Pakistan Journal of Social Research
ISSN 2710-3129 (P) 2710-3137 (O)
Vol. 4, No. 2, April-June 2022, pp. 1302-1311.
www.pjsr.com.pk

CONSUMPTION PATTERNS AND PERCEIVED USEFULNESS OF MHEALTH APPS AMONG YOUTH

Shabana Asgher*
Assistant Professor, Mass Communication, Lahore College for Women University. Email; shabana.asgher@lcwu.edu.pk

Faiza Latif
Associate Professor, Public Relations and Advertising Department, SCS, University of the Punjab, Lahore, faiza.prad.scs@pu.edu.pk

Dur-e-Ajam
Assistant Professor /Ph D Scholar, Department of Mass Communication, Lahore College for Women University, Lahore, tahsintahir@gmail.com

ABSTRACT
The rapid advancement in new Information Communication Technologies (ICTs) has transformed the ways people take care of their health. The significant role of new media in health-related behaviors at both macro and micro levels is a recognized fact. mHealth apps are amongst the advancements which are benefiting human health at an individual level. This increased usage of mHA led the researchers to explore the ways youth consumes these Apps and the benefits they perceive to attain for their physical and psychological health. The data on consumption patterns and perceived usefulness were measured on a five-point Likert scale. The finding of the study suggested that most of the users reported having one to three health apps on their mobile phones on average and found them useful to get both PHI (Prevent Health Information) and CHI (Curative Health Information). The study concluded that these apps were creating awareness among youth and benefiting them by gratifying both their physical as well as their psychological health related needs.
Keywords: mHealth apps, Youth, Perceived Usefulness.

INTRODUCTION
The internet has revolutionized the way information is shared and accessed. Information retrieval is easier now than ever before. The phenomenal task of turning the world into a global village became possible with the arrival of Information Communication Technology (ICT) (Singh, Bhanotra, Niketha, Wani & Kumar, 2015). Internet and ICTs have transformed every field of life at every level (Souter, 2012) and have played a major role in improving the access and quality of every field of life, especially in the healthcare zone. With the advent of internet, a term also emerged in health communication which is recognized as eHealth. The term eHealth stands for Electronic Health and can broadly be defined as the application of ICTs to healthcare (Aceto, Persico & Pescape, 2018).

The European Commission defined eHealth as the practice of ICTs in health services, products and procedures joined with organizational transformation in health care systems and new skills, in order to improve the health of people, efficiency and productivity in the health care delivery, and the economic and social value of health. mHealth (mobile health) emerged as an essential subcategory of eHealth, which is defined as the use of mobile devices in medicine and health. Where eHealth generally concentrated on information and communication technologies, mHealth strives to explore more wireless communication and mobile (Abaza & Marschollek, 2017).

* Corresponding Author

mHA brought a revolution in health communication. The purpose of this technology is to encourage the individual activity goals meant to improve the health and the value of health care fields (Miyamoto, Henderson, Young, Pande & Han, 2016). In past years, the number of mHA of iPhone Operating System (iOS) and Android stores just doubled up and is way better, cheaper, and faster (Ghanchi, 2019). Every iOS and Android smartphone has built-in health apps for its users. For further specific health issues, the users can download/install any mHealth app from the Google play store. According to the software application industry, an estimated 500 million smart phone users were using an mHA worldwide. In 2015 and by 2018, it was estimated that more than 3.4 billion mobile phone and tablet users were youth people who had installed mHA (Bjuyan, 2018).

According to statistics research department, the expected amount of mHealth apps installed worldwide from 2013 to 2017 was in the billions and it increased to 3.7 billion by 2017. The number of health apps available at the Google play store worldwide from the first quarter of 2015 to the third quarter of 2019 was 41,377 demonstrating that there was a 4.69 percent increase over the former quarter (Mikuli, 2019).

