MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.11.28.32

OPEN ACCESS

Key Words
Tele medicine, diabetes, hypertension, rheumatoid arthritis, systematic review, meta-analysis

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Received: 28 August 2024
Accepted: 30 September 2024
Published: 10 October 2024

Citation: J. Gayathri and M.K. Suresh, 2024. The Impact of Tele Medicine on Chronic Disease Management During the Covid-19 Pandemic. Res. J. Med. Sci., 18: 28-32, doi: 10.36478/makrjms. 2024.11.28.32

The Impact of Tele Medicine on Chronic Disease Management During the Covid-19 Pandemic

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ABSTRACT
During a pandemic, tele medicine can offer the lowest risk of infection as well as the best degree of patient satisfaction. The settings in India, with limited resources, make the aspects linked to its use and patient adherence invisible. In light of the COVID-19 epidemic, this study sought to ascertain how people with chronic illnesses perceived tele medicine. For z = 1.96 and d = 0.05, a 95% confidence interval was assumed in order to calculate the sample size. Pretesting of the questionnaire was conducted on a small, randomised sample of participants. The questionnaire was revised to make it simpler and easier to understand in light of their responses. Data collection from the outpatient departments of the designated distinct tertiary institutions was done by a group of skilled healthcare professionals (both for face-to-face and telephone interviews). In-person data collection took about ten to fifteen minutes to finish and was done with signed informed consent. The majority of participants had a favourable opinion of telemedicine. Of them, 91% of participants believed that telemedicine may save time and that telemedicine should be used for medical care for patients with COVID-19 symptoms or diagnoses. It is imperative to enhance users' comprehension of the technology's operation and facilitate their ability to adjust to it prior to incorporating tele medicine services into healthcare systems.

INTRODUCTION

NCDs have arisen as a severe threat to health and socio-economic growth[1]. NCDs have significantly increased premature deaths and have placed a twofold burden of disease on the health system (previously existing communicable diseases, plus newly added non-communicable diseases) via increased service demand and overall treatment expense[1,2]. Moreover, poor patient treatment adherence increases both the mortality and morbidity burden, and the healthcare utilization and cost of NCDs. The impact of poor adherence has grown in tandem with the rise in prevalence of NCDs and this issue is anticipated to be worsened further during the COVID-19 pandemic[3]. Further, the pandemic has limited consultation availability and time and led to a reduction in in-person examinations[2].

Telemedicine can be a good solution when distance impairs the delivery of proper care to a patient. The aims of telemedicine are to allow the long-term management of chronic illnesses and to provide immediate information to give an early warning of possible diseases-both of which meet the goal of preventive healthcare[4]. During the pandemic, the care of people with severe illness and their families required impeccable social distancing for their protection and for the protection of healthcare professionals, who were so critically needed[3]. Therefore, telemedicine is a proven modality for delivering palliative care to the most vulnerable people.

During the COVID-19 pandemic, access to telemedicine has been increased for patients, along with other improvements to patient access, to help ensure continuity of care across a variety of different patient groups, including NCDs[5]. The COVID-19 pandemic spurred the medical profession to embrace telemedicine and protocols were swiftly altered to ensure patient care continued during the pandemic[6]. Standard of care refers to the consistent and connected care that a patient receives across time, in accordance with their health needs and personal circumstances. It is rec-ognized as a fundamental value of patient healthcare and serves as a proxy for the level of care provided in general practice. Additionally, benefits are noted from the patients' standpoint. Patients favor continuity of care[7], particularly those with chronic diseases or high healthcare utilization[8]. As such, telemedicine can provide the highest level of patient satisfaction and, at the same time, the lowest risk of infection in the midst of a pandemic, by continuing the patient's care under the same specialist remotely. As the quick transmission of COVID has increased fear among individuals amid the pandemic, and it has become more hazardous for a wide range of patients (including those with COVID-19) to go to a specialist or medical clinic to receive therapy, telemedicine administrations have emerged as a solution.

