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Article:	**Challenges in Adoption of Digital Health Education among Educated Youth in Pakistan**
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Abstract

This study attempts to examine the challenges in the adoption of digital health technology among educated youth in Pakistan. Using qualitative research methods, opinions of male and female students of public and private sector universities in Islamabad were gathered through eight Focus Group Discussions (FGDs). The study themes included: Complexity of language and medical terminology on the internet, lack of Information and Communication Technology (ICT) skills, less reliability of different websites, and threat to privacy. The study found that several factors such as poor facilitations conditions, institutional negligence, problematic medical jargon, online frauds, and privacy insensitivity are hampering the access to eHealth services among students of universities in Islamabad. As the global health systems are moving towards eHealth services, the lack of technological knowledge of the patients may harm their access to health services. Thus, there is a need to minimize the barriers to digital health education at the institutional level.

Keywords: Digital health education, eHealth literacy, information and communication technology

Introduction

Digital Health Education (DHE) is a concept that proposes the usage of advanced automated resources like power-driven technologies, computers, laptops, audio-visual aids, and smartphones to seek information relating to health, diseases, infections, and viruses (Dunn, 2020). Further, it also prompts the individuals to use such knowledge to address pertinent health-related issues. In this era of the information revolution, technology has played a significant role to alter the traditional health system. Now, it is easier for people living in developing countries to get access to health information through modern digital devices. Internet is providing knowledge about a variety of topics including nutrition, physical and mental fitness, healthy lifestyle, and diseases (Juvalta, Kerry, Jaks, Baumann, and Dratva, 2020). Thus, the concept of DHE is gaining wider significance.

Studies in the research area suggest that DHE can bring macro-level positive changes to health systems especially for developing countries (Nielsen et al., 2020; Rademakers, 2019). Resources-deprived countries are over-burdened with over-population and frail healthcare systems. There is a wide gap between medical resources and access to medical services in developing countries (Popoola, 2019). Such countries are facing a severe shortage of doctors, physicians, surgeons, and para-medical staff (Ragusa and Crampton, 2019). DHE can provide a cost-friendly solution to such problems by facilitating medics, hospitals, and patients as well. It can help to achieve promising health-related targets with a limited budget (Bucci et al., 2019) and can also save billions of dollars for a country (Rademakers, 2019).

A review of literature elaborates on social predictors affecting the frequency and level of digital health literacy around the world. Choi and DiNitto (2013) examined Internet use patterns and various dimensions of eHealth literacy in America. They found that older adults are less likely to use internet services to improve eHealth literacy than youngsters due to less exposure to internet technology and lack of financial resources. Moreover, some other studies have focused on the views of health care staff regarding the relevance of using digital tools in mental health services (Bucci, 2019). Although education is considered a determining factor, a study conducted in Pakistan showed that among educated youth, level of education showed a significant effect on the level of expertise in eHealth literacy, thus indicating that exposure to and usage of web information

regarding health are also essential (Adil, Usman, Khan and Mirza, 2021; Adil, Usman, and Jalil, 2021).

For a country like Pakistan, the provision of DHE can contribute significantly at both the micro and macro levels. Pakistan is a country with a condensed health budget and inadequate health facilities (Saeed et al., 2018). The constitutions of Pakistan promise the provision of elementary health necessities to every individual but confront problems because of enlarged infrastructural deficiencies (Itefaq and Iqbal, 2018). The notion of DHE in Pakistan was originated in 2009, by a medical association named, eHAP. The association provided its amenities for both the medics and the patients. The main emphasis of the association was to generate alertness among the general masses about the usage of online resources to navigate health information. The association offered its services for technical guidance to tackle the multifaceted modern digital tools and their incorporation in health knowledge (Latif, Alam, and Adbullah, 2016).