In general terms, mHealth is the application of mobile computing, medical sensors, and communication technologies for healthcare. They are created as a synergy of emerging mobile medical computing, medical sensor technologies, and communication technologies. In general terms, mHealth is the application of mobile computing, medical sensors, and communication technologies for healthcare. They are created as a synergy of emerging mobile medical computing, medical sensor technologies, and communication technologies. In general terms, mHealth is the application of mobile computing, medical sensors, and communication technologies for healthcare. They are created as a synergy of emerging mobile medical computing, medical sensor technologies, and communication technologies. In general terms, mHealth is the application of mobile computing, medical sensors, and communication technologies for healthcare. They are created as a synergy of emerging mobile medical computing, medical sensor technologies, and communication technologies. In general terms, mHealth is the application of mobile computing, medical sensors, and communication technologies for healthcare. They are created as a synergy of emerging mobile medical computing, medical sensor technologies, and communication technologies

In progressive countries, mHealth apps focus mostly on supporting aging populations via delivering prevention plans and reducing healthcare costs by home-based monitoring (Heerden, Tomlinson &Swartz, 2012). In Pakistan, high ratio of mobile phones is mostly used by the youth. Statista showed that about 51 percent of Pakistani population had mobile phones in 2020 which was five times higher than in 2014.

In the coming years, these apps can actually work as personal doctors through which users can take care of their health problems on a continuous basis (Moore, 2013). It will be beneficial for software companies or people who are making these applications because they make well-targeted apps after needs are identified which also improves apps according to the requirements of the user (Jakson, 2011). As there is a growing percentage of people who are using mobile technology and they can contact health services via mobile phone apps, there are several solutions to chronic diseases which are available and improve the access to health, knowledge, and behavior through the use of mHA. This study is helpful for healthcare providers because it can improve the communication between professionals and patients, giving patients an insight into their conditions so they get better information and understanding about their health (Wallwiener, et al., 2016).

REVIEW OF LITERATURE

The trend of mHA is increasing these days. Mckay, Wright, Shill, Stephen & Uccellini, (2019) explored the increase of mHA especially in physical activities, eating habits, smoking, and reducing alcohol to improve mental well-being. The study was done in Australia and different apps were selected for the mobile store. They found that somehow these apps lead to changes in behavior and improve their mental well-being. The study found that there was a wide range of health apps but there was a limited number of behavior changes. However, the results also showed that these health apps improved lifestyle and provided better health facilities. Miyamoto et al., (2016) explained that mobile health technology was creating awareness to track health data. The purpose of the study was to identify the point of view of mobile health users

regarding mobile health technology. The focus group method was used for data collection. The findings identified that health tracking data may create awareness of daily activity but is not sufficient to sustain the use of mHealth apps.

Guffey (2017) in his study found that those users who do self-track for reasons other than diet or exercise are more likely to have excellent reports of health as compared to non-app users. Herrmann& Kim, (2017) described in the article that there were thousands of apps on smart phones that either are free or can be purchased. The purpose of the study was to examine the usage of fitness apps and their effect on the theory of planned behavior. The scholars wanted to check whether these fitness apps were helping individuals to maintain their personal health and sustain their fitness. The results revealed that there was no significant change over the past five months in fitness perception and the mobile health apps were not connected to the theory of planned behavior.

mHealth application snow provides a healthy lifestyle as Khan (2016) examined in his research the usability-related problem of the selected mHealth wellness application. He selected a developed app "Activio" used by trainers and trainees in gyms and fitness centers. The results showed that there were some usability problems, but overall satisfaction was shown with "Activio" app. Gay & Leijdekkers, (2012) examined in their research an application which was "my Fitness Companion". Their research aimed at making users of "my Fitness Campanion" app share their experiences regarding their health and fitness. This study was based on seven months. The result showed that this app was predominantly suitable for chronic condition users because it was necessary for them to collect their health data and monitor their health on a daily basis. Robbins, Krebs, Jagannathan, Louis & Duncan (2017) in research explained that mobile apps serve a healthy lifestyle to the general public. Health conditions like hypertension and obesity have increased due to which health care costs have also increased.

Langford, Solid, Scott, Lad, Maayan, Williams & Seixas (2019) examined the popularity of smartphone ownership, mobile health apps, and self-reported hypertension status. The study explored that mobile health apps help users to achieve good health status and make good decisions about their health. The result they found was that smartphone ownership was low in US adults who have a history of hypertension. Compared to adults who did not have a history of hypertension had health apps on their smartphones. In the end, they found that mobile phones helped US adults to achieve good health and make good decisions about their health. Korte, Wiezer, Roozaboom, Vink & Kraaj (2010) highlighted in their research how mHealth apps will help employees to have a better environment and have a healthy lifestyle. They chose mental and physical health apps for employees to identify behavior change techniques in them. So, they did a comparative evaluation of physical and psychological apps to check that these apps helped the employees in reducing stress environment and promote a healthy work style of the individuals. In the end, their finding suggested that these apps might help in improving behavior and also help the employees to make better decisions about their work.

