

Knowledge, Attitude and Utilization of Information Communication Technologies (ICTs) in an Ethiopian Medical Teaching Hospital

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Abstract

Information Communication Technologies (ICTs) play substantial role in providing efficiency and effectiveness in different sectors and medical education as well as quality health service delivery are not exceptions. However, there is no adequate information on the level of knowledge and utilization patterns of ICTs in the health sector in Ethiopia. This study is aimed at assessing the knowledge, attitude and utilization of ICT among students and health care providers in a teaching Specialized Hospital in Ethiopia. A survey was conducted in the hospital, a total of 403 study participants were randomly selected from undergraduates, residents and health care providers based on their population size proportionally. Data were initially entered into EPI-6 DOS version and exported to SPSS version 15.0 for analysis. The study indicated that students and Health Care Providers have low knowledge level and poor utilization status of ICT for academic purpose and service delivery needs. The findings indicate the need for improving the existing ICT course in the curriculum to be more skill-oriented and also formal in-service ICT related trainings for the health care providers.

Keywords: ICT knowledge, attitude, utilization, Information Communication Technologies

1. INTRODUCTION

Developments in information and communication technology occur at an astonishing rate. This has had huge implications for medical practice throughout the world (Samuel et al, 2004). Medicine has always been an “information-intensive” occupation, and the penetration of information technology into practice and education is generally welcomed. The advances in technology provide greater ease of access and use to exploit the benefits of computing for medical education as well as quality health service delivery purposes (Kenneth & Michael, 2000; Samuel, et al, 2004). This trend of increased use of computers in medical practice makes it important for medical school graduates to develop and enhance computer skills for their future practices (Amy, et al, 1997).

Although the importance of computer literacy in today’s rapidly changing environment cannot be denied, institutional provision of opportunities and inclusion of such skills into their curriculum for medical students to acquire the necessary technical skills has been comparatively slow and inconsistent (Kenneth & Michael, 2000; Thomas & Richard, 2006). One of the basic concerns with this regard is that the spread of information and communication technologies in developed countries is leaving the rest of the world behind. In most of the developing countries including Ethiopia many programs have concentrated on increasing the number and spread of ICT infrastructures without adequate effort on the capacity building. These may create a gap in ability and utilization of ICT and also reduces the impact of Information technology use, measured by financial, economic and clinical returns. In other words, equipment alone is useless unless people are able to use it effectively and informed of the potential benefits of its use (Samuel et al, 2004).

The Government of Ethiopia believes that exploiting information technology is central to promote growth and reduce poverty. One of the ICT strategies in Plan for Accelerated and Sustained Development to End Poverty (PASDEP) is mainstreaming the use of ICT in all sectors of the economy. A central part of this strategy is applying the principle of modern ICT to the delivery of services and administration of government, to improve effectiveness and reduce costs. Accordingly, health is one of the main service delivery sectors that need mainstreaming the ICT to provide quality health care delivery. Equipping the health professionals with appropriate knowledge and skill of ICT during their stay in the medical school is vital to implement the information technology in the health sector as to the national strategy (Ministry of Finance and Economic Development (MoFED) of Ethiopia, 2006). However, the reality in the ground is different according to the ICT penetration and usage base line study conducted in Ethiopia that indicated only 2% of the sampled health professionals have formal college or university ICT training. This may be an evidence to say much should be done in the medical institutions in the area of increasing ICT skills for the prospect graduates as well as the existing health care providers. The skill and utilization patterns of ICT among medical students is not known and to my knowledge there is no published reports on the knowledge and utilization patterns of ICT among medical students in Ethiopia particular in Black Lion Hospital. Hence, this assessment will identify factors contributing to the poor ICT knowledge, skill and utilization in the medical set up (Mulat & Tadesse, 2002).

