

A Quantitative Analysis of Barriers to International Telemedicine Education: The Case of the Philippines

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Abstract: A multitude of studies have investigated the opportunities and limitations of telemedicine pre- and post-COVID-19 pandemic. However, most of the research has focused on telemedicine's constraints in the context of international, regional, and developed nations, with few studies examining the specific challenges that may affect telemedicine's progress in developing countries where the pandemic may have exacerbated existing technological and geographical difficulties. This study takes the Philippines as a case study due to its archipelagic location, use of English as an official language, and other factors that influence its adaptability to international telemedicine. We assessed the barriers and challenges to the advancement of telemedicine from four viewpoints: policy, organization, individual, and collaboration between organizations. Therefore, the significance of this study is twofold: (a) to concentrate on international telemedicine education by contrasting domestic and international practices, and (b) to newly reveal connections between each component, as prior research highlighted barriers and difficulties but did not clarify relationships among different elements. We surveyed and interviewed 38 physicians, technicians, coordinators, and staff involved in telemedicine education in the Philippines. The study found that (1) public support yields favourable results, (2) a strong correlation exists between domestic and international telemedicine, (3) communication and technical obstacles are interconnected, (4) unity and cooperation in intra-hospital collaboration are critical, and (5) comprehending the "significance of work" has a positive impact. This study underscores the intersectionality of several barriers to telemedicine development. It also recommends providing greater support for telemedicine education in developing nations and promoting collaboration between developing and developed nations.


1 INTRODUCTION


Since the global outbreak of COVID-19, telemedicine has gained momentum as an increasingly popular approach to the delivery of primary health care conducted at a distance. While telemedicine has been the subject of numerous studies in the past, focusing on its limitations and possibilities for delivering


healthcare across space and scale, the pandemic has magnified the challenges to the conduct of telemedicine and telemedicine education among practitioners. This study focuses on international telemedicine education and identifies its barriers and challenges, with particular attention to the relationships among factors, which has not been explored in previous studies.


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International telemedicine education, as defined in this paper, is an international video conference connection between hospitals for training and exchange of ideas. Through international telemedicine education, healthcare professionals can consult with medical experts from around the world, acquire knowledge and skills, and see live demonstrations of advanced surgical techniques performed by world-class experts. This study aims to compare domestic and international telemedicine practices and newly uncover relationships between each element. While previous studies pointed out barriers and difficulties, relationships among different elements are not clear.

The survey covered in this paper includes both domestic and international telemedicine, with the aim of comparing the two to identify issues in the latter. The impact of the COVID-19 pandemic has increased the growing need to examine how telemedicine can be effectively implemented in local contexts, be it in rural or urban areas, global or national, developed, and developing countries.

This case study is focused on the Philippines, a developing state with a high demand for international and domestic telemedicine due to geographical and technological factors. The conduct of telemedicine becomes a challenge to provide health care to far-flung areas that may have limited access to medical and communication technologies, given its archipelagic status. However, as English is an official language in the country, international telemedicine education is highly adaptable, allowing for international cooperation among telemedicine practitioners. This research explores the connection between these barriers and further explores other difficulties associated with creating a network environment, especially during COVID-19, where remote work has also progressed.

2 RELATED STUDIES

The existing literature has extensively explored the challenges and barriers to the implementation of telemedicine before the pandemic. Kruse et al. (2016) identified organizational barriers such as cost, liability, and efficiency, patient barriers such as technological literacy, and staff barriers such as staff shortages, aversion to change, and interoperability that hinder telemedicine delivery. Weigel et al. (2020) examined the development and evolution of telemedicine policies by federal, state, and private insurance companies. Kudo et al. (2022) found that physicians and technicians face different barriers to care in their study at a national university hospital in

Japan. Legler et al. (2021) discussed hospital-to-hospital telemedicine collaboration in detail. However, the relationship between these multiple constraints has not been adequately explained.

During the COVID-19 pandemic, several studies have assessed how the global health crisis has exacerbated the existing challenges to telemedicine delivery. However, these studies have mainly focused on barriers specific to international/global (Bhaskar et al. 2020; Legler et al. 2021), regional (Sabrina and Defi 2021; David et al. 2021; Chu et al. 2022), and developed country (Weigel et al. 2020; Kudo et al. 2022) contexts. Only a few studies have examined the challenges specific to developing countries, notably South Asian countries, during the pandemic, such as Pakistan (Farooqi et al. 2022), Bangladesh, and India (Agarwal et al. 2020; Das et al. 2020).

Considering the gaps in the existing literature, the present research aims to explore the challenges that hinder the implementation of telemedicine in the Philippines during the pandemic.