Liang, He, Jia, Zhu & Lei, (2018) analyzes the usefulness of hypertension management apps that were available in the Chinese market. They also wanted to identify the gap between China apps products and non-mainland China apps products, provide recommendations to the developer industry and help out hypertension patients to select suitable apps for themselves. A systematic evaluation was done by the researchers. The result found that apps from mainland China provided were far lower usefulness than the China apps products. In the end, they concluded that psychological apps were suitable for hypertension patients. The researchers recommended that the developer industry should also work on privacy and data security issues.

Steeb, Wessely, Mastnik, Brinker, French, Niesert, Berking & Heppt (2019) narrated that digital and eHealth was an emerging field and skin cancer apps were very useful tools for dermatologists and also for the patients. But very little was known about these kinds of apps in patient perception. The study investigated the patient's attitudes and awareness regarding skin cancer apps. Researchers used a cross-sectional study and took patients from the university hospital LMU Munich, Germany, and a survey method was also used to know the usefulness of skin cancer apps. The finding suggests that patients never used skin cancer apps. However, they were more interested to know if dermatologists recommend skin cancer apps or not.

Han, & Lee (2018) expressed in their research, that mHA were helping in changing health behaviors and a systematic review was done on clinical health outcomes. A comprehensive bibliographic was conducted on health behavior change articles. Different databases were used to collect the data. In the result, they found that mHA had a positive impact on changing the health behavior on clinical outcomes.

The knowledge researchers found out by reading the literature on mHA that it is an emerging trend of knowledge and very little is known about it. Most of the studies focus on specific physical apps (fitness, exercising, and diet), psychological apps (stress, hypertension, etc.), chronic diseases apps (skin cancer, blood pressure, diabetes), and awareness regarding mobile health apps. But the area of consumption patterns of mHA along with the usefulness refers to physical and psychological health among youth are unaddressed. However, mHA are helpful for the users to solve their health problems. Therefore, this study aims to,

- find out the consumption patterns of youth regarding mobile health applications
- identify the usefulness of mHA, which refers to self-reported gratification of Physical and Psychological health related needs of the users

METHODOLOGY

The researcher chose a survey design for the study. The population was comprised of youth living in Lahore. With the random sampling technique, a sample of 500 students from the top five public sector universities was selected. Students at universities who reported to have at least one mHealth Apps were included in the study, with the help of a screener. The reason to focus the study on students was that they are sensible and educated and an increased trend of using mobile phones in their daily routine is reported (Vaidya, 2016).

Socio-Demographics

The following socio-demographics were asked from the respondents which included Age (18-29), Gender (Male &Female), Education (BS, M.Phil. & Ph.D.), Health status of the respondents (Poor, Average, Good & Excellent), Respondents were also asked whether they or any close family member suffering from any chronic disease (like blood pressure, diabetes, etc.)? (Yes or No) and since how long they were using mobile health apps (less than 2 years or more than 2 years).

RESULTS

Table 1. Using mobile health apps

Since how long you are using mobile health apps?

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Less than 2 years	348	69.3	69.6	69.6
	More than 2 Years	152	30.8	30.8	100.0
	Total	*500*	*100*	*100.0*	

Interpretation: According to the gathered data, a significant majority (69.6%) of the respondents reported that they were using mHealth apps (Mobile Health apps) for less than 2 years. About 30.4% of the respondents were using these apps for more than 2 years. From the data gathered it was concluded that respondents were getting awareness about such mobile health apps.

Table 2. No of mobile health apps (pre-installed or downloaded)

Pre-installed or downloaded mHealth apps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only one	320	63.7	64.0	64.0
	Two	152	30.3	30.4	94.4
	More Than two	28	5.6	5.6	100.0
	Total	*500*	*100.0*	*100.0*	

Interpretation: According to the findings, a significant majority of respondents had installed or downloaded only one App in their mobile phone. 30.3% of the youth were using two mobile health apps and very few (5.6%) were having more than two apps related to health in their mobile phones.

