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Original Research Article

Usage of new-age digital technology on the day-to-day health practices: a cross-sectional study in urban area of central Gujarat

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ABSTRACT

Background: Non-communicable diseases (NCD) are becoming a larger concern for individuals and the healthcare system. Poor diet and sedentary lifestyle are becoming more prevalent. Digital technologies have the potential to be useful tools for managing NCDs and altering health-related behaviours. Objectives were to estimate the proportion of users of digital technology for health, to know the type of digital devices use for health and to know the reasons and barriers of using and non-using it for health.
Methods: A cross sectional study was conducted among 303 people whose age more than fourteen year residing at one area of Ektanagar urban health centre of central Gujrat by doing house to house survey from July 2022 to August 2022. Data was collected by using semi-structured questionnaire in local language based on socio-demographic characteristics, various types of digital technology and reasons and barriers of using and non-using digital technology. Data was entered in MS excel sheet and was analysed using Medcalc software.
Results: Around 55% were male, mean age was 42.2 year. Only 33% were using digital technology. Among them more than half around 62% were using it because they were health conscious. Among users not having time and non-affordability to use digital devices are an important reason for non-usage.
Conclusions: Majority were not using digital technology for improving their health. Health consciousness was the main reason behind usage. Main barriers of usage are non-affordability and not having time to use the devices.

Keywords: Digital technology, Non-communicable disease, Physical activity, Smart phone, Smart watch

INTRODUCTION

Noncommunicable diseases (NCDs) pose one of the biggest challenges to public health in the twenty-first century, causing 74% of all deaths worldwide, and killing 41 million people year.[1]

According to the WHO data from 2015, 5.8 million Indians die from NCDs (heart and lung diseases, stroke, cancer, and diabetes) per year, or 1 in 4 Indians are at risk of dying from an NCD before the age of 70.[2]

Lifestyle variables play a crucial role in the development of chronic diseases. A lack of physical exercise and increased intake of poor diet like energy-dense and high-fat foods are both considerable factors that have contributed to the non-communicable disease, but modifying them is difficult.[3] The World Health Organization (WHO) reports that sedentary behaviour is on the rise, with only around 23% of adults meeting recommended levels of physical exercise.[4]

Digital technology (such as smartphone apps, activity trackers and e-learning platforms) have supported individuals with chronic diseases in changing their health-related lifestyle choices.[5] As stated in the WHO's global action plan, creative methods to promote and track physical activity are therefore urgently required.[6] Digital health technologies can help patients and customers better manage and keep track of their health and wellness-

related activities and can assist in managing chronic conditions as well as enabling users to take responsibility for their own health. More sophisticated ways for tracking nutritional consumption and physical activities are now possible because to promising technological advancements.[5]

A lot of individuals use their smartphones, smartwatches, and other wearable technology to monitor their daily steps, heart rate, and calorie burn.[7] The current study aims to estimate the proportion of users of digital technology for health, to know the type of digital devices use for health and to know the reasons and barriers of using and non-using it for health.

Objectives

To estimate the proportion of users of digital technology for health, to know the reason for using digital devices for health and to know the barriers of not using digital devices for health.

METHODS

A cross sectional study was conducted among 303 people age more than fourteen years residing at one area of Ektanagar urban health centre of Baroda Medical College, Vadodara, Gujrat by doing house to house survey from July 2022 to August 2022. Study technique was purposive sampling method.

We calculated the sample size through the epi info software. Using prevalence of 33%, a confidence interval (CI) of 90%, and a 5% degree of precision, the estimated sample size was 240. In order to obtain the maximum responses, a total of 320 participants were approached. After excluding the incomplete interviews, 303 responses were included in the study.

Data was collected by using semi-structured questionnaire in local language. Verbal Informed consent was taken from participants after explaining the detailed purpose of study. Participants whose age less than fourteen years and did not give consent for the study were excluded.

Questionnaire-based interviews were conducted. Questionnaire consist of socio-demographic details of participants (age, gender, religion, education), having any comorbidities and using different type of digital technology (smart watch, smart phone, medical equipment, gym machines), reasons for using it and barriers (money, education, age) of non-using digital devices for health.

