ORIGINAL ARTICLE

Awareness, Willingness, And Practices Of Telemedicine For Management Of Selected Chronic Diseases Amongst Patients Attending NCD Clinic At An Urban Health Centre In Raigad District, Maharashtra

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ABSTRACT
Background: Telemedicine involves the use of electronic communication technologies to deliver and support healthcare services when distance separates patients and providers. As chronic diseases continue to be major contributors to global mortality, disability, and healthcare expenditure, continuous monitoring and accessible care remain essential. Telemedicine offers a potential solution, especially in resource-limited settings. **Objectives:** The study aims to assess patients' awareness, willingness, and current practices regarding the use of telemedicine. It also seeks to identify factors that contribute to their unwillingness or limited utilization of telemedicine services. **Methods:** A descriptive cross-sectional study was conducted at an Urban Health Centre in Raigad District, Maharashtra, involving 130 patients above 30 years of age registered under the Non-Communicable Disease clinic. A pre-validated questionnaire, administered in Marathi and Hindi, was used for data collection. Socio-economic status was categorized using the Revised BG Prasad Classification, and data were analyzed using SPSS Version 26. **Results:** 54.2% of participants owned a smartphone, 82.2% were unaware of telemedicine, 81.5% lived within 10 km of the Urban Health Centre. **Conclusion:** The study highlights the need to improve awareness, address barriers, and enhance patient engagement to maximize the benefits of telemedicine for chronic disease management in resource-limited areas like Raigad District.

KEYWORDS
Telemedicine, Urban, Willingness, Chronic Diseases.

INTRODUCTION
Telemedicine is the use of electronic information and communication technologies to provide and support healthcare when distance separates participants (1). It has improved access to healthcare services for patients in remote areas and reduced the economic burden of disease (2,3–5). Medical technology includes the tools, techniques, medicines, and procedures used by healthcare professionals in delivering care (6). Patients have shown increasing interest in using e-mail, text messaging, and video conferencing for managing chronic non-communicable diseases such as hypertension and diabetes (7). Video consultations can substitute face-to-face visits and improve communication efficiency(7).
Chronic diseases remain major causes of mortality, disability, and healthcare expenditure worldwide, requiring long-term management and lifestyle modification. Technologies such as teleconsultation, decision-support systems, virtual visits, and electronic reservation systems aid chronic disease control (8). Reduced waiting time and cost encourage telemedicine use, while preference for in-person visits remains a barrier (9). Many patients are willing to pay for e-mail access, though physician adoption remains limited (10,11). E-mail communication improves satisfaction and doctor–patient relationships (12). Digital expansion, especially mobile networks, can enhance healthcare delivery and research in resource-limited settings (13). Expanding telehealth may reduce healthcare disparities (14). This study assesses patients' awareness, willingness, practices, and barriers regarding telemedicine use.

Aim & Objective(s)
- To assess their awareness of patients towards telemedicine.
- To assess their willingness and practices of patients to use telemedicine.
- To assess factors contributing to unwillingness of patients for lack of use of telemedicine.

MATERIAL & METHODS
Study Design: Descriptive, Cross sectional.
Study site: The study is set in the non-communicable disease clinic of an Urban Health Centre at Khopoli which

is a field practice area under Department of Community Medicine at Raigad District in the state of Maharashtra.
Sample Size: 119 registered under NCD clinic until 30th April 2023.
Sampling Technique: Universal Sampling
Study subject:
Inclusion Criteria: All patients above 30 years registered under the Non-Communicable Disease (NCD) Clinic at Urban Health Centre, Raigad District, Maharashtra, Patients registered with active Hypertension or Type-2 Diabetes Mellitus and associated complications.
Exclusion Criteria: Patient who refuses consent, Patient who has been admitted to a Tertiary Care Hospital undergoing intensive care.
Data Collection Tool: Data will be collected via a pre-validated, pre-designed questionnaire, consisting of three Sections:
Ethical Considerations: Data collection began for the study began aster the ethical approval from the Institutional Ethical Committee. (Letter No.: DHR-EC/2023/09/59)
Confidentiality: The identity of all participants was kept confidential from the beginning of the study.
Methodology:
The questionnaire was designed to assess the following divided into four sections:
Section A: Demographic Details
Section B: Awareness on Telemedicine
Section C: Willingness and Practices of Telemedicine
Section D: Barriers in the practices of Telemedicine.
The interview took approximately 5-10 minutes per study subject.
The sociodemographic profile was assessed by collecting information on age, literacy status, occupational status and their household economic status.