Table 3. Reasons to install/ download mobile health app

Reason to install mHealth apps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	For health issues (my parents or any family member is suffering from)	194	38.6	38.8	38.8
	To monitor my own Health	211	42.0	42.2	81.0
	To manage my daily health-related needs	95	18.9	19.0	100.0
	Total	*500*	*100.0*	*100.0*	

Interpretation: The findings show that the major reason behind installing mHA was to monitor their own health as 81.0% of the respondents strongly agreed to it. It shows that young users of the mobile phones are monitoring their health through mobile phones apps. About 38.8% were using mHealth apps for their parents or family members. These findings highlight the increased use of mHealth Apps for both preventive and curative health.

Table 5: Frequency of the usage of mHealth apps

How frequently use mHealth apps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular (Daily)	305	60.8	61.0	61.0
	Once a week	160	31.9	32.0	93.0
	Twice a week	25	5.0	5.0	98.0
	Whenever needed	10	2.0	2.0	100.0
	Total	*500*	*100.0*	*100.0*	

Interpretation: The above table shows that 61.0% of the respondents were frequent users of mobile health apps. The ratio of respondents who use these Apps in case of some health-related need was very low i-e only 2.0%. Those who use health apps once a week were 31.0% and 5.0% reported to use these Apps twice a week. Categorizing these patterns into regular use (combining regular, once/ twice a week) and need-based usage, the difference is visible, showing a significantly high ratio of the regular use of mHA among youth.

Table5 Continuing to use mHealth apps till fully recovered from the health issue

Continuation of the usage of mHealth apps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To great extent	150	29.9	30.0	30.0
	To some extent	227	45.2	45.4	75.4
	Not decided	69	13.7	13.8	89.2
	To little extent	32	6.4	6.4	95.6
	Not at all	22	4.4	4.4	100.0
	Total	*500*	*100.0*	*100.0*	

Interpretation: According to the data, the feedback is presented above in the table that shows that in case of using mHA for curative purposes, 45.4% respondents prefer to use mHealth apps till they get fully

recovered from the health issue they are facing. It reveals that mHealth apps are relevant in solving their health regarding issues.29.9% highly used these health apps for their health recovery. And very few agreed to make persistent use of mHA till getting recovered from their health issue/disease.

Table 5.: Downloaded mHealth apps but don`t bother to use it

Not utilizing mHealth apps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To great extent	43	8.6	8.6	8.6
	To some extent	92	18.3	18.4	27.0
	Not decided	179	35.7	35.8	62.8
	To little extent	98	19.5	19.6	82.4
	Not at all	88	17.5	17.6	100.0
	Total	*500*	*100.0*	*100.0*	

Interpretation: Data revealed that 35.7% respondents were undecided while responding to the question whereas 19.5% responded to little extent they have downloaded the mHealth apps but they don`t bother to use it. 17.6% did not agree with this, which mean from the gathered sample of data very little amount of users prefer not to use mobile health app.

Statistical Analyses:

Descriptive analysis was conducted using SPSS version 17. Responses were presented in the form of tables and bar graphs.

Analysis &Discussion:

The study intended to seek answers to research questions regarding the consumption and perceived usefulness of mHA among users. The following section presents the analysis of the answers in the light of literature review and theoretical foundations.

Research Question 1

What are the consumption patterns of mHealth apps?

The purpose of this study was to explore the consumption patterns of mHA among youth. According to the data gathered from the questionnaire, this study found that these apps were not only creating awareness, but their usage has also increased. The users were using these apps not only for themselves but also for their parents and their family members. These apps helped them to maintain their health as well as they also monitor their parents or any family member's health issue. The study finds that these apps were working well for them and also were convenient for them to use in their daily lives.

