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Acceptance of Teledermatology Among Primary Health Care Workers in Isabela, Philippines

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ABSTRACT

Teledermatology is emerging as a means of delivering healthcare service to remote areas. In the context of the full implementation of the Universal Health Care in the Philippines, dermatological services can be given even to those in the primary care facilities where there are usually no Dermatologists. Using a descriptive quantitative research method, this study explores the acceptance of teledermatology among primary healthcare workers in Isabela, Philippines, focusing on technological, individual, and organizational factors influencing adoption as guided by the modified Technology Acceptance Model (TAM). A structured survey was administered to 87 purposively selected healthcare professionals, including nurses, midwives, doctors, and barangay health workers. Results show that teledermatology is acceptable among the respondents. Moreover, findings reveal that perceived usefulness and attitude significantly influence intention to use. Younger professionals and nurses exhibited higher acceptance levels, whereas gender and years of service were not significant factors. In conclusion, this study highlights the acceptance of teledermatology among primary health care workers in Isabela.

Keyword : Teledermatology; modified technology acceptance model; primary health care workers

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INTRODUCTION

Telemedicine—defined as delivering care via telecommunications—emerged more prominently during the COVID-19 pandemic, when usage surged across specialties. Dermatology, a visually driven field, proved especially suited to this shift, giving rise to teledermatology. Studies report a six-fold rise in teledermatology consultations at the pandemic's onset (1). Filipino dermatologists note that the modality broadens reach, maintains continuity of care, and helps offset the severe shortage of

specialists (e.g., a ratio of 1 dermatologist : 263,267 people in Cagayan Valley versus 1 : 18,833 in Metro Manila)(2,3,4,).

Studies by several authors highlight the significant positive impact of teledermatology on patient outcomes, healthcare resource utilization, and operational efficiency (5,6,7). These studies demonstrate that teledermatology effectively manages a considerable proportion of dermatological cases remotely, reduces waiting times, streamlines referrals, and enhances accessibility to dermatological expertise, ultimately improving patient care.

Moreover, systematic reviews underscore the cost-effectiveness and efficacy of teledermatology compared to traditional face-to-face consultations, emphasizing its potential to enhance accessibility and quality of care (8, 9).

It has also been shown that teledermatology is highly satisfactory for patients and providers as it saves time and resources by effectively managing dermatological issues without the need for in-person visits (5). In another study, teledermatology minimized referrals and reduced costs (6).

This study utilized the modified TAM as evaluated in the study of Orruño (10). Originally proposed by Davis in 1989, TAM posits that perceived ease of use and perceived usefulness significantly impact users' attitudes towards technology, subsequently influencing their intention to use it and ultimately determining actual usage behavior. In this modified framework, additional constructs pertinent to the healthcare. For the technological factors, alongside perceived usefulness and perceived ease of use is the additional construct, habit, which is initially rooted in the Triandis Theory of Interpersonal Behaviour (TIB). This construct refers to the behaviors that have become automatized through repetition. The individual context includes the variables of compatibility and attitude.(10).

Finally, within the organizational context, the framework incorporates the variables of facilitators and subjective Norms. On the one hand, drawn from the Theory of Interpersonal Behavior, the facilitator is a construct that refers to the perceived existence of organizational and technical infrastructures to support system utilization. On the other hand, derived from the Theory of Reasoned Action, the construct of subjective norms refers to the individuals' belief that significant others will approve of their adoption of the technology. This comprehensive framework will serve as this study's foundation for examining primary healthcare workers' acceptance and adoption of teledermatology (10).

Despite growing research, there is a notable gap in studies on primary healthcare workers' acceptance of teledermatology in the Philippines specifically in rural areas. Understanding the factors driving or hindering their acceptance is crucial for designing effective interventions to promote its integration into the Philippine healthcare system.

