

## Perception of Telemedicine in Health Care Workers of a Tertiary Care Hospital

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### ABSTRACT:

**Objective:** This investigation aimed to determine the feasibility of using telemedicine for screening and to observe healthcare provider's opinion about telemedicine. In addition to that, explore the barriers in use of telemedicine

**Study Design and setting:** A cross-sectional study was carried out at Central Park Medical College and Teaching Hospital.

**Methodology:** The study was conducted between November, 2020 to April, 2021 from 176 doctors and nurses working at Central Park Teaching Hospital using a convenience sampling technique. Convenience sampling was used because there is always a high probability of non-response or unavailability of clinical doctors and nurses. The minimum sample size was calculated as 88 for the group of doctors. The minimum sample size was doubled to collect the data from two cadres. The questionnaire was based on demographic information, general opinion about telemedicine such as reliability, comparison with standard examination procedure, nature, popularity, knowledge requirement, cost-effectiveness, designed frame and barriers for telemedicine.

**Results:** Nearly, 80.1% of the participants were doctors with clinical experience while the remaining were nurses. Approximately 72.5% of the doctors and 58.5% of the sampled participants said that telemedicine does not fulfill the need for standard examination procedures.

**Conclusion:** The findings of our study showed that the general opinion of healthcare professionals about telemedicine was unfavorable. Doctors had negative views but the nursing staff was optimistic. There was a mixed response about convenience. The main barrier to telemedicine was the poor communication skills of patients and availability and knowledge for using infrastructure.

**Keywords:** challenges, digital health, healthcare, telemedicine.

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### INTRODUCTION:

Advancements in communication and information technology have made the world a global village. This reflects as telemedicine in the health care system. Telemedicine is a new approach in technology that facilitates the treatment of patients from a distance and has led countries

to accept the idea of opening their health systems to trade.<sup>1</sup>

Novel computer capabilities and improved telecommunication services will make telemedicine possible through laptop computers and multi-media notebooks for health care providers in developed countries in the coming future. However, the developing countries should not be denied this facility and arrangements should be made for its provision to the developing world in the coming decade. This will bring a complete change in health education and healthcare delivery.<sup>2</sup>

Telemedicine, defined by W.H.O in its 1997 Health Development Strategy Report states it as "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for the diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities".<sup>3</sup>

According to W.H.O statistics, more than one-fourth of countries all over the world have an acute paucity of healthcare force. This includes Pakistan as well. The shortage

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of resources coupled with poor medical services makes telemedicine an affordable and effective solution for providing health care results for populations living in remote areas. Telemedicine by providing reliable diagnosis, consultation, and training can be beneficial for people living in distant geographical areas.<sup>4</sup>

Telemedicine was introduced in Pakistan in 1998 and since then has expedited its activities due to improvement in the telecommunication industry. A high bandwidth favors its usability and productivity. Since Internet has become a popular medium for communication for many users in Pakistan, with more than three million telephone lines spread all over the country the feasibility and potential contribution of telemedicine has become complimentary for the citizens of Pakistan.<sup>5</sup>

Pakistan Space Organization (SUPARCO) established its first satellite-based telemedicine network in conjunction with the Ministry of IT. It intends to establish three satellite-based centers in big cities. The government also plans to build a telemedicine network country-wide.<sup>6</sup>

The Covid-19 pandemic made use of telemedicine as a front-line program for safe healthcare delivery. Being cost-effective, safe, and providing strategic medical care with clear guidelines has led to its promotion by many healthcare institutions. "Sehat Kahani" is a recent communication-technology- initiated project where virtual consultations are provided in Pakistan.<sup>7</sup>

A telemedicine survey done by W.H.O in 2016 in Pakistan reveals some of the challenges/ deficiencies faced by the country for the establishment of telemedicine. It highlights the lack of general rules and regulations as well as the absence of a framework for approval of launching programs and what permissions are required from which department.<sup>8</sup>

Lack of standard government regulations, absence of malpractice liability insurance policy, deficiency in medical services licensing, all pose risks for the security and confidentiality of personal data.<sup>9</sup>

Ethical and deontological issues related to confidentiality of data, protection of dignity, and private life of the patient are some other concerns of health care professionals worldwide.<sup>10</sup>

Keeping all the above possibilities in mind we plan to interview the healthcare staff to find out their perceptions about the ease of use of telemedicine, how willing they would be to use it, and if they have any reservations about its usage.

