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Telemedicine in rural settings: A cross-sectional study on its promoters & barriers

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***Background & objectives*: Telemedicine is a promising tool for the delivery of remote healthcare services in the country. This study was conducted to assess the promoters and barriers for healthcare workers (HCWs) to adopt telemedicine using hub and spoke model for health care delivery in selected rural areas.**

***Methods*: A cross-sectional study was undertaken using an online questionnaire, at the Primary Healthcare Centre (PHC) at Kaiwara, district Chikkaballapur and Avathi PHC- Devanahalli Taluk, Karnataka, which are adopted by MS Ramaiah Medical College Hospital, Bengaluru as part of their hub-spoke model of telemedicine. The study was conducted among Health Care Workers (HCWs)- consultants, postgraduate residents, interns, nurses who were posted at these facilities during the study period.**

***Results*: There were 86 HCWs approached and 78 participated in the study. 73 (94%) respondents considered themselves to be having knowledge for basic computer use. Total 52 (67%) participants agreed that telemedicine eased connections with specialists at the hub and majority of patients appreciated telemedicine services. Out of the total 52 respondents, 64 per cent respondents agreed that telemedicine greatly reduced travel costs and helped cover a larger patient population, making referrals and prescriptions efficient. However, 16 (20%) respondents were nervous about using telemedicine services, 46 (59%) respondents felt that telemedicine could breach patient confidentiality and 36 (46%) of respondents felt that there could be loss of jobs to telemedicine.**

***Interpretation & conclusions*: The findings of this study indicates that telemedicine model is feasible and has good acceptance among the health care workers for the delivery of health care in the selected rural settings. Most respondents were positive that using telemedicine would make specialised healthcare more accessible in rural settings and improve digital health record management.**

Key words Attitude - digital health - perceptions - rural healthcare - telehealth

Telemedicine helps in providing remote health care delivery, monitoring and point of care testing while reducing the burden on healthcare infrastructure and saving travel time/costs of patients.

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During the COVID-19 pandemic, the government of India launched the Telemedicine Practice Guidelines in 2020, which facilitated use of telemedicine[1].

Despite its advantages, there are a few limitations, like lack of proper physical examination and access to high tech diagnostic testing or imaging, limited competency in telemedicine technology, and inadequate handling of emergency cases. The optimal use of telemedicine guidelines will require motivation from provider and beneficiary ends.

This study was conducted to assess the promoters and barriers for HCWs to adopt telemedicine using hub and spoke model for health care delivery in selected rural areas in the State of Karnataka, India.

Materials & Methods

This study was conducted at the department of Community Medicine, MS Ramaiah Medical College, Bengaluru, Karnataka, India between July 2022 to September 2022. The study was conducted as per the ICMR National Ethical Guidelines for Biomedical and Health Research Involving Human Participants, 2017[2]. The study was approved by the Institutional Ethics Committee of MS Ramaiah Medical College, Bengaluru. Informed consent was obtained from each participant online before administering the questionnaire.

Study design: A cross-sectional study was implemented. The HCW survey was conducted using a structured online questionnaire. The hub and spoke model of telemedicine was established in 2016 and is currently providing health services[3].

Study setting: The study was carried out at the Primary Health Centre (PHC) at Kaiwara, district Chikkaballapur, Karnataka, Avathi PHC- Devanahalli Taluk which are part of the hub and spoke model of telemedicine services at MS Ramaiah Medical College & Hospital, Bengaluru.

Study population: All HCWs (faculty, postgraduate residents, interns and nurses) involved in providing telemedicine services *via* hub-spoke model during the study period were eligible subject to their consent.

Sample size: Non-probabilistic, purposive sampling was done. Eligible HCWs were approached (n=86) and of them 78 who provided responses were included in this study (response rate of 90%).

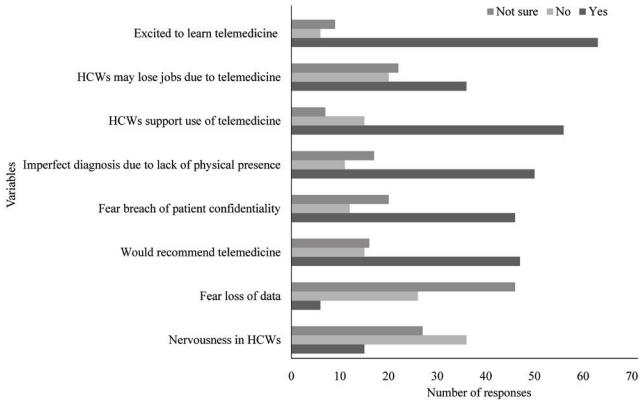

Fig. 1. General attitude and perception of healthcare workers.

Study tools: A self-administered questionnaire was developed based on Unified Theory of Acceptance and Use of Technology (UTAUT) model[3-4], pilot tested and implemented using secure online Google forms with a set of 25 multiple choice questions so as to collect data on demographic characteristics, healthcare provider assessment, general attitude and perception for telemedicine.

After an online informed consent, the questionnaire was self-administered by the study participants using online platform developed using Likert scale.

Statistical analysis: Data collected was cleaned and checked for errors (missing values, consistency, range checks). Using anonymised data, descriptive analysis as proportions was done using Microsoft Excel spreadsheet application.

Results

Out of total 78 respondents, majority were females (78.9%). The age of respondents varied from 21 to 57 yr and 49 (63%) respondents were nurses and 9 (11%) medical faculty/consultants, 6 (7.7%) senior residents, 8 (10.3%) interns, 4 (5.1%) junior residents, 3 (3.8%) others.

