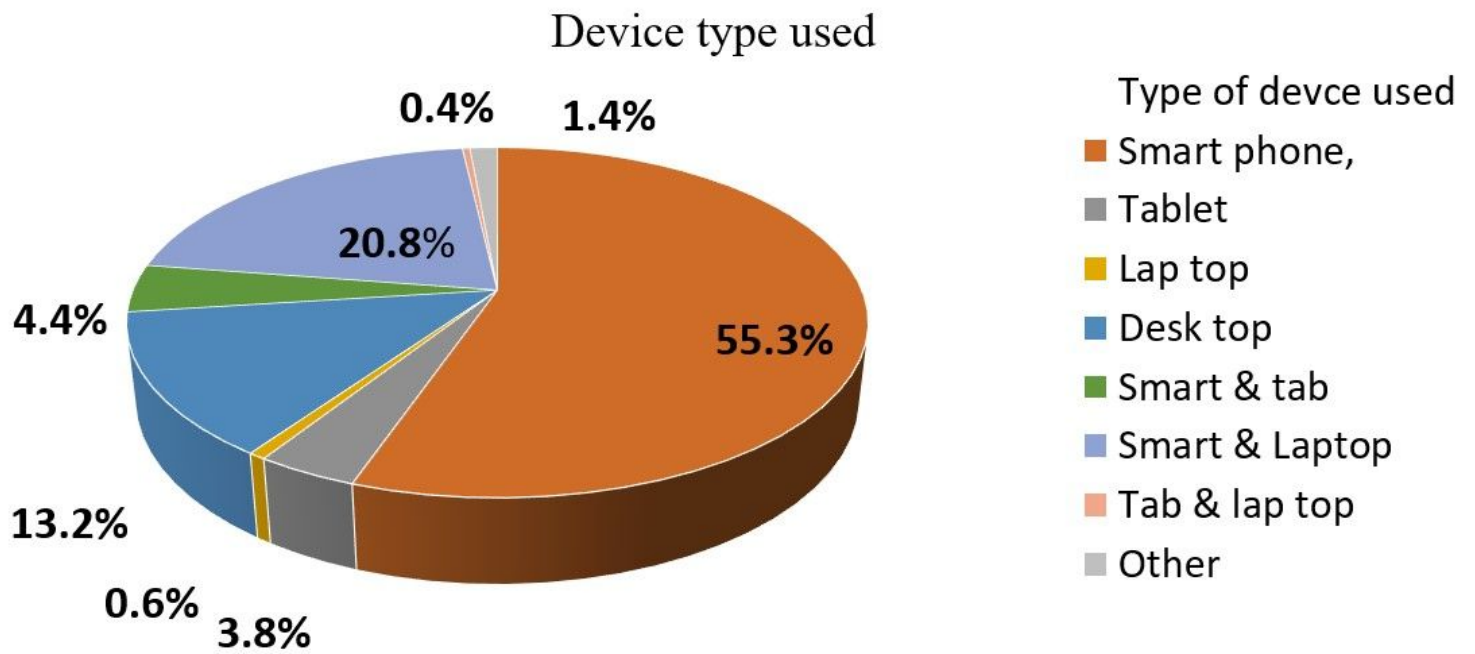


Figure 1

Type of device used by students for Internet