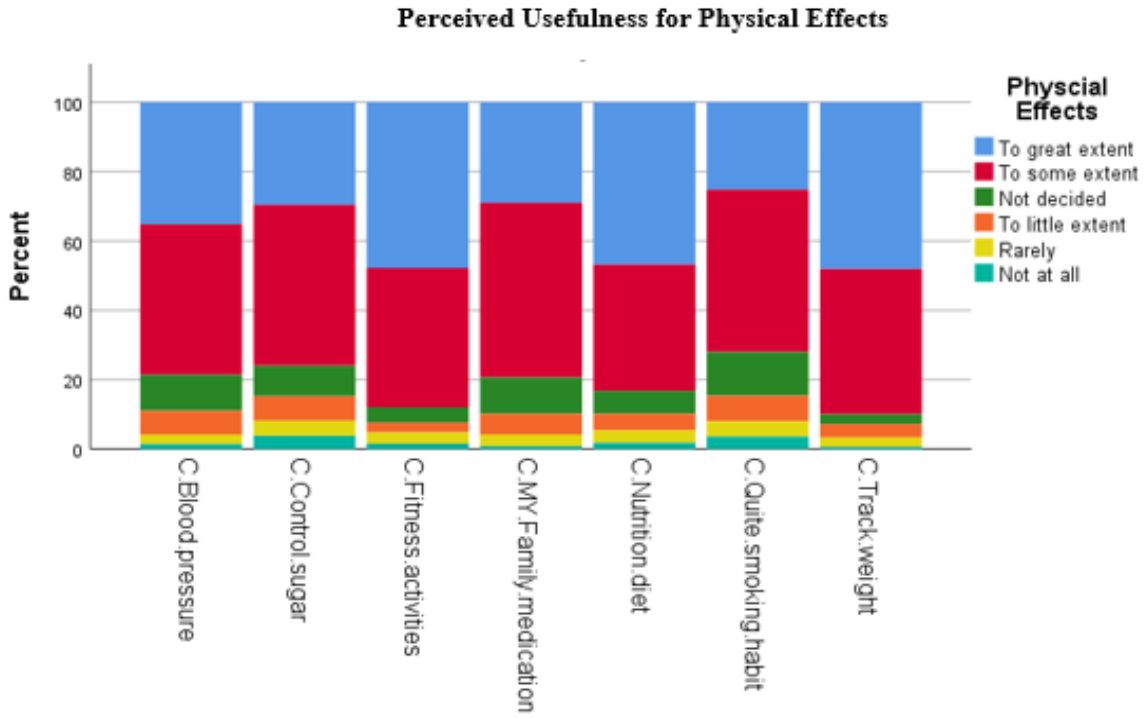
The assessment of the data from this study highlights the researcher found that majority of users were using these apps frequently and on regular basis which can be interpreted that these apps were helping them to gratify their health-related needs. These findings support the Uses and gratification theory which states that motivation and patterns of use of a medium are generated by the needs of the user. Researchers intended to find that after using these apps whether the user need is being gratified or not? The result showed that along with the increased usage of mHA, the ratio of needs-gratification was also high. Among the reported reasons of this increased usage and perceived usefulness was the different health issues were getting resolved after using these apps because these apps helped the users to get better information about health-related issues. The use of mobile health apps can save users time also.

These findings are also supported by the existing result, that these apps provide high quality information to target individual needs. The usability of these apps overall was found satisfied. The adoption of these apps has significant impact on the health globally, especially in low- and middle-income countries (Woldaregay et al, 2018; Khan, 2016; & Zhao et.al. 2016).

Research Question 2

Do mHealth apps helping the users gaining any physical health benefits?

Perceived Usefulness of mHA for physical health



Data was collected to seek answer to this research question. Specific items related to physical health were added in questionnaire i-e keep track of weight, guidance or information about users' nutrition and diet, fitness activities etc. The result showed that users were gaining a lot of benefits from these mHA. The findings indicated that physical health related apps were not only helping the users with weight issues but were also providing relevant guidance regarding their diet and nutrition. Which means most of the mobile health users are satisfied after using such physical apps.

Technology Acceptance Model (TAM) guided and helped the researcher to define the construct of usefulness and determine the concepts to measure it. For instance, what benefits users are gaining from this technology and what ease of use these apps are offering them. This model also helped the researcher to find out the motivation of the users behind using this technology. The result showed that mobile health apps were helping the users to gratify their needs related to physical health. Most of the questions answered indicates that users are satisfied with these apps. According to the collected data, the question about the mHealth apps is useful and helped the users or their family members to take their medication regularly. The result showed that most of the users having positive responses about this question because most of the users installed these apps to monitor their parents' health condition, and it exhibited that users not only helped their parents to take their medication frequently but also control their Blood pressure and diabetes.