Regarding computer proficiency, 73 (94%) respondents considered themselves to be computer literate, having knowledge for basic computer use. On assessment of attitude for using telemedicine, 20 per cent were nervous about using telemedicine services. Furthermore, 46 (59%) respondents felt that telemedicine could breach patient confidentiality, while only 15 per cent felt that it was safe. Furthermore, 46 per cent of respondents felt that there may be loss of jobs of healthcare workers due to telemedicine.

The general attitude and perception of respondents (Fig. 1) was found to be positive and a large majority

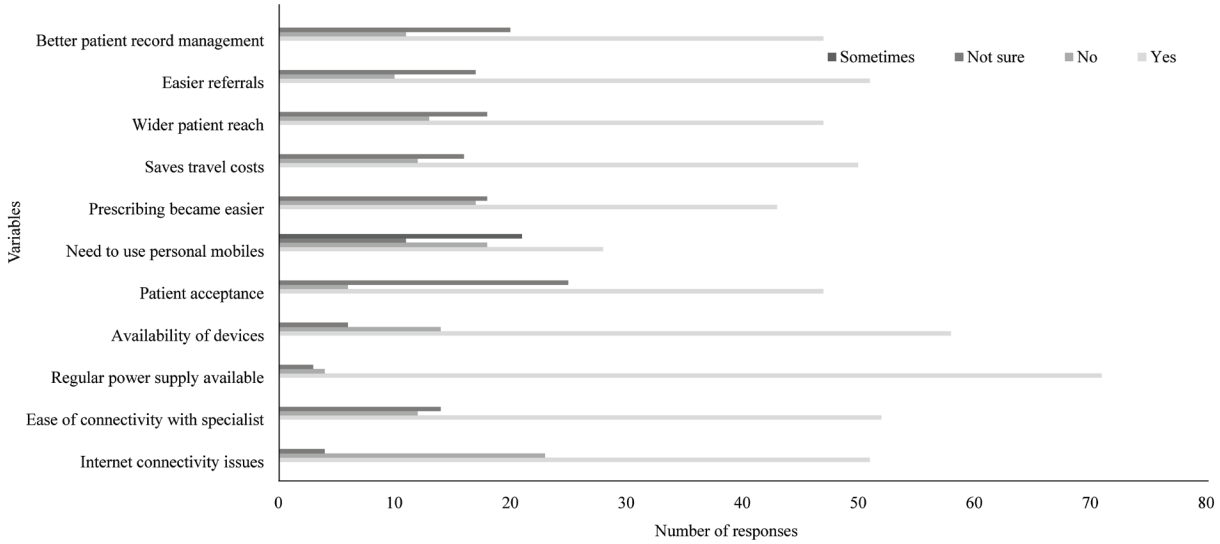

Fig. 2. Promoters and barriers of using telemedicine.

of 63 (81%) agreed that use of telemedicine was indeed was a promising way ahead to provide good healthcare in rural settings. Furthermore, 52 (67%) participants agreed that telemedicine eased connections with specialists at the hub and made referrals easy. Most responders agreed to availability of regular electricity supply and computers for using telemedicine and that majority of patients appreciated telemedicine services. Total 43 (55%) respondents reported that the prescribing system became easier and 50 (64%) respondents agreed that telemedicine greatly reduced travel costs and helped cover a larger patient population (Fig. 2).

Discussion

This study was done to assess the perception, awareness, technological adaptation, and willingness of HCWs for the use of telemedicine in rural settings.

This study showed that the HCWs accepted telemedicine as an important tool for providing remote health care services to patients, as seen in other research[5]. Though the majority of HCWs were not well versed with computer database systems, there were no major proficiency limitations identified in the use of telemedicine technology hindering its use. However, in another study, it was seen that despite the recognised value and availability of telemedicine, major barriers existed that could prevent adoption and uptake of telemedicine[6]. HCWs who can instil trust among rural population, have evolving communication skills and sound technical knowledge are essential to increase acceptance for telemedicine in rural areas[7-8]. A large number of respondents were nurses, and other studies have shown increasing telemedicine services and associated primary care administration by the nursing HCWs[9]. Telemedicine holds potential to make healthcare more structured, and accessible to the masses, especially in rural settings where a good quality of initial patient assessment and referral system can boost healthcare coverage immensely.

The Government of Karnataka is encouraging the use of telemedicine for healthcare as an efficient means of achieving Universal Health Coverage. With the launch and rapidly increasing use of e-Sanjeevani and e-Sushrut portals, scaling the use of telemedicine will be less challenging[1,10]. The National Health Authority, Government of India, launched the *Ayushman Bharat* Digital Health Mission (ABDM) in September 2021 to standardize the use of telemedicine[11]. Research to pave the way for optimizing the use of telemedicine shall be useful towards achieving Universal Health Coverage in India.

There were a few limitations in this study. First, convenience sampling was done in a select health care setting; the results are not generalisable among all rural healthcare settings. More nursing responders were part of the study sample there than medical doctors and no subgroup analysis was done.

Despite the listed shortcomings, the study showed that telemedicine used *via* hub and spoke model is a feasible tool for the delivery of healthcare. Most respondents were positive that using telemedicine would make specialised healthcare more accessible

in rural settings and improve digital health record management.

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Conflicts of Interest: None.

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