The socio economic status of the participants was assessed using Revised BG Prasad socio economic Classification, 2024. (15)

SOCIAL CLASS	UPDATED SCALE FOR 2024 BASED ON MONTHLY PER CAPITA INCOME (Rs.)
I (Upper class)	9098 and above
II (Upper middle class)	4549-9097
III (Middle class)	2729-4548
IV (Lower middle class)	1364-2728
V (Lower class)	<1364

B. G. Prasad's SES scale updated for year 2024.
Data Analysis: Data will be entered into spreadsheet, Microsoft Excel using standard coding procedure. It will be analysed using SPSS Version 26. The necessary statistical tests will be applied.

RESULTS

Figure 1 illustrates the proportion of patients willing versus unwilling to use telemedicine services where a large majority of patients (approximately 90%) were unwilling to use telemedicine and only a small fraction of 10% participants expressed willingness to adopt telemedicine. This stark difference indicates significant barriers in telemedicine adoption among the study population to improve acceptance.

Figure 1: Pie Chart Showing Percentage Of Willingness Of Patients Registered Under NCD Clinic At An Urban Health Centre, Raigad District, Maharashtra.

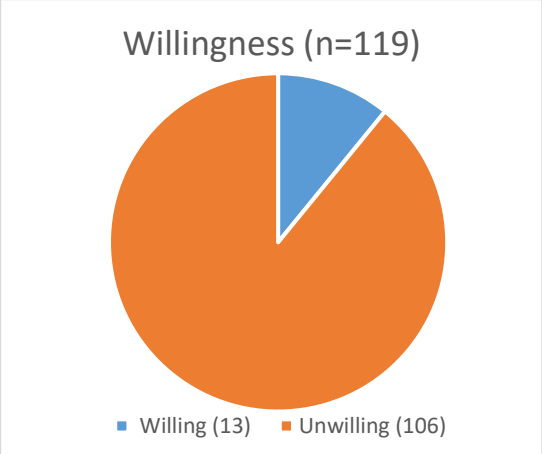

Figure 2: Bar Graph Showing Factors Contributing To Unwillingness In Usage Of Telemedicine In Patients With Selected Chronic Health Diseases In NCD Clinic At An Urban Health Centre, Raigad District Maharashtra (N=119).

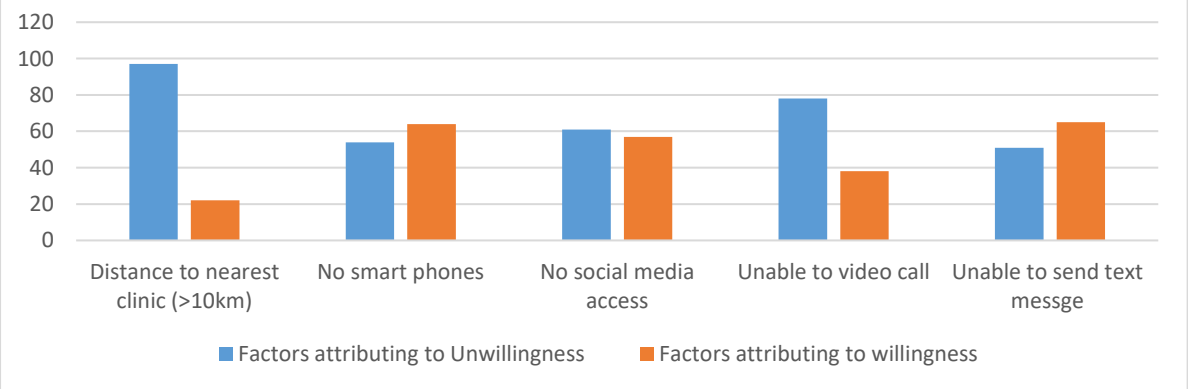

Figure 2: The bar graph compares key barriers influencing patients' unwillingness to use telemedicine. Distance to the nearest clinic where around 97 patients were located within a 10 km radius, suggesting that proximity to the clinic reduced the perceived need for telemedicine. Over 50% of participants did not own smartphones, making them unable to access telemedicine platforms effectively. A similar proportion (~50–55 patients) lacked access to social media, which is often used for telemedicine communication and education. A notably high number (~80 patients) reported difficulty in using video call functions, highlighting technological illiteracy as a major barrier. Close to 70 patients were unable to send simple text messages, further emphasizing low digital literacy.