According to the data, mHA users were gaining any usefulness regarding the control of their diabetes and sugar. The study asked which chronic condition was the most common disease and that was diabetes as most users were suffering from it. These apps also alert the users in the health emergency condition and 45.2% of the mHA users agreed with it meaning these apps were very useful for urgent situations such as to check their diabetes condition anytime if they needed.

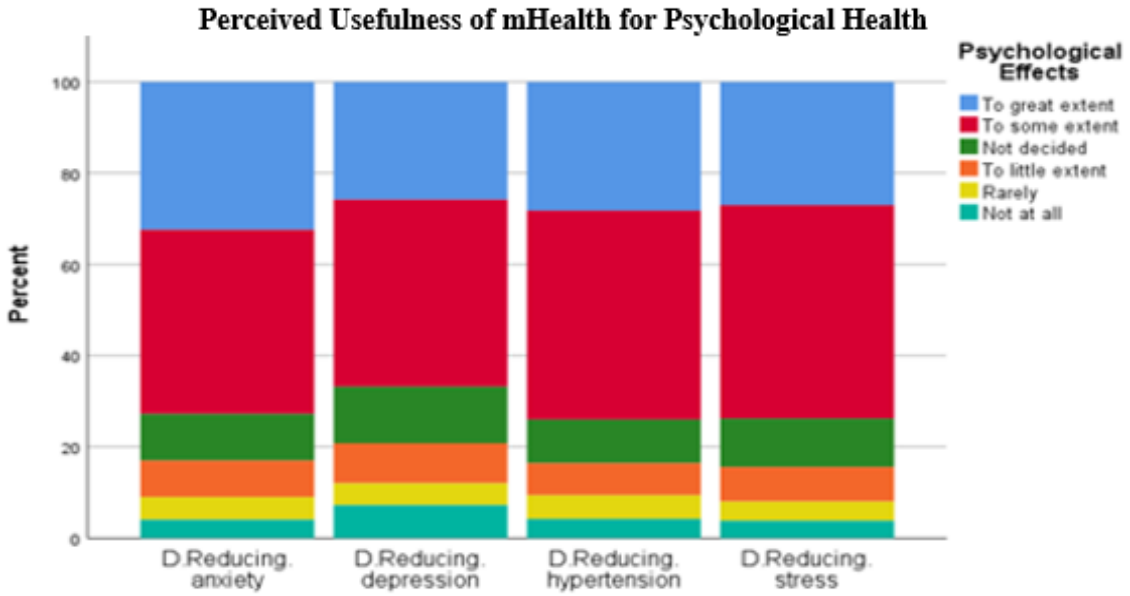
The benefits users were gaining were that they were quitting bad habits that were injurious to their health (like overeating, smoking or late-night sleep etc.). The result showed that most of the users admitted that these type of physical apps are helping them to quit bad habits. These findings supported the existing result that physical apps users were giving up on their awful habits and improving their lifestyle and their mental well-being. Most of the female users were getting benefits from these apps more than the male users because they frequently used these apps to monitor their health conditions. These types of users who were more engaged in physical activities like their intake of low-fat diet, so they have a great immune system. Those users who self-track and maintain their diet or exercise were more likely to have excellent health as

compared to non app users. The apps were helping in self-tracking as well as creating awareness in the common public to achieve excellent health goals (Mckay, et al. 2017; Ernsting, et al. 2019; Guffey, 2017; & Miyamoto, et al. 2016).

Research Question 3

Do mHealth apps help users in coping with psychological health issues?

Perceived Usefulness of mHA for psychological health



According to the data gathered regarding the perception of youth about mHealth apps show that these apps were useful for them to reduce their stress (e.g. work stress like doing some yoga). The results showed that users who were using these apps were likely to have positive response towards these apps.