India's internet penetration rate was 73.06% in November 2021[9]. This coverage enables the use of web network services (such as telemedicine, video calls, and emails) to connect with individuals and provide more tailored healthcare, which may improve ad her-ence and illness outcomes, hence reducing the burden on the health system and healthcare costs[10]. However, telehealth service consumption has not yet achieved its full potential. Additionally, patients' desire to employ such an intervention as an extra treatment option and the factors associated with its usage and patient adherence, are not yet visible in India's resource-constrained settings. Patients suffering from chronic diseases may place a high value on routine check-ups or hospital visits., however, the COVID-19 pandemic has affected them by reducing access to care.

MATERIALS AND METHODS

Convenient sampling was used to gather most of the data for this study through in-person interviews conducted at public tertiary institutions in India. On the other hand, a tiny percentage of research participants underwent phone interviews through the use of snowball sampling techniques.

The Following Standards were Applied to Decide who Might Participate in the Study: (i) be a resident of India as of right now, aged 18 years or older, of either gender., (ii) be diagnosed with a chronic illness, such as diabetes, chronic kidney disease, cancer, or cardiovascular disease (such as hypertension and stroke), as determined by a registered doctor's prescription., (iii) understand the purpose of the study and (iv) give consent to take part in it.

For z=1.96 and d=0.05, a 95% confidence interval was assumed in order to calculate the sample size.

Pretesting of the questionnaire was conducted on a small, randomised sample of participants. The questionnaire was revised to make it simpler and easier to understand in light of their responses.

Data collection from the outpatient departments of the designated distinct tertiary institutions was done by a group of skilled healthcare professionals (both for face-to-face and telephone interviews). In-person data collection took about ten to fifteen minutes to finish and was done with signed informed consent. The telephone survey took 15-20 minutes to complete, and the researchers got verbal consent for it over the phone. The questionnaire was a well-structured, closed-ended self-report form that was developed. An epidemiologist, a psychiatrist and a public health investigator wrote, evaluated and finalised the form. The survey was first composed in English and then translated into Bangla. To guarantee consistency and

remove bias, we started with a bilingual translator, had it checked by a third party expert and then had it back-translated by a multilingual translator.

Analysis: The data were examined using IBM Statistics version 25's Statistical Package for Social Sciences (SPSS). Descriptive analyses (frequencies and percentages) were performed to describe the sociodemographic traits of 878 participants, COVID-19 risk indicators and their responses to the nine-item survey. During the primary analysis, the continuous variables, like age and years of education, were categorised. Monthly income, another continuous variable, was first dichotomised and then transformed, using the exchange rate in effect at the time of the study, from BDT to USD.

Using Fisher's exact test and Chi-square (X^2) test, the significance of differences between the sociodemographic factors and WRTCCD was assessed. To evaluate the relationship between WRTCCD and the relevant independent factors, odds ratios (ORs) were computed. In addition to indicating the strength of the link, ORs were accompanied by estimates of their 95% confidence intervals (CIs). A binomial logistic regression model was employed to examine potential factors influencing the management of WRTCCD. The model contained all of the study's independent variables. A p-value of >0.05 indicated statistical significance in the relationship between the variables.

RESULTS AND DISCUSSIONS

About half of the participants had lost earnings during COVID-19 (46.6%) and only 14.9% of participants had lost their close relatives due to the COVID-19 pandemic (Table 1). Most of the participants showed a positive attitude towards telemedicine. Among them 91% of participants thought that telemedicine could save time, and that people with COVID-19 symptoms or diagnoses should use telemedicine for medical care.

In total, 91% of the participants were willing to learn about telemedicine and 87.9% thought that telemedicine had the potential to play an important role in providing healthcare. In this study, 89.3% of participants thought people with chronic diseases should use telemedicine for their mental healthcare. Additionally, 70.6% of participants thought that standard healthcare could be provided via telephone/computer audio or video conferencing, and 70.6% were willing to receive telemedical care even after the COVID-19 pandemic. Finally, 77.1% of participants were associated with WRTCCD (Table 2).