Table 1 illustrates the demographic distribution and key factors associated with unwillingness to adopt telemedicine among 119 patients with chronic diseases. The majority of participants were aged between 55–74 years (58%), while only 5% were aged above 75 years. This indicates that middle-aged and older adults form the predominant group requiring telemedicine interventions. The study included 52.9% females (n=63) and 49.7% males (n=56), showing a nearly equal gender distribution. However, females showed slightly higher representation, suggesting potential gender-related barriers to telemedicine. Illiterates accounted for the largest group (31.4%), showing a strong link to telemedicine unwillingness. Those with high school certificates (21.2%) and middle school education (18.6%) formed the next largest groups. Only 2.5% were graduates or postgraduates, and none had professional or honours-level education. Hypertension was the most common condition, affecting 56.7% (n=67) of the study population. Diabetes mellitus alone was reported in 21.2% (n=25). Combined diabetes and hypertension were seen in 22.1% (n=26) of patients. This indicates that telemedicine programs must primarily target hypertension management, followed by diabetes and combined conditions.

Table 1: Showing Factors Leading To Unwillingness For Usage Of Telemedicine

VARIABLE	n=119	UNWILLINGNESS				p value
	(%)	NO SMART PHONE (%)	NO SOCIAL MEDIA (%)	NO VIDEO CALLING (%)	UNABLE TO TEXT MESSAGE (%)	
AGE						<0.0000001*
30-54	44 (36.9)	11 (25)	14 (31.8)	19 (43.1)	9 (20.4)	
55-74	69 (57.9)	38 (55.0)	42 (60.8)	19 (27.5)	38 (55.0)	
>75	6 (5.04)	6 (100)	6 (100)	6 (100)	4 (66.6)	
GENDER						0.3642
Male	56 (47.0)	25 (44.6)	29 (51.7)	37 (66.0)	22 (39.2)	
Female	63 (52.9)	29 (46.0)	32 (50.7)	20 (31.7)	29 (46.0)	
LEVEL OF EDUCATION						)0.000000227*
Professional/Honours	0	0	0	0	0	
Graduate/Postgraduate	3 (0.02)	0	0	0	0	
Intermediate/Post High School Diploma	19 (15.9)	1 (5.2)	3 (15.7)	5 (26.3)	2 (10.5)	
High School Certificate	25 (21.0)	7 (28)	10 (40)	12 (48)	0	
Middle School Certificate	22 (18.4)	11 (50)	11 (50)	15 (68.1)	10 (45.4)	
Primary School Certificate	12 (10)	7 (58.3)	8 (66.6)	11 (91.6)	8 (66.6)	
Illiterate	36 (0.3)	28 (77.7)	28 (77.7)	34 (94.4)	25 (69.4)	
Revised BG Prasad Scale						0.003134*
I (Upper class)	24 (20.1)	2 (8.3)	3 (12.5)	4 (16.6)	3 (12.5)	
II (Upper middle class)	35 (29.4)	12 (34.2)	15 (42.8)	24 (68.5)	10 (28.5)	
III (Middle class)	16 (13.4)	11 (68.7)	11 (68.7)	12 (75)	8 (50)	
IV (Lower middle class)	14 (11.7)	10 (71.4)	10 (71.4)	12 (85.7)	10 (71.4)	
V (Lower class)	28 (23.5)	19 (79.1)	20 (83.3)	24 (85.7)	18 (64.2)	

Table 2: Showing Demographic Details Of Patients With Chronic Diseases Registered Under NCD Clinic At An Urban Health Centre In Raigad District, Maharashtra (*p value is significant)

CHARACTERISTIC	n=119(%)
AGE GROUP	
30-54	44(37%)
55-74	69(58%)
>75	6(5%)
GENDER	
Male	56(49.7%)
Female	63(52.9%)
EDUCATION	
Professional/Honours	0
Graduate/Postgraduate	3(2.5%)
Intermediate/Post High School Diploma	19(16.1%)
High School Certificate	25(21.2%)
Middle School Certificate	22(18.6%)
Primary School Certificate	12(10.2%)
Illiterate	37(31.4%)
TYPE OF NON COMMUNICABLE DISEASE	
Diabetes Mellitus	25(21.2%)
Hypertension	67(56.7%)
Diabetes Mellitus and Hypertension	26(22.1%)