The data demonstrated the reduction of hypertension after using mobile health apps among users. It indicated that to some extent it was helpful for the users who were heavily stressed. It also helped to control their high blood pressure. These findings on one side authenticated the phenomenon of increased hypertension in youth (Carrera et al, 2016), while on the other hand it also identified mHA as being helpful for the users to cope with their mental health-related issues like hypertension and stress. Previous research however had different results regarding the role of mHA. Langford et al 2019, for instance, in their secondary data analysis of HINTS, found that the adults with hypertension were not using these Apps. One possible explanation of this contrast in findings can be the difference in population of both studies and their demographics. In a country like Pakistan where psychological problems are either not considered as worth noticing or are hidden, it is natural that those facing these issues will try to seek help from anonymous sources. Furthermore, Social taboos, lack of communication due to generation gap, less medical facilities, and financial constraints cause information deprivation among youth. These Apps in such circumstances provide the best alternate source to seek help for issues like stress and hypertension. Youth, being more vulnerable to accept change, adopt new ideas, and being heavy user of new technology also adopts and uses these technologies. Therefore, the two main requisites of technology acceptance i-e Perceived usefulness (PU) and Perceived ease of Use (PEOU) were found among the target of this study i-e youth.

These apps were helping the users in reducing their anxiety issues, as identified in the result that majority of the users were getting help from such apps. These findings were supported by the earlier result that about 71% of the users were interested and these apps were more convenient for them to use rather than to visit clinic on daily basis (Lipchitz, Miller, Hogan, Burdick, Foster, Simon, & Burgess, 2019).

The discussion in this research question was about psychological health apps that helped the user in reducing their depression (like when they cannot stop feeling sad or down or empty). According to the

responses the users disclosed the answer that to great extent these apps were helping them in reducing their depression.

In this study researcher asked that whether these apps were helping the users at their workplace to calm themselves and these finding were matched to the existing study that these psychological apps were helping the users to make better decisions, calm their minds and reduce stress environment and promote healthy work style for the individual (Korte et al. 2010).

CONCLUSION

In the light of the analysis, it can be concluded that the youth of Pakistan are using mobile phone for PHI (Prevent Health Information) and CHI (Curative Health Information). They not only use these apps in their daily lives but also find them helpful especially for chronic condition patients. It can be concluded that users of mHA perceive these Apps beneficial for both physical and psychological health. Further research is needed to find out the possible negative influences of these Apps as well as the role of other variables like eHealth literacy in determining the effectiveness of these Apps.

REFERENCES

Abaza, H. &Marschrlek, M. (2017, August 8). mHealth Application Areas and Technology Combinations: A Comparison of Literature from High and Low/Middle Income Countries. (Institute for Medical Informatics, Hannover Medical School. Hannover, Germany). https://www.thieme-connect.de/products/ejournals/html/10.3414/ME17-05-0003#N68301

Aceto, G., Persico, V. & Pescape, A. (2018, February). The role of Information and Communication Technologies in Healthcare: Taxonomies, Perspectives, and Challenges. *Journal of Network and Computer Applications, 107*.

Gay, V.& Leijdekkers, P. (2012). Personalised mobile health and fitness apps: Lessons learned from myFitnessCompanion. *Studies in health technology and informatics, 177*. 248-253. ttps://www.researchgate.net/publication/230783948_Personalised_mobile_health_and_fitness_apps_Lessons_learned_from_myFitnessCompanionR

Ghanchi, J. (2019, September 24). mHealth Apps: How Are They Revolutionizing the Healthcare Industry?. *Medical Device and Diagnostic Industry*. https://www.mddionline.com/mhealth-apps-how-they-are-revolutionizing-healthcare-industry

Guffey, T. (2017). Smartphone application self-tracking use and health. (Doctoral thesis, Texas Woman's University, Demton, Texas)

Han, M.& Lee, E. (2018, July). Effectiveness of Mobile Health Application Use to Improve Health Behavior Changes: A Systematic Review of Randomized Controlled Trials. *Healthc Inform Res, 24* (3). 207-226. https://pubmed.ncbi.nlm.nih.gov/30109154/

Heerden, A. V., Tomlinson, M.& Swartz, L. (2012). Point of care in your pocket: A research agenda for the field of mHealth. *The world Health Organization Bulletin of the World Health Organization, 90*(5). 393-394.