It is well known that computers influence every sphere of human activity and bring many changes in medical education, healthcare and scientific research etc. Computers can perform a wide range of activities that save time and help health care providers to be engaged in other patient care activities. The availability of quality applications for medical education in both the basic and clinical sciences makes it feasible for an institution to incorporate such applications into the existing curriculum (Amy, et al, 1997; Emans, et al, 2004). Accordingly, it is necessary to ensure the knowledge and utilization of ICT among those who deliver the service. Therefore this study is going to assess the knowledge of medical students on ICT and their utilization status and also the possible factors that influence using ICT for their academic purpose and service delivery needs. In line with this, the findings will also provide baseline information for medical faculty and health facility administrators in planning ongoing computer training for medical students as well as health care providers currently working in the health facilities.

2. LITERATURE REVIEW

2.1 Role of ICT in Medical education

The emerging need of computer knowledge has made an impact in every field, including the medical world (Jha, et al, 2004). Since the development of the computer and the evolution of the Internet, Information Technology (IT) has had a positive impact on health care delivery systems worldwide, particularly in the areas of disease control, diagnosis, patient management and teaching (Ibrahim, et al, 2004). In general, clinical practice has been tremendously improved by the technological interventions (Ime, et al, n.d.). As a result of this revolution the application of ICT especially in the areas of information access, storage, retrieval, analysis and dissemination of information is becoming a routine activity in the health care system. This makes it almost mandatory for the healthcare professionals to be well versed with this technology in the developed world (Jha, et al, 2004).

Moreover computerization could resolve certain problems and derive benefits including reduction in clerical work required of professionals, reduction in printed forms, centralized patient care data etc (Emans, et al, 2004). The development of online databases plays a vital role in packing and delivery of medical research as the same time it allows medical professionals throughout the developed world immediate access to hundreds of e-journals at the touch of a button, a striking contrast to the plight of many of their colleagues in developing countries who are forced to search empty libraries (Samuel, et al, 2004; Nkeiruka, et al, 2008).

Rapid advancement in information technology and the increasing availability of electronic health information are revolutionizing health care systems worldwide. Innovations in technology have made portable electronic devices, network database applications, electronic medical records, and computer software programs increasingly integrated into many health care settings. These changes create the educational need for health care providers to become proficient at appropriately using technology to deliver high quality health care services. However, the impact of ICT on medical practice in the developing world is not significant due to lack of awareness and access to computer (Tina & Scott, 2007).

2.2 Accessibility of ICT

The use of computer and Internet technology by health science students will result in more effective medical education, including teaching, medical examination, and diagnosis of disease. However, these gains will only occur when students have increased access to these technologies (Grace, 2003). One of the central factors identified for the skill of computer among physicians is the ownership of a personal computer. This is because it is associated with better information-handling knowledge and favorable perception of the computer-based record system (Ime, et al, n.d.).

Several studies in the accessibilities of IT among medical students and health workers showed a magnificent difference between the developed and developing world. In a survey of physicians across eleven North American, European and Asian countries in 1998, 80% of physicians were found to own a computer and 44% of these physicians had accessed the Internet and their predominant place of Internet access was in the home. In another survey of European Universities Skill in ICT of students and Staff (SEUSISS) project (2001-2002) the number of personal computer (PC) ownership at the start of studies varied from 54% (Abo, Finland) to 89% (Groningen, Netherlands). Recent studies have however shown remarkable improvements in these figures. But much is not reported in the literature about the level of Internet access amongst doctors and the use of electronic medical records of health facilities in Africa (Jens, 2004).

A study conducted in Medical university of Vienna showed almost all students (94%) have access to a privately owned PC, which is either owned by the students themselves (74%) or shared with family members or roommates (20%). Only 5% rely primarily on public computer facilities. In the same study the great majority of students also have access to the Internet (Thomas & Richard, 2006). Similarly a longitudinal study in Aarhus, Denmark showed

among the total first year medical students, 71.7% indicate they had access to computer at home. In this study Internet access at home was also assessed and it was found to be increased from 20.4 to 62.9% in the study period and there was an even more pronounced increase in the use from any location, of Internet and e-mail (Jens, 2004). On the other hand in developing countries, the Internet is still only available to a minority of health professionals, and often it is not available at the point of care (Grace, 2006).

