Bridging Healthcare Horizons: Illuminating Pakistani Medical Students' Perspectives on Telemedicine

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Abstract

Purpose: In the evolving landscape of global healthcare, telemedicine stands out as a beacon of progress, offering enhanced accessibility. Nowhere is its impact more critical than in the rural expanse of Pakistan, where traditional healthcare struggles to reach. This research delves into the minds of Pakistani medical students, a cohort pivotal in steering the future of healthcare delivery in the country.

Methodology: The research design for your study can be described as cross-sectional or survey research, focusing on understanding the telemedicine exposure, interest levels, and plans for future utilization among Pakistani medical students across 20 medical schools.

Target Population: The target population in your study comprises Pakistani medical students enrolled in the 20 medical schools included in the study.

Findings: Among the 396 students surveyed, 24% boasted prior exposure to telemedicine, while a noteworthy 52% expressed unwavering intentions to incorporate it into their future medical practices. Notably, 73.8% of those with prior exposure were resolute in their commitment to using telemedicine, compared to 43% without prior exposure. Among the undecided students, 21% had been exposed previously, shedding light on the profound influence of exposure on shaping future intentions.

Unique Contribution to Theory, Policy, and Practice: This research goes beyond the surface exploration of medical students' attitudes towards telemedicine; it makes a distinctive contribution to theoretical frameworks, policy development, and practical implications. The study acts as a theoretical cornerstone by shedding light on the intricacies of the awareness gap within this demographic. From a policy perspective, the findings provide policymakers in Pakistan with a nuanced understanding of the current state and future potential of telemedicine integration into the healthcare system. The practical implications are profound, emphasizing the urgent need for early education in telemedicine to prepare the next generation of healthcare professionals for the challenges and opportunities presented by an evolving healthcare landscape.

Keywords: *Telemedicine, Healthcare, Medical Students, Early Education, Healthcare Landscape, Policy Development*

Introduction

The rapid advancement of technology has redefined the landscape of healthcare worldwide, transcending geographical boundaries and reshaping the way we access and deliver medical services. One remarkable innovation that has gained significant momentum in recent years is telemedicine. Telemedicine leverages digital technologies to bridge the gap between patients and healthcare providers, offering a myriad of possibilities for efficient and accessible healthcare delivery (1). This research embarks on a journey to explore the awareness and attitudes of medical students in Pakistan towards telemedicine, a topic that has become increasingly relevant in our ever-evolving healthcare landscape. In Pakistan, there are still significant issues with making and using telemedicine apps, such as fixing technical glitches and dealing with rules against treating patients remotely (1).

Pakistan, a nation with diverse healthcare challenges stemming from its population's distribution and economic disparities, is poised to benefit immensely from the incorporation of telemedicine into its healthcare system. With a population exceeding 220 million, Pakistan's healthcare infrastructure often struggles to provide comprehensive and timely care to all citizens, particularly those in rural and remote areas (2). Telemedicine has the potential to revolutionize healthcare delivery by providing virtual access to medical professionals, diagnostic services, and healthcare information, thereby reducing the barriers of distance and improving overall healthcare outcomes (1). Telemedicine is becoming increasingly common in health education and training, as it proves to be a helpful tool for teaching and training healthcare teams. In this context, understanding the perceptions, knowledge, and attitudes of medical students in Pakistan towards telemedicine is of paramount importance.

Medical students represent the future of healthcare, and their views and preparedness for embracing telemedicine as an integral part of the healthcare ecosystem hold immense significance. As they are poised to become the healthcare providers of tomorrow, their insights can offer valuable guidance on the integration of telemedicine into the Pakistani healthcare system. Telehealth is gaining importance in healthcare due to its ability to reach remote areas and utilize expertise regardless of distance, aligning with the growing role of technology in healthcare (4). This study seeks to unravel the current state of awareness and attitudes of medical students in Pakistan regarding telemedicine. By exploring their perceptions, concerns, and potential barriers, we aim to gain a comprehensive understanding of their readiness to embrace telemedicine as an essential tool for healthcare delivery in Pakistan. At the core of this research lies a recognition of the evolving nature of healthcare and the imperative for medical professionals, including students, to adapt to emerging technologies and trends. If health information technology (HIT) applications aren't widely accepted, it can lead to delays or even the failure of HIT system implementation and hinder important organizational goals, like managing patient data effectively (6).