The data was entered in Microsoft Excel 2019 and analysed using Epi Info. Quantitative variables were analysed using mean and standard deviation according to normalcy of data. Qualitative variables were expressed in terms of proportions and percentages. Results were expressed with appropriate graphs and tables. Association between qualitative variables were done by chi-square test. P value of less than 0.05 was considered statistically significant.

RESULTS

Total 320 patients were recorded during the study, after excluding the incomplete interviews, 303 responses were included in the study. Our study shows 33% participants were using digital technology for health (Figure 1).

Table 1: Sociodemographic and clinical characteristics of the study sample (N=303).

Characteristics	Value (%)
Gender	
Male	167 (55.10)
Female	136 (44.90)
Age (years)	
15-30	98 (32.34)
31-45	81 (26.41)
46-60	76 (25.41)
>60	48 (15.48)
Religion	
Hindu	217 (71.50)
Muslim	77 (25.50)
Others	9 (3)
Education	
Graduation	35 (11.50)
Higher secondary	86 (28.40)
Secondary	83 (27.40)
Primary	70 (23.10)
Illiterate	29 (9.60)
Diet	
Vegetarian	184 (60.72)
Non-vegetarian	119 (39.27)
BMI	
<18.5	12 (3.96)
18.5-24.99	231 (76.23)
25.0-29.99	52 (17.16%)
30-34.99	6 (1.98%)
35.0-39.99	1 (0.33%)
>40.0	1 (0.33%)
Comorbidities	
Present	55 (18.15%)
Absent	248 (81.84%)
Type of comorbidities	
HTN	37 (12.21%)
Diabetes	24 (7.9%)
Thyroid	5 (1.65%)
Duration of comorbidities	
>6 months-1 years	3 (0.99%)
>1year-3 years	11 (3.6%)
>3 years-5 years	16 (5.2%)
>5 years-10 years	13 (4.29%)
>10 years	12 (3.96)

Table 2: Factors determining usage of digital equipments for health.

		Non users ((n=203)	Users (n=100)	Chi-square	P value
Gender	Male	107 (53%)	60 (60%)	1.16	0.28
	Females	96 (47.3%)	40 (40%)		
Age (years)	15-30	62 (30%)	36 (36%)	1.41	0.70
	31-45	55 (27%)	26 (26%)		
	46-60	51 (25%)	25 (25%)		
	>60	35 (17.2%)	13 (13%)		
Education	Primary	45 (22.1%)	26 (26%)	6.34	0.17
	Secondary	59 (29%)	24 (24%)		
	Higher secondary	56 (27.5%)	30 (30%)		
	Graduation	19 (9.3%)	15 (15%)		
	No formal education	24 (11.8%)	5 (5%)		
Affordability	Cannot afford	82 (40.3%)	76 (76%)	32.6	.0001
	Can afford	121 (60%)	24 (24%)		
Time to utilize the device	Having time for use	139 (68.4%)	45 (45%)	14.4	.0001
	Not having time for use	64 (31.5%)	55 (55%)		
Knowledge	Having knowledge about digital use	149 (43.3%)	34 (34%)	1.77	0.182
	Not having knowledge	54 (26.6%)	66 (66%)		

Table 3: Purpose of people using smartphone for health.

Purpose of using smart phone for health	No. of people	Percentage (N=303)
Home work out	2	0.66
Telemedicine	11	3.63
Meditation/yoga by any video	11	3.63
Reminder for drugs	2	0.66
Online drug purchase	10	3.30
Tracking diet	4	1.32
Reminder for water consumption	1	0.33
Recording the measurements	2	0.66

Table 4: Purpose and types of digital equipment usage for health.

Purpose and types of digital equipment usage for health	No. of people	Percentage (N=303)
Pulse Oximeter (SpO_2)	2	0.70
Glucometer (blood glucose)	4	1.30
BP machine (measuring BP)	6	2
Weighing machine (measuring weight)	6	2

On applying chi-square tests to find association between various factors and usage of digital technology, it was found that affordability and time to utilize the device were significantly associated with usage/non usage of technology (p value less than 0.05). Other factors such as gender, age, education and knowledge were not associated with usage of technology (Table 2). It was found that most people were using smart phones for telemedicine, meditation/yoga and online drug purchase (Table 3). Very few percentages of the people were using digital equipments for health such as pulse oximeter, glucometer, BP machine and weighing machine (Table 4). Majority of the participants were found non user (67%) of the digital technology for health (Figure 1).