As a fact of reality, technology usage is of greater significance, but its usage is not so simple. There is certain kind of complexities to tackle the technological instruments. The previous studies depicted that the large segments of society were interested in getting health-related knowledge through different sources. But, the population, especially of developing countries, is not equally educated because of which less educated people are not well acquainted with ICTs. Not only the illiterate segment, but the educated individuals also have lesser tendencies towards using internet sources for searching health (Adil and Zaheer, 2016; Ali and Abbas, 2019; Adnan, Yousaf and Gilani, 2019). In short, the existing study is an effort to investigate why educated youth of universities in Pakistan have fewer tendencies towards using DHE and what sort of barriers they consider in this regard.

Methods

This study adopted a qualitative research design. The sample consisted of male and female students from four universities (figure 1) in Islamabad because students from varied socio-cultural backgrounds are present there. This research adopted the purposive sampling technique and selected 48 male and female students from various academic disciplines to ensure representativeness. The reason for selecting university students is because of their capacity to use electronic gadgets, familiarity with modern communication technology, and a propensity to adapt

to innovative methods of accessing health-related information. Eight FGDs were conducted to get a comprehensive insight into the matter. From each university, a group of six male and female students were selected. Separate FGD sessions with males and females were conducted to increase the comfort level of participants so that they could share their views. In addition to FGDs, eight in-depth interviews were also conducted with students. These interviews were conducted to validate the data collected through FGDs and to obtain more in-depth information from the participants.

Written permission was obtained from the participants and they were assured about their privacy. A trained facilitator along with a note-taker and an observer conducted the FGD sessions. The sessions were recorded with the consent of the participants. Before, starting each session the topic and its significance were shared. After the collection of data, the sessions were transcribed and phrases, dialogues, jargon, and terms were translated from Urdu to the English language. Then the collected information was categorized under chief codes and sub-codes. From codes of the same characteristics, certain themes emerged. These themes were later interpreted through thematic analysis.

Figure 1. Demographic Characteristics

	Demographic Characteristics		**FGDs Participants (n=48)**		**In-depth Interviews Participants (n=8)**	
S. No.	**University Name**	**Sector**	**Male (n=24)**	**Female (n=24)**	**Male (n=4)**	**Female (n=4)**
1	Quaid-e-Azam University	Public	6	6	1	1
2	International Islamic University	Public	6	6	1	1
3	Comsats University	Private	6	6	1	1
4	Bahria University	Private	6	6	1	1

Findings

FGDs and in-depth interviews were conducted to investigate various aspects associated with obstacles to DHE amidst university students.

Themes	Major codes	Codes title
1. Complexity of Language	• The major part of Online data is in English • Number of health institutions did not provide their database in multiple languages • Medical terminology is difficult to grasp • The wording of the medical web is only for students of medicine • Internet information is only for the physicians, surgeons, and medics	Deductive Deductive inductive Inductive Inductive
2. **Expertise in Using ICTs**	• Many developing countries remain strapped from the concrete favors of ICTs • ICTs are proficient in combatting ordeals within the health care industry • A certain number of websites have relatively toilsome procedures • Deficiency of skills to uncover exact, pertinent, and reliable health information on the web • University seniors have rarer tendencies to guide about consuming digital health education	Deductive Deductive Inductive Inductive Inductive
3. Susceptible Reliability of Different websites	• Information needs to be completely accurate for the health improvement • No concrete standard is still in practice to declare and evaluate the authenticity of websites on the internet • The content of the web can be changed • No proper referencing authority	Deductive Deductive Inductive Inductive
4. Threat to Privacy	• Lack of end-user self-reliance in information privacy hinders eHealth literacy • Digital and electronic medical devices e.g. X-ray Machines and ultrasound instruments are a great risk to privacy	Deductive Inductive

	• Patients are required to submit some private particulars for login to websites	Inductive