Telemedicine is not merely a trend; it is an evolving paradigm that promises to enhance healthcare accessibility, reduce costs, and improve patient outcomes. Consequently, it becomes incumbent upon medical students to not only be aware of telemedicine but also to be open to its integration

into their future medical practice. This research further aligns with global efforts to explore the potential of telemedicine. In an era marked by globalization and the rapid dissemination of information, the experiences and insights of medical students in Pakistan can contribute to the broader discourse on telemedicine's adoption and acceptance in diverse healthcare settings worldwide. Implementing telephonic triage the day before a visit can prevent symptomatic patients from entering oncology wards, ensuring both patient and physician safety while maintaining quality service (7). As telemedicine transcends borders and cultures, understanding the attitudes and awareness of medical students in Pakistan becomes a piece of the larger puzzle in promoting its global integration.

The findings of this study hold multifaceted implications. First and foremost, they can serve as a guide for medical education institutions in Pakistan. The literature suggests that real-time medical communication leads to better care outcomes and improved patient health (8). By understanding the current awareness and attitudes of their students, these institutions can adapt their curricula and training programs to better prepare future medical professionals for a healthcare landscape that increasingly includes telemedicine. According to recent studies, the majority of patients expressed high satisfaction with their telehealth experiences (9). This proactive approach can help bridge the gap between traditional medical education and the demands of modern healthcare practice. Furthermore, policymakers in Pakistan can utilize the insights from this research to inform the development of policies and regulations governing telemedicine. In Korea, a bill aimed at providing telemedicine to underserved populations and communities was introduced to the national assembly in May 2010. The Ministry of Health and Welfare should take a more proactive role in ensuring the availability and safety of necessary telemedicine services (10). As telemedicine continues to grow, establishing a supportive regulatory framework is crucial to ensure its safe and effective use. Understanding the perspectives of medical students can contribute to the formulation of policies that align with the expectations and aspirations of the future healthcare workforce. Healthcare organizations and practitioners can also benefit from this research by gaining insights into the attitudes of the next generation of medical professionals. This can guide them in the implementation of telemedicine services and the cultivation of a healthcare culture that embraces technological advancements while upholding the highest standards of patient care and ethical practice. The widespread acceptance and success of new technology depend on user knowledge, skills for implementation, and a supportive working environment (11).

This research embarks on a journey to explore the awareness and attitudes of medical students in Pakistan towards telemedicine, a transformative force poised to reshape the nation's healthcare landscape. Medical schools are integrating telemedicine skills into undergraduate medical education to empower future physicians in effectively using telemedicine for better care, enhanced access, and cost reduction (12). As we delve into the perspectives of these future healthcare providers, we anticipate uncovering valuable insights that will not only shape the trajectory of medical education in Pakistan but also contribute to the global discourse on telemedicine's integration into diverse healthcare ecosystems. Telemedicine is not just a tool; it is a bridge to a

more accessible, efficient, and patient-centred healthcare system, and the medical students of Pakistan have a pivotal role to play in its journey toward realization.

Literature Review

Telemedicine has emerged as a transformative tool in global healthcare, particularly in regions with limited access to traditional medical services like rural Pakistan. This study examines the perceptions and intentions of Pakistani medical students regarding telemedicine, recognizing their pivotal role in shaping the future of healthcare delivery in the country.

Previous research has highlighted the significance of telemedicine in improving healthcare accessibility, especially in underserved areas. Studies have shown that telemedicine can bridge the gap between healthcare providers and patients, leading to improved healthcare outcomes and patient satisfaction. However, the adoption of telemedicine among healthcare professionals, particularly medical students, remains a subject of inquiry.

The methodology employed in this study utilizes a cross-sectional survey approach, targeting Pakistani medical students across 20 medical schools. While convenience sampling was utilized, which may introduce biases, the use of online surveys facilitated data collection from a diverse and geographically dispersed population.