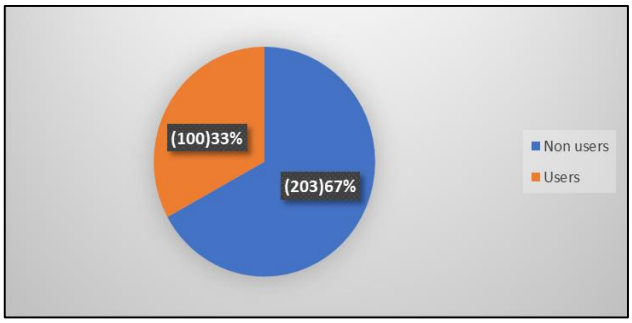

Figure 1: Proportion of people using digital technology for health.

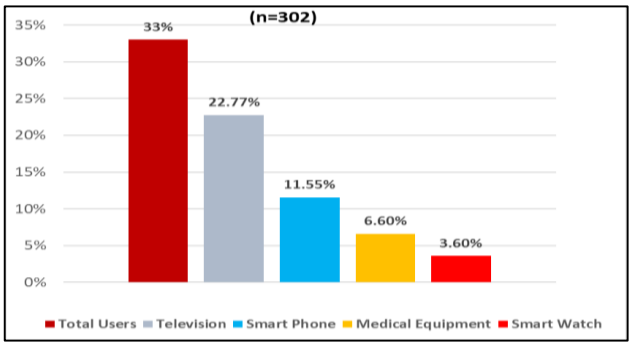

Figure 2: Type of digital devices used for health among users (Overlapping).

Television (22%) and smartphones (11.55%) were most used by people for health (Figure 2). Among users 62% of the people were using digital devices for health because they were health conscious while the others used because of the diseases they had (38%) (Figure 3). Smart watch as a health device was mainly used for spO2 (3%), pulse rate (2.6%) and blood pressure monitoring (2.3%) (Figure 4).

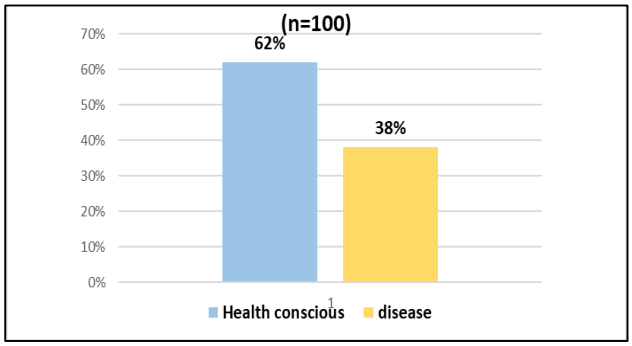

Figure 3: Reason for using digital devices for health.

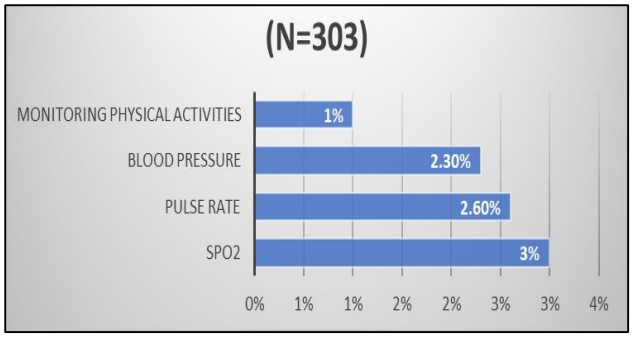

Figure 4: Purpose of using smart watch for health-related activities.