Age and years of education were significantly associated with WRTCCD, with 81.6% in the 35–54-year-old age group and 86.2% in the 1-5 years of education group. We found that those in the service/business occupation (83.1%) and those with a monthly income >USD 116.58 (84.3%) were significantly associated with WRTCCD. Additionally, people who did not lose their earnings during the COVID-19 pandemic (84.3) were also significantly associated with WRTCCD (Table 3).

Given the pandemic's impact on this cohort's health and safety, this research explores NCD patients' perceptions toward and willingness to employ modern technologies such as telemedicine to manage their chronic illnesses. The findings of this study indicate that telemedicine is often regarded as a highly satisfactory method of receiving care in the field of chronic disease. The majority of participants regarded telemedicine favorably, emphasizing benefits such as time savings. This approach could be due to the time required to visit a physician at any healthcare facility in this country[4]. Most of the participants also thought that people with a COVID-19 infection or symptoms should use telemedicine rather than a face-to-face visit, most likely because they are afraid of spreading the infection among the high-risk group. Moreover, most of the patients in our study were willing to learn how to use telemedicine to receive medical care.

In our logistic regression analysis, we found that people with no education and <10 years of education were significantly more WRTCCD compared to the people with >10 years of education. Similar findings were found in the United States, where those with lower levels of education accessed telemedicine at a higher rate as the pandemic progressed[12]. This trend might be due to patients with a higher level of education being more concerned about the privacy issues involved with telemedicine.

Additionally, younger people (18-34 years old) were significantly more likely to be WRTCCD compared to the older group (35-54 years old). Previous research has found that older people are less likely than younger people to use modern gadgets such as computers and the Internet[13,14]. This attitude could be because older people are less confident about using the Internet, particularly an Internet-based telemedicine system that they do not regularly use[15].

Another significant finding of our study is that people with higher incomes were more WRTCCD compared to lower-income people. A similar finding has been observed in previous studies where individuals with a higher income seemed to be more likely to utilize telemedicine services[16,17]. This finding implies that, while telemedicine has both potential for the future and the potential to address healthcare disparities, its technological prerequisites are neither universally accessible nor affordable[18]. This trend was further observed in a US study, where patients who did not choose telemedicine over in-person sessions were much poorer[19]. Additionally, our study found that people who did not lose their earnings due to the COVID-19 pandemic were more WRTCCD compared to people who lost their earnings, a finding that is consistent with previous studies[18-20].

Table 1: Impact of COVID-19 on the Study Population (N = 898)

Variable	Number of Study Participants with Positive Responses	Percentage (%)
Did you lose your earning due to the COVID-19 pandemic?	419	46.6
Did you recently lose any of your close family members due to the COVID-19 pandemic?	134	14.9

Table 2. Participants' replies to the nine-item questionnaire (%) (N = 898)

Items of Questionnaire	Number of Study Participants	Percentage (%)
Item (1): Willing to learn about the use of telemedicine for getting healthcare	790	87.9
Item (2): Thinks telemedicine saves time in case of medical visits and follow-up	802	89.3
Item (3): Thinks chronic disease can be managed properly through video conferencing	634	70.6
Item (4): Willing to receive telemedicine service for current chronic disease	693	77.1
Item (5): Thinks people with COVID-19 symptoms or who are COVID-19 positive should use telemedicine for medical care	805	89.6
Item (6): Thinks people with chronic diseases should use telemedicine for their mental healthcare-related advice/counseling	751	83.6
Item (7): Thinks doctors can provide standard healthcare via telephone/computer audio or video conferencing	570	63.4
Item (8): Thinks telemedicine has the possibility to play an important role for providing healthcare to India public 765	85.1	
Item (9): Willing to receive healthcare via telemedicine if needed after the COVID-19 pandemic	634	70.6

Table 3: Association Between WRTCCD with Sociodemographic Characteristics (N=898)