The access to computer of medical students in Africa is lagging behind when compared to the developed world. A study in the MUCHS, Tanzania showed the medical student to computer ratio is 100:1. It is too far behind when it is compared to 35:1 in Portugal, 9:1 in the UK and 5:1 in Norway. With regard to ownership of computer at home 76% of MUCHS students didn't have a computer at home. This figure is in stark contrast with the availability of computer at home which is 71.7% Aarhus, Denmark and 86% in California, USA (Jens, 2004); Samuel, et al, 2004). Similarly a study in Ile Ife university teaching hospital, Nigeria showed only 26% of students owned a computer (Ibrahim, et al, 2004). Even if computer access is vital in acquiring skill of ICT, almost all of the studies conducted in Africa indicated that access to computer is very limited.

A base line study on ICT penetration and usage in Ethiopia indicated that 51% of health workers gain access to computers in their work place. Private computer centers are the second most important place (46%) and only 12% of the sampled health professionals had computer access at home of which majority of them are from Addis Ababa. It should also be realized that access to printed materials is very much limited in the health facilities, especially outside of Addis Ababa. As information is critical in the operation of health professionals every effort should be made to improve access to computers and the Internet at the work place. Thus Health workers will constantly update themselves about new developments (in the area of treatment and nature of various diseases) with the help of computers and Internet (Mulat & Tadesse, 2002).

Therefore providing students with computer access in addition to the theoretical training by placing computer stations in the library or by developing a dedicated computer laboratory space have been the most common solutions adopted by institutions to ensure the skill of medical students on ICT before they leave the campus. As a result of the aforementioned facts recently some medical schools have considered policies recommending that students acquire a PC for their medical education, or even requiring them to do so (Amy, et al, 1997).

2.3 Knowledge and Attitude towards ICT

In this ICT era the need for medical students to be computer literate is no longer an issue for debate. Currently using computerized medical records, retrieving patient data at a distant and accessing medical journals and literature electronically is common. Hence, acquiring basic knowledge on computer and understanding the basics of Internet among physicians is crucial (Brenda, et al, 2002). However, several studies in the literature suggest many medical students feel that they lack computer skills and majority of them are interested in learning more about computers while attending medical school (Sue, 1999).

A study conducted in Punjab, India showed that majority (75%) of staff nurses had good computer knowledge and 21% had average computer knowledge in clinical care setting. All the nurses had positive attitude towards computers (Emans, et al, 2004). Another study from Chennai, India indicated that 42% of Undergraduate (UG) and 47% of Postgraduate (PG) medical students felt that working with computer gave them a lot of self-confidence. Concerning Knowledge 40% of all medical students did not have any knowledge of database and spreadsheet (Jha, et al, 2004). Similarly the longitudinal study conducted in Aarhus, Denmark indicated that 86% of male and 76% of female students had positive attitude towards use of ICT resources as a supplement for their medical education (Jens, 2004). Contrary to this a study from Nigeria teaching hospital showed that from the total respondents only 19% and 40% of the medical students demonstrated a good knowledge on computers and had positive attitude towards IT respectively (Ibrahim, et al, 2004). The study from MUCHS, Tanzania indicated that only 52% of students felt that they understood the basic terminology and concepts of computing (Samuel, et al, 2004). Similarly a study from a resource poor setting showed that 60% of the students who were familiar with computers acquired their

knowledge through self-learning efforts while 37.5% attended a formal training. Based on the ICT penetration base line survey conducted in Ethiopia the overall computer literacy among health professionals was 39% with no visible differences between Addis Ababa and regional towns. Personal effort is the main method (67%) of acquiring ICT skill, which is similar to other studies followed by short-term computer training (33%), formal College or university ICT training is reported by only 2% of the respondents (Mulat & Tadesse, 2002; Nkeiruka, et al, 2008). These all facts in the literature indicate delivering computer courses at the medical institutions is neglected. More over majority of the literatures suggest the need for training of physicians in the use of computer in the medical education. To that end, determining the gap of medical students for acquiring computer skill in terms of training or accessibility should be assessed before starting any intervention (Amy, et al, 1997).