#### **METHODOLOGY:**

A cross-sectional study was carried out at Central Park Medical College and Teaching Hospital from 01-November 2020 to 30-April 2021. The data was collected from 176 doctors and nurses working at Central Park Teaching Hospital using a non-random convenience sampling technique. As

the data was collected from clinical doctors and nurses, where there is always a high probability of non-response due to unavailability. That is why the convenient sampling technique was used. The minimum sample size was calculated as 88 by using 34.8% as the proportion of doctors' favored practice of telemedicine by introducing national standards,<sup>11</sup> 90% power of the test, and 5% level of significance. The sample size 88 was calculated for the group of doctors. The minimum sample size was doubled to collect the data from two cadres. The double sample was taken to ensure that it represents the population well. This can also be justified as when we calculate the sample size for the difference between two population proportions,<sup>12</sup> we get almost double the sample size. The inclusion criteria were doctors and nurses working at Central Park Medical College and Teaching Hospital.

A self-designed questionnaire was used to collect data. The questionnaire addressed demographic information such as gender, educational level, year of experience, profession, and graduating college or university. The questionnaire was also based on statements tailored under general opinion about telemedicine such as reliability, comparison from standard examination procedure, nature, popularity, knowledge requirement, cost-effectiveness, and designed frame for telemedicine. Some information on barriers against telemedicine was also gathered. The first part of the questionnaire addressed the demographic information about the graduating college, years of experience, age, and profession of participants. The second part of the questionnaire was based on general opinion about telemedicine and its reliability and the third part was based on barriers against telemedicine. The questionnaire was designed and administered in British English (BrE) language. The reliability of the questionnaire was observed using Cronbach alpha which came out to be approximately 70%.

Before data collection, written consent was taken from all the participants. Ethical approval of the study was taken from the Institutional Review Board (IRB) of Central Park Medical College and Teaching Hospital (CPMC/IRB-NO/1319). The data was analyzed using SPSS version 26. Chi-square test of association was performed to observe significant association of different variables with the opinion of the participants whether telemedicine meets the needs of standard examination procedure or not. Descriptive statistics were presented as mean and standard deviation. The general opinion about the reliability, adoption, requirements and barriers is given in the form of frequency and percentages.

#### **RESULTS:**

A cross-sectional study was carried out to collect data from 176 participants. The mean age of the participants was  $33.11 \pm 11.65$  SD (in years). About 65.9% of the participants were female while 34.1% of the participants were male. The data were collected both from doctors and nurses. Nearly 80.1%

of the participants were doctors with clinical experience while the remaining were nurses.

Most of the participants whose educational level was post-graduation or above were of the opinion that telemedicine does not meet the need of standard examination procedure. The level of education was significantly associated with the opinion. Approximately 72.5% of the doctors and 58.5% of all the participants said that it does not fulfill the need for standard examination procedures. The opinion of nurses was quite different. Nearly 80.5% of the nurses favored telemedicine. The profession was also found as the significantly associated factor with the opinion. Working experience and graduating college or university were insignificantly related to telemedicine. Most of the participants, regardless of their graduating college or university did not favor telemedicine.

Two-thirds of the respondents found telemedicine expensive. About 33% of the respondents said that the cost of telemedicine is not high. Nearly 83.5% of the participants mentioned that knowledge is required for medical practitioners and nurses to be able to use technology. Approximately 80% of the participants mentioned that older people are least likely to use telemedicine. The general opinion of 34.7% of participants on the use of telemedicine was that its application was little likely, 35.8% of the participants found the use of telemedicine somewhat likely. Only 4% of the participants found it very likely to be used. About half of the participants agreed that telemedicine is

convenient for more patient appointments in a day and more than half agreed that it is reliable for more frequent contact (Table 1). However, approximately 66% of the participants were of the view that it is more reliable compared to physically visiting a doctor. Approximately 79% of the participants said that telemedicine is comparatively less adopted in rural areas and 72.7% mentioned that a full design framework is required for awareness about telemedicine. Major reasons for the lack of awareness about telemedicine in rural areas were lack of a fully designed structure for telemedicine followed by lack of availability and knowledge to use system and unavailability of internet facilities. Most of the participants mentioned that the communication skills of the patients were the biggest barrier followed by fear of incomplete information and infrastructure cost (Table 2). A chi-square test of association was performed to observe the significant association between opinions of the participants about telemedicine that it meets the needs of standard examination procedure with various factors (Table 3).