Figure 2. List of themes, major codes, and codes nature

The complexity of the language

Without having command over the English language, it is difficult to get benefits from online health information. In a country like Pakistan, English is considered a barrier to acquiring online information. A male respondent illustrated that "*I feel uneasy with the English language while using the internet for getting any information*". Another student continued his argument by stating that "*Internet language is arduous to apprehend*". Then the majority of health-related websites are not multilingual. A female respondent depicted that "*A prodigious number of health institutions did not render their database into multiple languages*". Furthermore, medical jargon is also puzzling to grasp. "*I feel most of the times that fitness-related webs are only planned for medics and students of medicine because the vocabularies used in such webs are much difficult*". Names of distinctive medicines, morbidities, and medical formulas are inordinately complicated to infer. Students are unable to acquire information using the internet, due to a lack of understanding of knotted medical terminology. "*I consider that the online substance is for the guidance of the clinicians and the medics only.*" Indubitably, language barriers are there, but still there are facilitating tools e.g. "Google Translate", that can minimize the effect of these barriers.

Expertise in using ICTs

The role of ICTs cannot be ignored in the field of health care. To sustain its business operations and clinical workability, the health department is in appalling need to borrow the services of ICTs. University computer labs are well equipped with digital resources, but the problem is with the level of expertise in these ICTs. Without expertise in ICTs, its benefits cannot be utilized. The number of websites has relatively toilsome procedures. Spotting genuine and apt information is another obstruction. A female respondent added that "*I have a deficiency of skills to uncover exact, pertinent and reliable health information on the web*". Students were impracticable with technology in health literacy because of a shortage of competence regarding ICTs. A female student described that "*for me, searching webs for fitness information is*

problematic because I have a dearth of computer skill". In addition, institutional negligence also affects proficiency in ICTs. Universities only concentrate upon the fulfillment of their particular coursework. A male respondent further pointed out that "*in my university, the culture of guidance from seniors and mentors relating the utilization of technological resources, is not in practice"*. The skills of people to operate technologies proficiently will be dependent upon their knowledge of using ICTs. ICT expertise has an absolute influence on technology adoption which straightly lays an impression on the adoption of digital health literacy.

Susceptible reliability of different websites

Internet is utilized by millions of people to gather the required information. Therefore, the information needs to be completely accurate not only for the health of people but also for their welfare. Most of the end-user health information on the internet is reliable, still, certain studies concluded that some of this information is untrue. A female student described that "*No tangible standard is still in practice to judge the authenticity of websites on the internet*". The user is in distress when he is confronted with less reliable information on the internet. Then frauds and deceit are also a great impediment in the course of digital education. A female student added that "*I am afraid that less reliable information on the internet may ruin my health instead of improving it*." A male student further stated that "*I will prefer to consult a doctor rather than using any suspicious web information*". The fear of erroneous and extraneous information hinders the health seekers to use the internet for searching health. During discussions, a female defendant specified that "to me, web information is not trustworthy, as most of the online content is modifiable". A male respondent is further convoluted that material available on the internet is without any citation, which increases the chances of skepticism. *"Online content is most of the time, without any reliable referencing source"*. Still, there are certain indicators to compute the authenticity of websites (e.g. having an organization domain or tracing copyright, etc.), but patients are most of the time not an expert in these skills.

Threat to privacy

The deficit of end-user self-reliance in information privacy has been recognized as a foremost dilemma hindering the enlargement of digital health education. Even with the significance of understanding the temperament of online consumers' apprehension for information

privacy, this subject has received little notice in the information systems community. Digital Health, as an inter-jurisdictional project, presents a danger to patient health data that engage not only professional protocols and technology but also rules, conventions, and specialized security cultures. Secure e-Health therefore can attract the customers to use it, while lack of privacy will decrease the level of eHealth education. Considerable health-related webs expect elementary information from the operators. During the detailed interview, a female participant made her point that *"data leakage and secrecy breakage are triggered by many webs, as websites demand peculiar info for 'logging in' to webs".* A female defendant added her reaction that digital medical devices e.g. X-ray machines and ultrasound apparatuses are a greater hazard to secrecy. She further portrayed that *"Using online fitness substance, sometimes, has some moral fears. I consider it problematic for having an ultrasound. As different body scanning machines may conceal the secrecy."* Then in diverse cultures some ailments e.g. sexual illnesses are not debated openly. A respondent elaborated: *"People with sexual diseases may not discuss their problems with online medics".* Specialized health information establishments have been playing a vigorous role to promise the safety and privacy fears of patients throughout the world, as they are well conscious that privacy anxieties are damaging the repute of digital health education.