Findings from the study reveal a promising trend among Pakistani medical students towards telemedicine adoption. Despite only 24% reporting prior exposure to telemedicine, a substantial 52% expressed firm intentions to incorporate it into their future medical practices. This underscores the potential of telemedicine in the country and emphasizes the importance of early education and exposure.

The study contributes to existing literature by elucidating the awareness gap among medical students regarding telemedicine and its implications for future healthcare delivery. From a policy standpoint, the findings offer valuable insights for policymakers, advocating for the integration of telemedicine education into medical curricula to prepare future healthcare professionals for the evolving landscape.

Methodology:

Study Design: This cross-sectional study utilized a convenience non-probability sampling technique.

Study Participants: The research engaged first- to final-year medical students from 20 medical schools across Pakistan.

Survey Distribution: Utilizing a Google form disseminated through WhatsApp and other social media, the survey reached around 2500 eligible medical students, achieving a response rate of 15.84%.

Ethical Approval: The research protocol received approval from the IIMC ETHICAL RESEARCH COMMITTEE, and participants provided informed consent.

Questionnaire Design: The survey, adapted from a relevant article on telemedicine awareness and attitudes among U.S. medical students, comprised 12 questions covering demographics, telemedicine exposure, interest, and future utilization plans.

Inclusion Criteria: Enrolled medical students were included, while non-medical students, residents, and doctors were excluded.

Data Analysis: SPSS was employed for data analysis, utilizing the Pearson chi-square test, likelihood ratios, and linear-by-linear associations to determine statistical significance.

Results

A total of 396 students participated in the survey. Among them, 111 students (24%) had prior patient exposure to TM, while 285 students (72%) had no such exposure. Notably, 52% (N=206) of the students expressed intentions to utilize TM in the future. In contrast, 11.6% (N=46) had no plans for utilization, and 36.4% (N=144) remained undecided.

For those with prior clinical exposure to telemedicine, a significant 73.8% (n=82) expressed an intention to use telemedicine in the future. In comparison, only 43% (n=124) of those without clinical exposure planned to utilize it. Among undecided students, 21% (N=24) had previous exposure to telemedicine, while 42% (N=120) had never been exposed.

Utilization of Telemedicine

Clinical exposure to Telemedicine	N(396)	%
Had clinical exposure	111	28%
Had not any clinical exposure	285	72%

Future plans to utilize Telemedicine	N(396)	%
Plan to utilize	206	52%
Undecided	144	36%
No plans to utilize	46	11.6%

Students' Level of Interest: Regarding their interest in telemedicine, 68 students (17.2%) expressed being "very interested," while 180 students (45.5%) indicated they were interested.

Conversely, only 29 students (7.3%) were not interested, and 119 students (30.1%) remained undecided.

When inquired about didactic exposure to telemedicine, 21.7% (N=86) of students reported that their medical school offered telemedicine didactics. In contrast, 43.9% (N=174) stated that telemedicine was not offered, and a substantial number (36.4%, N=144) were uncertain about its availability.

Impact of Didactic Exposure: Among students with didactic exposure to telemedicine, 41.8% (N=36) expressed being "very interested," 47.6% (N=41) were interested, 3.4% (N=3) were not interested, and 6.9% (N=6) were undecided.

For students without didactic exposure, 1.9% (N=16) were "very interested," 44% (N=77) were interested, 10.9% (N=62) were uninterested, and 35.6% (N=19) remained undecided.

Didactic exposure offered by medical school	N(396)	%
Had didactic exposure	86	21.7%
Had not any didactic exposure	174	43.9%
Not sure about it	136	34.3%

Level of interest in Telemedicine	N(396)	%
Very interested	68	17.2%
Interested	180	45.5%
Undecided	119	30.1%
Uninterested	29	7.3%

Exposure and Level of Interest

Discussion

Telemedicine, an evolving field, is pivotal for healthcare accessibility globally. Its benefits include improved healthcare access, patient-centered care, clinical decision-making efficiency, and management of chronic diseases, all at reduced costs. The COVID-19 pandemic has accelerated its adoption, emphasizing its role in alleviating strain on healthcare systems. In this context, our study reveals the interest of Pakistani medical students in telemedicine, despite limited exposure. The shortage of telemedicine training in Pakistani medical schools could contribute to this

knowledge gap, urging a re-evaluation of curricula to address evolving healthcare landscapes (13, 14).