Characteristics		WRTCCD Management Yes %	No %	P- Value
Age	18-34 years old	7.3	30.6	0.004
	35-54 years old	81.6	16.1	
	≥55 years old	76.7	23.8	
Gender	Male	78.2	21.3	0.682
	Female	79.3	20.7	
Years of Education	≥10 years	77.5	20.2	0.048
	6-9 years	75.1	24.7	
	1-5 years	86.2	13.6	
	No education	71.4	30.2	
Marital Status	Unmarried	63.8	34.3	0.263
	Married	78.1	21.4	
	Divorced	74.3	24.1	
	Widowed/widower	81.2	18.5	
Family type	Nuclear	81.2	8.3	0.065
	Joint	76.1	23.6	
Monthly income (USD)	≤116.58	71.4	28.1	<0.001
	>116.58	84.3	13.8	
Occupation	Homemaker	77.2	20.5	0.016
	Service/business	83.1	16.4	
	Student/retired/other	71.4	30.2	
Residence	Urban	77.2	24.3	0.070
	Rural	82.4	17.4	
Chronic disease	1 or None	79.3	20.7	0.164
	>1	76.8	25.3	
Lost your earning	Yes	74.4	27.7	<0.001
	No	86.7	13.8	
Death of close family members	No	77.1	20.2	1.000
	Yes	80.2	22.3	

Finally, our study found that people living in urban areas were more likely to use telemedicine compared to people living in rural areas. A similar finding was observed during the same timeframe in the US, where those living in rural locations were less willing to use telehealth than those living in metropolitan areas[1]. It is expected that telemedicine healthcare requires possessing a computer, access to the Internet, or a mobile telephone, all of which are more easily and efficiently available in urban areas compared to rural areas.

This study was conducted to ascertain patients' perceptions of telemedicine and of- fer policymakers the information necessary to develop an action strategy and direction. However, there are a couple of limitations. Firstly, the preference assessments were con- ducted in a "yes or no" style, which constrained their interpretation when translated to actual attitudes.

Rheumatoid arthritis is one of the most prevalent chronic infammatory diseases. Te primary symptoms of rheumatoid arthritis include rheumatoid nodules, pulmonary involvement or vasculitis and systemic comorbidities[21]. Patients with rheumatoid arthritis have a long disease duration involving joint deterioration and functional disability, eventually leading to unfavourable disease outcomes. Patients with rheumatoid arthritis often experience psychological distress, such as anxiety and depression, and all of these symptoms seriously afect daily life activities[22]. Te method for the long-term management of rheumatoid arthritis patients with telemedicine has developed gradually. Telemedicine as the primary management method among rheumatoid arthritis patients could improve negative emotions and promote medication adherence. More studies should be performed in the future to confrm the efect of telemedicine on the disease management of rheumatoid arthritis.

This study was conducted to ascertain patients' perceptions of telemedicine and of-fer policymakers the information necessary to develop an action strategy and direction. However, there are a couple of limitations. Firstly, the preference assessments were con- ducted in a "yes or no" style, which constrained their interpretation when translated to actual attitudes. Another limitation is that developing a direction of causality under in-vestigation was impossible due to the data-gathering method presenting only a snapshot. However, because our study included a sufficient sample from numerous tertiary hospitals in Dhaka, the likelihood of generalizing the findings to the entire city is increased. As a result, more studies employing alternative approaches and including participants from diverse regional areas may generate different conclusions. As a result, the findings are not confined to a specific intervention, but rather indicate some of the critical components that must be considered when developing and implementing future telehealth efforts.

CONCLUSIONS

This study's main advantage is that it addresses a broad spectrum of patient interests in diverse telehealth contexts. If healthcare workers in India have the proper training and knowledge, there is a great chance that telemedicine will be integrated into the current healthcare system. Prior to telemedicine services being integrated into health systems, it will be critical to increase users' comprehension of the technology and their ability to quickly adjust to it. Ensuring the user-friendliness of telemedicine services is crucial, particularly with regard to socio-cultural and demographic aspects (e.g., local language and rural populations).

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