3 RESEARCH DESIGN

The COVID-19 pandemic has highlighted the need for telemedicine as a crucial tool for delivering healthcare services remotely. However, implementing telemedicine in developing countries such as the Philippines comes with its own set of challenges. The limited access to technology and internet connectivity, inadequate infrastructure, and a shortage of trained healthcare professionals are some of the challenges that need to be overcome to implement telemedicine successfully.

The study aims to identify these challenges and prospects of implementing telemedicine in the Philippines. The research will employ a mixed-method approach, using surveys, interviews, and statistical methods to collect and analyse data from telemedicine professionals in the country. The study's participants will include medical staff, technical staff, and secretaries/coordinators involved in telemedicine. The study will identify the specific challenges that these professionals face based on their professional characteristics and the level of policy, organizational, and individual factors that contribute to these challenges.

One of the critical areas that the study will focus on is telemedicine education in the Philippines. The study will assess the current status and issues related to telemedicine education and examine how medical staff, technical staff, and secretaries/coordinators acquire the necessary skills for telemedicine through

activities such as medical conferences.

The study's findings will be used to develop tailored policy recommendations and problem-solving strategies for different professional categories in telemedicine. By identifying and addressing these challenges, the study aims to contribute to the successful implementation of telemedicine in the Philippines. This, in turn, will improve access to healthcare services for the country's underserved communities and help bridge the gap in healthcare delivery between urban and rural areas.

In conclusion, this mixed-method study is critical to identifying the challenges and prospects of implementing telemedicine in the Philippines. By collecting and analysing data from telemedicine professionals, the study will provide insights into the specific challenges faced by different professional categories in telemedicine. The study's findings will help develop tailored policy recommendations and problem-solving strategies that can contribute to the successful implementation of telemedicine in the Philippines, ultimately improving access to healthcare services for the country's underserved communities.

4 METHODOLOGY

4.1 Survey Methods

To gather data for this research, an online survey was conducted using Google Forms between July 17 and August 7, 2022. The survey was targeted at medical staff, technical staff, and secretaries/coordinators who were involved in telemedicine education in Japan and the Philippines. A total of 38 participants were included in the survey and subsequent follow-up interviews, consisting of 26 medical staff, four technical staff, two secretaries/coordinators, and six others.

The survey was conducted in two stages.

- (1) Respondents completed an online survey via Google Forms.
- (2) A follow-up interview was conducted with the same respondents via Zoom to obtain more in-depth information on the reasons and background behind their answers in the survey. During the interview, participants were asked to elaborate on their survey responses and provide additional insights into their experiences with telemedicine education in the Philippines.

Overall, the data collected from the survey and interviews will be analysed using a combination of

statistical and qualitative methods to identify the challenges and prospects of implementing telemedicine in the Philippines. The findings of this research will provide valuable insights into how telemedicine education can be improved.

4.2 Analytical Methods

The data collected from surveys and interviews with telemedicine professionals in the Philippines have been analysed using statistical methods such as regression analysis, factor analysis, and correspondence analysis. These methods have been employed to identify differences in the awareness of problems related to telemedicine based on the occupational attributes of the respondents, including medical staff, technical staff, and secretaries/coordinators. The results of the analysis will provide insights into the specific challenges faced by different professionals in the telemedicine industry in the Philippines. This information can inform the development of tailored policy recommendations and problem-solving strategies to address and overcome these challenges.

5 RESULTS

In this study, questions were categorized into three levels: policy, organizational, and individual. Respondents were asked to provide their opinions on government support for telemedicine and public-private partnerships, which were assessed using a seven-point Likert scale to gauge their level of agreement or disagreement. The results at the policy level indicated that greater satisfaction with international telemedicine education was associated with more favorable evaluations of government support for telemedicine. Additionally, positive evaluations of domestic telemedicine education were found to be correlated with positive evaluations of international telemedicine education.

Variables= public support	
disparity_world	-.056
disparity_country	-.107
Telemd_solution	.237
info_disparity_world	-.028
info_disparity_domestic	.066
private_solution	.251
education_cooperation_international	.581*
education_cooperation_domestic	.001
R^2	.421**

** p < .01, * p < .05, + p < .10

Variables=education cooperation international	
disparity_world	.254
disparity_country	-.414
Telemd_solution	-.094
info_disparity_world	.095
info_disparity_domestic	-.079
private_solution	-.160
public_support	.271*
education_cooperation_domestic	.564**
<i>R</i> ²	.730**

** p < .01, * p < .05, + p < .10

Organizational-level surveys illuminate the relationship between individual and organizational effort, as well as the connection between collaboration and performance. Individuals who appreciate organizational efforts are more likely to value personal contributions. Respondents tend to rate both individual and organizational performance more positively when they value interdepartmental collaboration or teamwork.