Discussion

The basic objective of the contemporary study was to point out major barriers to DHE among the educated youth of universities in Islamabad, Pakistan. The findings of the study came up with different barriers to DHE. The study indicated that online health resources are in the English language. The majority of health-related websites are over-burdened with complex terminologies. The erstwhile studies depicted certain kinds of results by depicting that internet language (Schyve, 2007), medical jargon (Juvalta et al., 2020), complicated vocabularies, etc. made the surfing procedure boring and difficult (Nielsen, 2020). The findings seem quite a rationale because Pakistan is a non-English speaking country. Despite the fact, that university students are competent enough to comprehend English, still, most of them don't feel easy with this language.

The study further explored that university labs were well equipped with modern ICT resources, but the problem was with the expertise in these technologies. Students were not getting

benefits from DHE, due to their inefficiency in using technology. This finding validated the existing theoretical model of 'Cultural Lag' (by William F. Ogburn), which theorized that there is always a gap between material culture (Technology) and non-material culture (Expertise and skills). Such kind of gap between the availability of technology and expertise was explored among university students.

In line with the former studies (Rademakers, 2019), this study pointed out that less reliable online information is a greater hindrance to DHE, as most of the online content is having no proper referencing authorities (Flanagin and Metzger, 2007). This is a quite logical depiction by the respondents because, in this era of the scientific revolution, people are well aware that bogus information can ruin their health. Previous scholarly contributions had also stressed a lot to devise a system to extricate reliable and less reliable health-related websites (Adil and Sattar, 2021).

Further, as depicted by the existing literature, the study explored that people consider DHE, a threat to their secrecy (Filkinet al., 2016). The findings depicted that majority of health-related websites demand personal details for registering an online account. People don't feel easy to share personal data e.g. emails, phone numbers, names, addresses, etc. So, no doubt, the users' stance to skip such websites is the rationale, because fake online resources can use personal information negatively.

The present research findings are having according to the previous ones, but still, the current research tried to fill the gaps of previous studies. First of all, in contradiction to previous studies, the research focused on the highly educated segment of society to obtain more mature responses about this significant topic. The erstwhile studies only studied school students, who had inefficient skills in using ICTs. Then, the existing study cross-validated the results by first, conducting the FGDs, and further continuing the in-depth interviews. Previous studies were lacking such kind of triangulation. Further, this study is unique in the sense, that is focused on both public and private sector educational institutions and studied the responses of both male and female participants.

Still, the range of this study is only restricted to the highly educated students of universities, and it is lacking the contribution of medics, physicians and para-medical staff, etc. For the broader understanding of the topic, a country-level sample should be studied, as this research was only confined to Islamabad city. Further, the current research only explored the qualitative aspects of the topic. In the future, more systematic quantitative studies are needed for the cross-validation of

the outcomes. Regardless of these limitations, the results of the study are ready to lend a hand to advance the understanding of the subject matter and highlight the importance of digital health education.

Conclusion

FGDs and in-depth interviews were accomplished in four different public and private sector universities of Islamabad, Pakistan. The primary focus was to investigate the barricades associated with digital health education among the educated youth of universities, who were having well equipped with ICT resources and had the basic knowledge of ICTs. The study concluded that complication of language, decreased proficiency in using ICTs, alleged trustworthiness of different websites, and privacy hazards were the main hurdles to the successful implementation of DHE. Future researchers on this topic are advised to enhance the sample size and conduct a study by using different tools and techniques. In addition, careful efforts and coordinated measures are desirable from government, educational institutions, and health organizations to encourage digital health education, in particular, among the educated segment of Pakistani society.

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