2.4 Utilization of ICT

Clearly, medical students need to acquire computer and information management skills at the beginning of their medical education. As indicated in many literatures most of the latest reference materials are accessible electronically; this is also an assertion supported by a recent two-year survey at the University Of Illinois College Of Medicine at Rockford (Kenneth & Michael, 2000). In support of the above fact a study conducted in Austria in 2004 showed that 75% of university and high school students used a computer daily for different purpose especially for e-mail communication (94%), Internet for information research (97%) and use of word process is very common (82%), but students are less familiar with other program types. (Thomas & Richard, 2006). Majority of the studies conducted in the developed world showed the skill of students in using ICT is high which were showed by 84% of undergraduate students in Glasgow, UK, 95% undergraduate dental students in Oulu, Finland. There is also an encouraging trend of ICT utilization in some of the East and Central Asia countries like 94% and 95% of medical students in Malaysia and Saudi Arabia respectively use computers for their medical education (Ibrahim, 2002; Grace, 2003).

In spite of the limited studies conducted in the developing world especially in Africa, some of the studies showed that the skill and utilization of ICT among medical students as well as health care providers are very poor. In support of the above idea a study from Nigeria teaching hospital on Computer and Internet use by first year clinical and nursing students showed that, only 43% of students could use the computer. Odusanya and Bangbala in the same institution found that 80% of the medical and dental students in their final year had used the computer; however, the use of software applications was poor, with computer games being the most frequently used (19%) followed by word processing software (18%). The Internet and email were used by 58%, but only 23% had used the Internet for medical research (Grace, 2003). In similar context a study from Tanzania medical university college indicated that about 74% of medical students never use a computer as part of any course either at school or university. Out of those who are using (25%) the median hours per week of computer use was 3.8 (Kenneth & Michael, 2000; Ibrahim, et al, 2004). At this time their computer skill was also measured and found to be very low. The method of measuring skill is adapted from the Center for Health Informatics and Multi professional Education (CHIME) in UK, students with an overall score of less than 10 are considered to have low skills and are offered peer mentoring training. Using this criterion, around 50% of the Tanzanian medical students would fall into the low skills category compared with 9% of first year UCL medical students in 2002. All these studies concluded that utilization of ICT was poor amongst the resource poor sub Saharan African countries (Ibrahim, et al, 2004; Samuel, et al, 2004).

Similarly in Ethiopia only 33% of the health workers use computers for various purposes. The single most important purpose of using computers is word processing and related activities (office tools) for 81% of the reporting respondents. Some 26% of the sample respondents use the Internet. As expected, e-mail is the most important reason for using the Internet (90%). The barriers identified for ICT utilization in the health sector during the base line survey on ICT penetration and usage in Ethiopia were Lack of necessary equipment (accessories) and absence of ICT strategic plan. In addressing the possible factors for ICT utilization the current ICT strategy of the country is encouraging especially in scale up of ICT infrastructures at all level of service delivering sectors. Hence the medical institutions should take this as a good opportunity to incorporate computer courses in their medical education then

medical students may acquire appropriate skill for their future carrier (Mulat & Tadesse, 2002; Ministry of Finance and Economic Development (MoFED) of Ethiopia,2006).

3. METHODOLOGY

The study was cross-sectional survey by design complimented with qualitative in-depth interview. The study was conducted at Black Lion Specialized Hospital in Addis Ababa. All students and health care providers in the Faculty of Medicine including residents, medical doctors and nurses, either attending their medical education in the faculty or providing health care service in Black Lion Specialized Hospital during the study period, were the source population. Among all the students in the Medical Faculty, Intern and clinical year-1 medical doctors, final year nursing students (Both clinical and midwives) and residents attending their education and health care providers working in Black Lion Specialized Hospital were selected for the study. These groups were selected purposively mainly to increase the likelihood of having more respondents with computer exposure. Then the total sample size was proportionally allocated based on the number of students and health care providers in each category. Finally the respondents were selected randomly from each category.