#### DISCUSSION:

Searching for prospects of telemedicine we took responses from both doctors and nurses working at a tertiary care hospital in Kahna. We found that 72.5% of doctors disapproved of telemedicine and thought it does not meet the needs of standard examination procedures; however, the response was different from nurses and 80.5% thought telemedicine was useful. In a study conducted in Korea, patient satisfaction with telemedicine was reported as 86%,

Table 1: Opinion about the reliability and requirements of telemedicine (Frequency (%))

Factor	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Telemedicine is convenient for more patient appointments in a day.	14 (7.95%)	74 (42.05%)	56 (31.82%)	26 (14.77%)	06 (3.41%)
Do you think that telemedicine is reliable for more frequent contact?	20 (11.36%)	78 (44.32%)	48 (27.27%)	25 (14.20%)	05 (2.84%)
Telemedicine is more reliable as compared to physically visiting a doctor.	09 (5.11%)	21 (11.93%)	30 (17.05%)	70 (39.77%)	46 (26.14%)
Is it difficult at times to diagnose through telemedicine?	36 (20.45%)	86 (48.86%)	25 (14.20%)	22 (12.5%)	07 (3.98%)
Is it user-friendly for patients with less awareness of technology?	11 (6.25%)	43 (24.43%)	43 (24.43%)	58 (32.95%)	21 (11.93%)
Do you think that training is required for doctors, nurses, and physicians for telemedicine?	58 (32.95%)	80 (45.45%)	24 (13.64%)	10 (5.68%)	04 (2.27%)
Do you think that telemedicine is comparatively less adopted in rural areas?	55 (31.25%)	84 (47.73%)	26 (14.77%)	09 (5.11%)	02 (1.14%)
The lack of a fully designed framework is the main reason for low awareness of telemedicine in small towns/villages.	39 (22.16%)	89 (50.57%)	37 (21.02%)	07 (3.98%)	04 (2.27%)
Do you think that the current system promotes telemedicine?	09 (5.11%)	47 (26.70%)	63 (35.80%)	41 (23.30%)	16 (9.09%)

Table 2: Barriers against Telemedicine

Barriers	Not at all n (%)	Little bit n (%)	Somehow n (%)	Often n (%)	Always n (%)
Unsure about diagnosis	21 (11.93%)	44 (25%)	49 (27.84%)	24 (13.64%)	38 (21.59%)
Fear of incomplete information	09 (5.11%)	23 (13.07%)	57 (32.39%)	59 (33.52%)	28 (15.91%)
Communication skills of patient	12 (6.82%)	16 (9.09%)	65 (36.93%)	46 (26.14%)	37 (21.02%)
Infrastructure	15 (8.52%)	23 (13.07%)	39 (22.16%)	45 (25.57%)	54 (30.68%)
High cost of telemedicine infrastructure	19 (10.80%)	32 (18.18%)	58 (32.95%)	37 (21.02%)	30 (17.05%)

Table 3: Crosstab of opinion with various Social and Demographics Factors

Factors	Categories	Telemedicine meets the need of standard examination		Chi-square (p-value)
		Yes	No	
Gender	Male	17 (28.33%)	43 (71.67%)	4.08 (0.05*)
	Female	51 (43.97%)	65 (56.03%)	
Level of Education	Graduation or less	36 (48%)	39 (52%)	4.83 (0.03*)
	Post-graduation or above	32 (31.68%)	69 (68.32%)	
Profession	Doctor	39 (27.46%)	103 (72.44%)	38.69 (0.00*)
	Nurse	29 (85.29%)	05 (14.71%)	
Working Experience	1-5 Years	43 (41.35%)	61 (58.65%)	1.29 (0.73)
	5-10 Years	10 (30.30%)	23 (69.70%)	
	10-20 Years	07 (38.89%)	11 (61.11%)	
	Above 20 Years	08 (38.10%)	13 (61.90%)	
Graduating College / University	Public Sector	23 (32.39%)	48 (67.61%)	1.96 (0.21)
	Private Sector	45 (42.86%)	60 (57.14%)	