The study findings highlight that a significant proportion of medical students in Pakistan are interested in telemedicine, yet many lack exposure. This exposure deficit raises questions about the adequacy of telemedicine incorporation in medical curricula. The survey indicates that exposure positively correlates with interest, emphasizing the importance of early clinical exposure for forming informed opinions about telemedicine.

The study findings, based on a survey of 396 medical students in Pakistan, reveal that 24% of respondents reported prior exposure to telemedicine. This exposure, however, was not uniform across all participants, as a significant proportion, comprising 52% of the surveyed students, expressed unwavering intentions to incorporate telemedicine into their future medical practices. Notably, among those with prior exposure to telemedicine, a substantial majority (73.8%) were resolute in their commitment to using it in their future practices, compared to 43% of students without prior exposure. This suggests a strong positive correlation between exposure to telemedicine and the intention to incorporate it into future medical practice. Additionally, among the undecided students, 21% had been exposed previously to telemedicine, highlighting the profound influence of exposure on shaping future intentions. These findings underscore the importance of early clinical exposure to telemedicine within medical curricula, as exposure positively correlates with interest and intention to adopt telemedicine practices. However, challenges such as disorganization, technical skills, and ethical concerns need careful consideration for effective telemedicine implementation (15).

As the demand for telehealth services rises, medical schools should prioritize training future physicians in telemedicine. The study encourages medical education reform to ensure students understand telemedicine's complexities, social implications, and cultural aspects. While the challenges exist, the potential benefits of integrating telemedicine into medical education and practice, particularly in rural areas, remain significant (16, 17).

In light of the ongoing global shift toward telehealth, continuous assessment of perceptions and attitudes is crucial. The study acknowledges limitations such as a modest response rate and the need for cost-effectiveness evaluation. Despite these, the findings align with global trends, emphasizing the growing importance of telemedicine in healthcare delivery (18, 19).

Comparisons with international studies, such as those from the United States and India, reinforce the study's significance. While uncertainties persist among students, the positive response in South Asian countries suggests a shared eagerness to embrace telemedicine. The dynamic landscape post-COVID-19 and the increasing importance of telemedicine in Pakistan's healthcare future underline the need for continued research and integration efforts (20, 21, 22).

Conclusion

This research, while unveiling a discernible awareness gap among Pakistani medical students regarding telemedicine, accentuates their undeniable interest in its future use. It underscores the

paramount importance of early education to equip the medical workforce for navigating the complexities of an evolving healthcare landscape. The insights gleaned from this study provide invaluable guidance for medical institutions, policymakers, and healthcare professionals steering the course of healthcare in Pakistan.

Recommendations

Curricular Integration: Revise medical school curricula to include comprehensive telemedicine training.

Early Exposure Programs: Establish programs for early telemedicine exposure through collaborations with healthcare providers.

Ethics and Privacy Education: Integrate modules addressing ethical considerations and patient privacy in telehealth practices.

Technical Skills Training: Include technical skills training to prepare students for challenges in telehealth implementation.

Cost-Effectiveness Studies: Conduct research on the cost-effectiveness of telemedicine integration in education and practice.

Collaboration with Healthcare Institutions: Foster partnerships between medical schools and healthcare institutions for aligned educational programs.

Continuous Evaluation and Adaptation: Implement ongoing evaluation mechanisms and adapt programs based on emerging trends.

National Telemedicine Guidelines: Advocate for the development and implementation of national telemedicine guidelines.

Increased Survey Participation: Improve survey participation methods for diverse and representative insights.
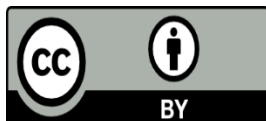
Longitudinal Studies: Conduct longitudinal studies to track evolving attitudes and utilization patterns in telemedicine.

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