DISCUSSION

A systematic review conducted in the year 2021 concluded that digital interventions have effectively improved many health conditions and health behaviours and they are increasingly being used in different health care fields, including self-management of long-term conditions, prevention of lifestyle diseases, and health promotion. Most of the study participants in our study were not using digital technology (67%) only 33% of the study population was using digital technology. A review article concluded that wearables can empower individuals by assisting with diagnosis, behaviour change, and self-monitoring.[8] An article published on telemedicine in 2020 suggested that after COVID-19, usage of wearables for health-related purposes is on the surge and can benefit both the practitioner and the patients, increased utilization of health monitoring devices by patients will likely become an important aspect of self-care and preventive medicine moving forward.[9]

Out of all the study participants, maximum (22.77%) were the users of television. Television as a medium has been used for many purposes such as health education is used since as early as 1950s and 1960s.[10]

Smart watch as a tool for digital health was used by 3.6% of the study population. It was used to measure blood pressure, oxygen saturation in blood, measuring physical activities and to measure the pulse rate. Wearables are the very recently been started to use as a digital health device. They can be used to measure daily activities, estimate energy expenditure, heart rate and its variability, assessment of sleep etc. There are many merits of it but there are certain shortcomings as well such as its validity and reliability. Although the rapid development of technology and sensors may soon overcome it.[7] A review article concluded that depending upon the type/company of wearable used and the sensors it has, it can be used in the early detection of and cardiovascular event.[11]

As found in our result fewer (2.3%) participants were using smartwatch as device for blood pressure monitoring. A study was conducted at Thomas Jefferson University Hospital in USA to find the accuracy of cuffless BP monitoring devices. It was found that the devices they tested were not accurate to be used as BP monitoring devices.[12] Another study concluded that smartwatch-based cuffless BP monitoring is feasible for out-of-office monitoring in the real-world setting and the stability of BP measurement post calibration and the standardization and optimal time interval for recalibration need further investigation.[13] Some smartwatch companies have also started to provide ECG which can be used to diagnose atrial fibrillation, incorporating this feature in everyday life of consumers may help raise awareness for atrial fibrillation and facilitate health promotion and preventative effort. There are some problems such as false positives, lack of outcome data etc. which can be overcome in time.[14] A review article concluded that wearables helped improving physical activity and reducing sedentary behaviour during COVID-19 pandemic.[15]

In this study, we found that only 1.3% participants had digital glucometer at their home for monitoring their condition. Total of 7.92% of the study population was suffering from Diabetes Mellitus. It means that only 16.67% of the patients had glucometer at their home. A study conducted at tertiary eyecare hospital in central India found that 35.3% of the patients presenting with sight threatening diabetic retinopathy had glucometer at home for self-monitoring.[16] Another study conducted in southern part of India found that only 47.41% of the patients possessed digital glucometer at home.[17] Similar study in Pakistan found that 59% of the patients had glucometers.[18] So, it can be said that the use of home based glucometers was less in our study population which can have many possible reasons that need to be understood and studies further.

Call to action on use and reimbursement for home blood pressure monitoring through a joint scientific statement from the American Heart Association, American Society of Hypertension and Preventive Cardiovascular Nurse Association recommended that home based BP monitoring should become routine component of BP measurement in majority of the patients with known or suspected hypertension and patients should be advised to purchase oscillometric monitors that measure BP on the upper arm with an appropriate cuff size and that have been shown to be accurate according to standard international protocols.[19] Only 2% of our study population had digital sphygmomanometer at their home. 12.21% of the total study population was suffering from Hypertension. That means 16.21% of the patients suffering hypertension had digital sphygmomanometer at their home. A scoping review of global literature concluded that most BPMDs (blood pressure monitoring devices) fulfilled the validation criteria. However, there are considerable gaps in BPMD research in terms of geographical representation, including specific target populations and diseases/conditions, and a range of arm circumferences.[20] As a part of Asia HBPM (home based pressure monitoring) survey 2020, a cross sectional study was conducted in India which found that 34.9% of the patients owned HBPM device and 30.4% of the patients measured their BP at home.[21]

A survey conducted in USA found that 55% of the patients between the age of 50 to 80 years used home based BP monitoring. So, it can be seen that the prevalence of users of home-based BP monitoring is lower in our study population. Awareness and health education by various means to the population regarding benefits of usage of digital devices for health purposes can and should be used to improve the digital literacy of the population.

Limitations

Limitation of this study is that it was conducted at only one Urban Health Centre of Western Gujarat and the population was purposively selected.

CONCLUSION

Majority of the study population were not using digital technology for improving their health. Health consciousness seemed to be the main reason behind its usage. Young, educated people and male sex are more likely to use digital devices for health and the main barriers in its usage are found to be non-affordability and not having time to use or utilize them.

Recommendations

It is needed to raise awareness about utility of smart devices for health improvement and to improve digital literacy in the population.

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