\*Significant at 5% level of significance

but only 52.7% of doctors and 48.0% of nurses were satisfied with it.<sup>13</sup> A study conducted in Pakistan reported that there was slight disagreement between the practitioners in acceptance of telemedicine and considering it a proper way for medical consultation.<sup>14</sup>

In our study, 83.5% of the participants thought that knowledge is necessary to use technology. In another study conducted in India where 86 doctors were interviewed, 50% said that lack of knowledge prevented them from using telemedicine.<sup>15</sup> Among physicians working at Tabriz teaching hospital in Iran, 33.55% knew telemedicine. 45.3% had used telemedicine in the form of telephonic conversations.<sup>16</sup> Another study mentioned that telemedicine is the most effective way however the distance is large, experts are rare and technology is limited.<sup>17</sup>

Regarding the convenience of telemedicine for patient appointments, 50% of health staff in our study agreed, another 50% also thought that it is reliable. Nearly, 66% thought that telemedicine is unreliable. A study done in Korea during the Covid epidemic showed 80% patient satisfaction regarding convenience. About 38.2% of doctors and 30.0% of nurses also found it convenient. 87.1% of patients found it equally reliable as in-patient visits but only 14.5% of doctors and 14.0% of nurses also found so.<sup>13</sup> Clinical usefulness of telemedicine was perceived as 34.7%

less likely usefulness, 35.8% as somewhat likely usefulness, and 4.0% very likely usefulness in our study. In a UK study, the usefulness of telemedicine was rated as 76%, 74%, and 74% respectively for clinical usefulness, functioning of equipment, and ease of use of equipment.<sup>18</sup>

About 33% of health professionals found telemedicine inexpensive but most thought it was expensive in our study. In contrast, in a study in rural India, 90.0% of the doctors found telemedicine cost-effective and 61.0% of doctors found an increase in patients' inflow apart from regular visits.<sup>19</sup> Telemedicine is not very popular and is now in Pakistan, but it does add benefits to the lives of people living in remote areas.<sup>14</sup>

The barriers to telemedicine reported in our study were poor communication skills of patients, fear of giving incomplete information about the disease, and the high infrastructure cost. In a study conducted in N. America and Europe through e-mails about barriers to telemedicine, no technological problems were reported and neither cultural issues were a problem.<sup>20</sup> In rural India, 47.0% of problems were related to technology and 39.0% in time scheduling.<sup>19</sup> In a study conducted in Lahore, Pakistan, most of the participants favored telemedicine if the health care provider is far away and they can save more than 60 minutes.<sup>21</sup> The important barriers in the UK were recorded as 55.0% as lack of suitable

training, 54.0% as high cost of purchasing telemedicine equipment, and 43.0% as an increase in GP and nurse workload.<sup>17</sup> The use of telemedicine is unpopular in Pakistan, however, only a few applications are introduced. A study concluded that active involvement is required to regulate and expand digital health, as it seems to have a future in Pakistan.<sup>22</sup>

### CONCLUSION:

The findings of our study showed that the general opinion of healthcare professionals about telemedicine was unfavorable. Doctors had negative views but the nursing staff was optimistic. Despite it adds benefits to the healthcare system, it has many barriers. The hindrances were identified as lack of appropriate technological knowledge, high operating cost, and lack of reliability and clinical utility. There was a mixed response about convenience. However, the communication skills of patients and availability and knowledge for using infrastructure were the main obstacles to telemedicine. Clinical staff is not much adaptive to the use of technology. More efforts should be done to create awareness about the uses of telemedicine and to reduce the infrastructure and technology barriers. Workshops much be conducted on basic knowhow of modern IT devices and technology system.

#### Authors Contribution:

**Shehnaz Khan:** Data Collection, Write-up  
**Tahseen Haider Kazmi:** Study design, Final Proof Reading  
**Noor Shahid:** Data Collection, Data Analysis, write-up  
**Shamaila Hassnain:** Drafting, Proof Reading

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