Table 2 presents the demographic distribution of 119 patients with chronic diseases registered under the NCD clinic at an Urban Health Centre in Raigad District, Maharashtra, along with factors contributing to their unwillingness to adopt telemedicine. A majority of the participants (58.0%) were between 55–74 years of age, with the unwillingness to use telemedicine due to lack of a smartphone was highest among the 55–74 years group (31.9%), whereas difficulty in video calling was equally reported among both the 30–54 years (15.9%) and 55–74 years (15.9%) groups. Of the total participants, 52.9% were female and 47.1% were male. Among males, 37 participants reported an inability to use video calling, whereas the unwillingness due to lack of social media presence was slightly higher among females than males. Most participants were illiterate (30.2%); Illiteracy was strongly associated with all four unwillingness factors, especially lack of smartphone ownership (28 participants) and inability to text message (25). A substantial proportion (23.5%) belonged to the lowest income group (₹1364). Unwillingness decreased progressively with increasing income. The majority of participants (81.5%) which suggested that physical proximity did not play a significant role in the adoption of telemedicine in this population. Our study also showed that most patients prefer in-person visits due to easy access to health facilities. Since most patients live near the health centre (within 10km radius), telemedicine must be positioned as a supplementary service rather than a replacement for face-to-face consultations.

DISCUSSION

This study found the awareness of telemedicine in participants to be 17.8%. A study conducted by in New Delhi, India, determined that 20% of the patients were aware of telemedicine.(1). Another study conducted in Uttarakhand found the prevalence of awareness about teleconsultations was 2.2%. (2) One hundred of the 121 patients that participated in this study were not aware of telemedicine.(3). 31.9% study participants knew how to use the video call feature; 54.2% participants owned a smart phone and 47.9% used social media. Similarly, a study found Seventy-two to 92% of participants had access to mobile phone.(4) In another study, 87% (n=228) routinely used and 88% (n=230) owned a mobile phone.(5).

Unavailability of technological resources and inadequate internet connectivity, were also identified as barriers to the implementation of telemedicine systems by about 40% and 32% of the articles, respectively. (6) Similarly, the lack of dedicated and trained workforces for telemedicine interventions and the requirement of physical assessments over virtual consultations in certain medical specialties were highlighted as barriers to telemedicine systems in 29% of the articles. 59% of the articles identified the fear of violating privacy and the security of patients' medical information as the most significant barrier to adopting telemedicine systems at healthcare facilities in India (6).

CONCLUSION

In conclusion, this research paper has explored the complex relationship between the lack of awareness and usage of telemedicine in patients with chronic health diseases. Through a comprehensive review of existing literature and analysis of survey data, several key findings have emerged. Despite the limitations inherent in this study, such as reliance on self-report measures and cross-sectional design, the findings underscore the need for continued research and intervention efforts to address the negative impact of social media on adolescent mental health. Future research should focus on exploring the underlying mechanisms driving these associations, as well as identifying protective factors and effective strategies for promoting healthy social media use among adolescents. In conclusion, the findings of this study underscore the importance of further promoting awareness, addressing barriers, and fostering patient

engagement to realize the full potential of telemedicine in managing chronic diseases in resource-limited settings like Raigad District. By leveraging telemedicine effectively, healthcare providers can enhance access to care, improve health outcomes, and ultimately, enhance the quality of life for patients living with chronic conditions in urban health centres and beyond.

Recommendation

The lack of educational campaigns or information dissemination about telemedicine services within the community could be a primary reason. Additionally, cultural beliefs, language barriers, and limited access to technology or internet connectivity might further exacerbate the lack of awareness among these patients. Patients may miss out on potentially beneficial healthcare services, leading to delayed interventions, poor disease management, and increased healthcare costs due to avoidable hospital visits.

Relevance of the Study

Understanding patients' awareness, willingness, and actual practices regarding telemedicine is crucial for successful implementation. Identifying barriers such as preference for face-to-face consultations, technological limitations, lack of digital literacy, or trust issues can help policymakers and healthcare institutions design targeted interventions to improve acceptance and uptake.

In developing countries, where uneven distribution of healthcare resources and specialist services persists, telemedicine can play a transformative role in improving accessibility and reducing healthcare disparities. However, its effectiveness depends largely on patient readiness and acceptance. Therefore, this study is relevant as it provides evidence on patient perspectives toward telemedicine and highlights factors influencing its utilization. The findings can guide healthcare planning, strengthen digital health strategies, and contribute to improving chronic disease management and overall healthcare delivery systems.

Authors Contribution

All authors have contributed equally.

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Nil

Conflict of Interest

There are no conflicts of interest.

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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