Both quantitative and qualitative techniques of data collection were employed in the study. Structured questionnaire encompassing all the variables of interest were adapted from other related articles for its consistency reliability next to standard questionnaire and it's modified to the context to fit the study population. Semi-structured questionnaire were developed to guide the qualitative data collection. In-depth interview was carried out with department heads, Instructors and students of the Medical Faculty and physicians working in Black Lion Specialized hospital to gather qualitative information. The in-depth interview was conducted using separate interview guide for each participant from each category of respondents by the principal investigator with the assistance of supervisors. Tape recorder was not used because of the refusal of the key informants to be recorded

Quantitative data were initially entered and cleaned using EPI-6 DOS version and exported to SPSS 15.0 for analysis. Frequency tables, proportions and crosstabs were used for the descriptive analysis. And for presentation tables and different type of graphs were employed. Association between independent variables such as, computer training, computer possession, having computer course, place of high school completed, category of study and socio-demographic characteristics of students and outcome variables of Knowledge, Attitude and Utilization, was examined using odds ratio, X^2 test and logistic regression when it is appropriate. For multivariate analysis the necessary adjustment was done for the possible confounding factors to identify the predicting factor for knowledge, Attitude and utilization of ICT among students category. Hence, internal comparison was done based on the adjusted odds ratio. In line with this the significance level was set at p -value = 0.05.

4. RESULT AND DISCUSSION

In Ethiopia there is no as such study conducted assessing the knowledge, attitude and utilization of ICT among medical students. This study contributes as base line information on the knowledge, attitude and utilization of ICT among Medical students and health care providers. The study indicated that 24.9% of the respondents had satisfactory knowledge and majority of them were undergraduate and residents. Of which almost half of them 41.1% were interns and clinical year medical doctors and this may be due to their exposure from their high school stay. This figure is comparable with the finding from Nigeria teaching hospital where 18.9% of medical students and health care providers had good knowledge (Emans, et al, 2004). However, this figure is less than the data obtained from the ICT penetration survey among HCPs in Addis Ababa and four towns of regions which was about 39% (Kenneth & Michael, 2000). Similarly, a study conducted in Nigeria was also greater than this finding 50.6% of clinical year medical students (Nkeiruka, et al, 2008).

In this study 56.7% of the respondents know basic ICT terminologies which are comparable with the study done in Tanzania College of Health Science, 52% of 4th year clinical year medical students felt that they understood the basic terminologies and concept of computer (Samuel, et al, 2004). The study also showed that younger age groups are relatively better knowledge of ICT than the older one. The reason behind may be younger ages are more favorite to new technology than the older ages. In support of this finding, a study conducted in Nigerian teaching hospital showed that younger respondents tended to have multiple accesses to internet than older age (Ime, et al, n.d.). The study also indicated that males from gender category are superior in knowledge level than females. The result is consistent with other studies conducted in Nigeria and Yemen (Abdula, 2008).

The study revealed that 62.2% of respondents had different type of formal and informal ICT trainings; however, training status was not translated to better knowledge among the respondents who have different type of training, only 26.5% of them score above the 3rd quartile. Similarly, in a study conducted at Ile Ife university teaching hospital, only 26% of medical students and 27% of physicians had good knowledge after having different type of training (Ibrahim, et al, 2004). A study from Punjab, India also indicated that type of computer training received by the nurses does not influence the nurses overall computer knowledge (Emans, et al, 2004). The possible reasons may be the type of training most of them had informal training less than 6 month and the time they received; majority of them took the training during their high school stay. On top of this, quality of the training, content of the training, mode of delivery, instructors' capacity, allocated time for theory and practical session during the training and gap between the training time and the actual use of computer are also contributing factors for knowledge status among those who had short term training.

This study showed that 67% of students had computer course in their current study. On the other hand their knowledge had no significant difference with those who had no computer course. These may be explained by the adequateness of the course and also the time the course is delivered. About 89.1% of medical students who took the course were not satisfied with the computer lab session. The in-depth interview also support this in which it is explained that the course delivered was simply introduction to computer in two and three credit hours and the allocated time for computer lab session was only two weeks.

In this study 51.7% of the total study subjects had at least one personal computer in their home. This figure is by far better than the result from ICT penetration in Ethiopia, computer access at home was reported by only 12% of the total respondents of HCP this may be the cost of the computer in previous times and also most of the respondents in the current study were final year students especially residents who possess the larger proportion of personal computer (Mulat & Tadesse, 2002). A survey of trainees in a Nigerian teaching hospital indicated the same figure, 51.7% of participants had personal computer (Ime, et al, n.d.). Similarly, the data from Aarhus, Denmark showed that 71.7% of first year medical students had access to computer at home (Nkeiruka, et al, 2008). In contrast to this finding, a study in Tanzania showed that about 76% of the medical students having no computer at home (Samuel, et al, 2004).