Herrmann, K. L. & Kim, J. (2017, January 30). The fitness of apps: a theory-based examination of mobile fitness app usage over 5 months. *Mhealth, 3* (2). https://www.ncbi.nlm.nih.gov/pubmed/28293619

Khan,K. (2016). Investigating motivational and usability issues of mHealth wellness apps for peoples to ensure satisfaction: Exploratory Study. *Computer Science*. https://www.semanticscholar.org/paper/Investigating-motivational-and-usability-issues-of-Khan/f215a7bc64bc82ded57370e2674a86fa3b43e414

Korte, E. D., Wiezer, N., Roozaboom, M. B., Vink, P. &Kraaj, W. (2010, October 3). Behavior Change Techniques in mHealth Apps for the Mental and Physical Health of Employees: Systematic Assessment. *JMIR mHealth and uHealth, 6*(10). 167. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6231882/

Langford, A. T., Solid, C. A., Scott, E., Lad, M., Maayan, E., Williams, S. K. & Seixas, A. A. (2019). Mobile Phone Ownership, Health Apps, and Tablet Use in US Adults With a Self-Reported History

of Hypertension: Cross-Sectional Study. *mHealth and uHealth, 7* (1). e12228. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6682274/

Liang, J., He, X., Jia, Y., Zhu, W.& Lei, J. (2018, March 18). Chinese Mobile HealthAPPs for Hypertension Management: A Systematic Evaluation of Usefulness. *JHealthc Eng.* https://pubmed.ncbi.nlm.nih.gov/29744027/

Mckay, H. F., Wright, A., Shill, J., Stephen, H.& Uccellini, M. (2019, July 4). Using Health and Well-Being Apps for Behavior Change: A Systematic Search and Rating of Apps. *JMIR MhealthUhealth, 7* (7). https://mhealth.jmir.org/2019/7/e11926/#

Miyamoto, S. W., Henderson, S., Young, H. M., Pande, A.& Han, J. J. (2016). Tracking Health Data Is Not Enough: A Qualitative Exploration of the Role of Healthcare Partnerships and mHealth Technology to Promote Physical Activity and to Sustain Behavior Change. *JMIR mHealth and uHealth, 4* (1). 5.://www.ncbi.nlm.nih.gov/pmc/articles/PMC4758807/

Robbins, R., Krebs, P., Jagannathan, R., Louis,G. J. & Duncan, D. T. (2017, December 119). Health App Use Among US Mobile Phone Users: Analysis of Trends by Chronic Disease Status. *JMIR mHealth and uHealth, 5*(12). 197. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5750424/

Singh, W. A., Bhanotra, A., Niketha, L., Wani, S. A. & Kumar, M. (2015, June) Mobile Phone Technology-An Eminent ICT Tool for Better Family Farming. https://www.researchgate.net/publication/290566905_Mobile_Phone_Technology-An_Eminent_ICT_Tool_for_Better_Family_Farming

Souter, D. (2012, May). IISD. ICTs, the Internet and Sustainability: A discussion paper. *International Institute for Sustainable Development (IISD).*https://www.iisd.org/library/icts-internet-and-sustainability-discussion-paper.

Steeb, T., Wessely, A., Mastnik, S., Brinker, J. T., French, E. L., Niesert, C. A., Berking, C.&Heppt, V. M. (2019, July 2). Patient Attitudes and Their Awareness Towards Skin Cancer–Related Apps: Cross-Sectional Survey. *JMIR MhealthUhealth, 7* (7). 13844. https://mhealth.jmir.org/2019/7/e13844/

Vaidya, A., Pathak, V.& Vaidya, A. (2016, April). Mobile Phone Usage among Youth. *The United Nations Educational, Scientific and Cultural Organisation.* http://www.unesco.org/new/en/social-andhuman-sciences/themes/youth/youth-definition

Wallwiener, S.,Muller, M., Doster, A., Laserer, W., Reck, C., Frohlich, J., Brucker, S. Y., Wallwiener, C. W.&Wallwiener, M. (2016, March 30). Pregnancy eHealth and mHealth: user proportions and characteristics of pregnant women using Web based Information sources—a cross-sectional study.

World Health Organization. (2011). mHealth New horizons for health through mobile technologies. *Global Observatory for eHealth series, 3*. https://www.who.int/goe/publications/goe_mhealth_web.pdf