Variables=Organization	
knowhow	.239+
cost	-.061
individual	.580**
performance	.139
collaboration	-.188
collabo_hospital	-.214
communication	.369
<i>R</i> ²	.581**

** p < .01, * p < .05, + p < .10

Variables=Performance	
knowhow	.117
cost	-.169
organization	.098
individual	.247
collaboration	.559*
collabo_hospital	-.078
communication	.159
<i>R</i> ²	.704**

** p < .01, * p < .05, + p < .10

Participants experience similar communication difficulties in international telemedicine as they do in domestic telemedicine education. Communication challenges in international telemedicine education are also attributed to technical difficulties. Domestic technological issues align with international technological challenges. To establish cooperative relationships within hospitals, unity and consultation are crucial. However, collaboration within teams may negatively impact cooperation at the hospital level.

Variables=communication difficulty international	
communication_difficulty_domestic	.376*
tec_diff_international	.456*
tec_diff_domestic	-.159
Overtime_international	.300
Overtime_domestic	-.270
Maintain	.175
<i>R</i> ²	.507**

** p < .01, * p < .05, + p < .10

Variables=tec difficulty international	
communication_difficulty_domestic	.322*
tec_diff_international	.111
tec_diff_domestic	.528**
Overtime_international	.150
Overtime_domestic	-.124
Maintain	-.147
<i>R</i> ²	.652**

** p < .01, * p < .05, + p < .10

Variables=collabo hospital	
Respect	-.068
Unity	.815*
Collaborate	-1.215**
Consultation	.638*
Voice	.333+
<i>R</i> ²	.490**

** p < .01, * p < .05, + p < .10

Lastly, there are relationships with external organizations. In order to build cooperative relationships with other organizations, it is essential to comprehend the importance of the work being done, rather than focusing solely on responsibilities, objectives, or the division of roles.

Variables=collaborate other	
responsibility_other	.056
importance_other	.833**
goal_other	-.203
role_other	.096
<i>R</i> ²	.628**

** p < .01, * p < .05, + p < .10

6 DISCUSSION

This study, based on data analysis, emphasizes several key points.

First, at the policy level, domestic and international telemedicine education practices are interconnected, and positive domestic telemedicine practices impact international telemedicine practices. Enhancing government support and promoting both international and domestic telemedicine practices

will consequently increase satisfaction with telemedicine at the policy level. Telemedicine education aims to identify issues within various professional categories to address problems and develop policy recommendations.

Second, the organizational-level survey reveals a correlation between individual-level efforts and organizational-level initiatives. Collaboration and teamwork lead to positive evaluations of both individual and organizational performance. Telemedicine education must emphasize the importance of organizational collaboration and individual effort.

Third, communication and technological difficulties are evident at the individual level. International communication challenges are similar to domestic communication challenges, and technical difficulties contribute to communication issues. National and international telemedicine education, as well as technical and communication aspects, are evidently interconnected.

Fourth, to build cooperation within hospitals, unity and consultation were found to be crucial. However, intra-team cooperation was found to negatively impact the development of cooperative relationships at the hospital level. Consequently, cooperation within small teams and larger groups may have different contexts and adverse effects.

Lastly, the results highlight the importance of forging relationships between organizations. The significance of "the importance of the work" is emphasized in this context. In telemedicine, where collaboration with other organizations is essential, sharing a macro-level understanding of the work within the team is more important than focusing on technical tasks alone.

7 CONCLUSION

Moving beyond previous studies that focus on specific barriers to telemedicine delivery from global, regional, and developed country perspectives, this study investigates the interconnections between four types of barriers affecting telemedicine in the Philippines: policy, organizational, individual, and inter-organizational collaboration. A questionnaire and interviews were conducted with 38 physicians, technicians, coordinators, and others involved in telemedicine in the country. The results revealed that: (1) public support generates positive feedback, (2) a strong connection exists between domestic and international telemedicine, (3) communication barriers and technical barriers are linked, (4) unity

and cooperation are crucial for hospital collaboration, and (5) the significance of the work is important. Previous studies identified barriers and challenges to telemedicine, but the relationships between factors remained unclear. This study elucidates how multiple barriers intertwine and suggests directions for advancing telemedicine education in developing countries. Future research should examine comparisons or connections between developed and developing countries and explore potential areas for collaboration between them.

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