The current study showed that possession of personal computer is one of the determining factors to have better score of basic ICT knowledge. In support of this study the finding from Nigerian teaching hospital indicated that ownership of personal computer is statistically significant association with knowledge of computer and longer duration of practice (Ime, et al, n.d.).

Access to computer in the Medical Faculty is very limited as disclosed in this study. The in-depth interview pointed out that no computer is dedicated for academic purpose in each department except in the computer lab. This explanation is similar with the study result from ICT penetration survey in Health sector of Ethiopia where it is stated as "accesses to the available computers in the health facilities were often limited to secretaries of facility officials" (Mulat & Tadesse, 2002).

Internet access was found to be 74.8% of the study subjects. The most frequently mentioned place for Internet access was Internet café (46.6%). This finding is much better than the result from ICT penetration base line survey in Ethiopia where it is showed that only 26% had access to Internet. However, the place for Internet access is comparable with the current study in that around 48% were accessed it at Internet café (Mulat & Tadesse, 2002). In

terms of access, this study is also better than a study conducted in Nigeria among first year clinical and nursing students in which around 60.7% had access to Internet and the common place of access is cyber café (87%) (Grace, 2003).

In this study 83.7% of all respondents had positive attitude towards Information Communication Technology. This finding is more or less comparable with the study conducted in Ludhiana, Punjab, India in which all the nurses (100%) had positive attitude towards computers in health care setting hospital (Emans, et al, 2004). Similarly, a study done in Aarhus, Denmark showed that majority of the first year medical students (68.4%) would like to replace traditional teaching with use of computers if possible and 88.1% of dental students in Egypt had also positive attitude towards computer (Nkeiruka, et al, 2008; Tanawi & Saleh, 2008). Therefore, we can say that even if there is limitation in access to computer most of the medical students are willing to know about ICT facilities and also to use it for their academic purpose and health care delivery needs.

The highest level of competence reported by the study subjects were word processing 44.3%, email use 53.9% and Internet browsing 45.6%. Which was average and above competence of application skill. This finding is comparable with the study conducted in Nigeria and Tanzania word processing competence 60%, e-mail 75% and Internet 58% (Samuel, et al, 2004; Nkeiruka, et al, 2008). In addition, graphics and MS-powerpoint competence is higher among residents because of the fact that their field requires a lot of presentations and seminars.

Regarding the way of acquiring skill, 67.3% of Internet browsing, 54.6% of graphics and MS-powerpoint presentation and 45.7% of word processing skill was acquired by personal effort. This result may be explained by most of the students use the word processing and MS-powerpoint for report writing and preparing presentation and regard to internet majority of them use email. The study has similar result with the ICT penetration survey in Ethiopia, personal effort is the main method (67%) of acquiring ICT skill followed by short-term computer training (33%) and short-term in-house training (21%) among health care providers in Addis Ababa and four main regional towns (Mulat & Tadesse, 2002). Comparably studies in Nigeria and Tanzania indicated that self effort contributes around 60% of the ways of acquiring skill and 68.9% in southern US medical university (Deiride, et al, 2000; Samuel, et al, 2004; Nkeiruka et al, 2008).

In this study 32.6% of study subjects were categorized under good utilization rate. Majority of the users were residents 52.3%. This is explained by the access level of computer among the respondents. Most of the residents have probably better income compared to the undergraduate students. This also reflected by their computer possession 93.3% of all residents had their own computer at home. Similarly, 33% of the health workers use computers for various purposes mainly for word processing and related activities (office tools) in ICT penetration survey of Ethiopia and in Zaria, Nigeria 26.7% of medical students utilize computer of them 60% comfortable in word processing. In contrary to this finding the study conducted in Chennai, India 94% of both undergraduate and post graduate students were found to utilize the computer for desktop usage. The Postgraduate medical students were found to use the computer more frequently as compared to undergraduate medical students (Mulat & Tadesse, 2002); Jha, et al, 2004); Nkeiruka, et al, 2008).

This study indicated that Internet is used by 87% of respondents and 80.4% of the study participants had email address for their mail communication. The email was the most common application used (90.1%) followed by research and education (66.1%) in this study samples. Similarly, a study conducted in public medical school of the southern United States in 2000 showed majority of students had used email (97%), educational software (75%) and conducted literature search (88%) (20). The study also concordant with the result from Nigeria where 76.4% of first year clinical and nursing students in Ibadan (Grace, 2003) and 75% fourth year medical students in Dare-Selam, Tanzania (Samuel, et al, 2004) have used email. The explanation for poor Internet use among students for academic purpose may be due to the fact that Internet connection is poor, slow and high cost in the Internet café. This makes difficult to download literatures and other documents from the Internet. As a result, most of the students inclined to use hardcopy for their education as a text or reference. Regarding the email service it is possible to be served with low level Internet connection in the Internet cafes.

The study also pointed out that computer possession is one of the main factors that resulted in better utilization status of students. Accordingly, 53.6% of respondents of those who have personal computer had better ICT utilization status. A study in Nigeria and New Jersey, Startford university of medicine showed that ownership of personal computer is highly associated with longer duration of practice (Lloy & Sherry, 2006). There are various reasons for not using computers and the Internet. Of which lack of access to ICT facilities, inadequate training and high cost are among the major constraining factors. (Mulat & Tadesse, 2002; Abdula, 2008).

In this study it is indicated that knowledge of respondents are one of the driving factor of utilization of ICT among students in the academic as well as in the health service delivery needs. Among respondents who had good knowledge 52% of them use computer satisfactorily. Likewise a study conducted in Helsinki, Finland demonstrated that basic computer skill was highly associated with utilization of ICT facilities (Kalle & Matti, 2006).

From the in-depth interview it is indicated that majority of the key informants explained that, majority of students in the medical faculty needs to have competence of computer skill like statistical analysis software and online literature searching. In consistence with this finding a study in Hadramout university of Yemen showed that 74.3% of medical students need to be provided with training on online literature searching (Abdula, 2008).

5. CONCLUSION

To design proper interventions of improving the awareness and utilization of ICT in the medical institutions and health care delivery system, it is worth to assess the knowledge, attitude and utilization of medical students and health care providers. Such kind of empirical investigation can be a spring-board for the appropriate interventions like curriculum revision or in-service training.

The results of this study have important implications for the knowledge and utilization status of health professionals in the medical institutions and health facilities. The study indicated that majority of the medical students and health care providers had low level of basic ICT knowledge and only half of them are familiar with the basic ICT terminologies. Majority of the respondents have received formal or informal ICT training, however their training did not differentiate them from those who have no training in the basic knowledge of ICT. Almost all of the study subjects have positive attitude towards ICT and willing to have the appropriate skill for their academic purpose as well as for their future carrier. Ownership of personal computer at home was found to be one of the determining factors to have better knowledge of computer. Almost all of the undergraduate students who received the ICT course were not satisfied with the course and uncomfortable with their computer lab sessions. Possession of personal computer was relatively better among residents which helped them to have relatively better utilization rate compared with the other groups. The younger age groups had more likely to have better knowledge attitude and utilization of ICT applications compared to older ages. The study showed that access to computer and other ICT facilities is positively associated with participants' knowledge and utilization of computer. However, access to ICT facilities in the medical faculty was very limited and there is no computer dedicated for academic purpose in each department. Internet access was limited at Medical Faculty and majority of the respondents' access in the Internet café mainly for email service. The highest level of competence, reported by the study subjects were word processing and Internet browsing for email service and most of them acquired it through personal effort. Computer possession is one of the main factors that resulted in better utilization status of respondents. In this study knowledge on basic ICT is found to be one of the contributing factors for using the existing ICT facilities among undergraduate and postgraduate students in AAU, Medical faculty. There are various reasons for poor utilization of computers and the Internet. Of which lack of access, inadequate training of ICT and high cost appeared to be the major constraining factors.

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