METHODS

This study employed a quantitative research design. It was conducted in rural health units of Luna, Cauayan, San Agustin and Reina Mercedes in Isabela. The primary level health care facilities were considered for this study since they will be the units directly involved once teledermatology is fully implemented in the context of health care provider networking under Universal Health Care. The selection encompassed physicians, nurses, midwives, and barangay health workers who are actively involved in delivering frontline healthcare services in rural communities. These professionals were specifically chosen for their critical role in the implementation and day-to-day use of teledermatology, making their insights vital to understanding its practical adoption. By engaging a diverse range of healthcare providers, the study captures a well-rounded perspective on teledermatology acceptance across different roles within the primary healthcare system.

The study employed a survey questionnaire as its research instrument, utilizing the instrument developed by Orruño et al. (10). This questionnaire consisted of 33 items grouped into eight theoretical dimensions, including perceived ease of use, perceived usefulness, habits, compatibility, attitudes, facilitators, and subjective norms. Respondents rated each item using a seven-point Likert scale ranging from strongly disagree to strongly agree. The reliability of the questionnaire has been assessed using Cronbach's alpha for each theoretical variable. As reported by Orruño et al. (10), Cronbach's alpha of all eight dimensions was acceptably high ($\alpha = 0.7$). Furthermore, the face and content validity of the instrument have been evaluated by a panel of experts in technology assessment.

The respondents were given adequate time to complete the questionnaires in a conducive environment, with measures in place to ensure data quality. Once collected, the data underwent statistical analysis, including descriptive and inferential statistics, to examine the acceptance of teledermatology and identify influencing factors. The findings were interpreted in the context of the research objectives and theoretical framework and presented comprehensively, with implications discussed for practice, policy, and future research. Throughout the process, adherence to ethical standards was paramount to ensure the integrity and validity of the study.

The data analysis in this study employed a combination of descriptive statistics, correlation analysis, multiple regression, and inferential tests to examine the acceptance of teledermatology among primary healthcare workers. Descriptive statistics were used to summarize demographic data, including age, sex, position, and years of service, as well as to compute means, frequencies, and percentages. Kruskal-Wallis H test, Dunn's pairwise test, and Mann-Whitney U test were used to determine whether acceptance levels varied based on demographic characteristics. Normality test was conducted.

RESULT

The demographic profile of respondents is presented in Table 1. A total of 87 healthcare workers participated in the study, which represents a range of geographical areas, age groups, genders, and professional roles. Results showed that a majority of the respondents are in the 30-39 age group. Ninety one percent (91%) are females. The BHWs comprise almost half of the participants. A majority (37.7%) has been in service for 3 years, followed by those in service for 10 years or more at 28.3% followed closely by those who have served for 7 to years at 24.5%. A minority at 9.4% have been in service for 4 to 6 years.

Table 1. Frequency and Percentage Distribution of Respondents according to RHU, Age, Sex, Position, and Years in Service of Primary Healthcare Workers

		Frequency	Percentage
RHU	Cauayan	24	27.59
	Luna	30	34.48
	Reina Mercedes	23	26.44
	San Agustin	10	11.49
Age group	< 30 y/o	10	11.49
	30-39 y/o	35	40.23
	40-49 y/o	20	22.99
	50-59 y/o	17	19.54
	60 y/o and above	5	5.75
Sex	Male	7	8.75
	Female	73	91.25
Position	BHW	41	48.24
	MD	5	5.88
	MT	1	1.18
	MW	15	17.65
	Nurse	23	27.06
Years in Service	0 to 3 years	20	37.7
	4 to 6 years	5	9.4
	7 to 10 years	13	24.5
	10 years onwards	15	28.3
	Total	87	100.0

Table 2

Predictor	Mean	Interpretation
Perceived Usefulness	2.56	Totally agree
Perceived Ease of Use	2.51	Totally agree
Habits	2.25	Totally agree
Attitude	2.55	Totally agree
Compatibility	2.37	Totally agree
Facilitators	2.42	Totally agree
Subjective Norm	2.41	Totally agree

As shown in Table 2, the respondents reported a high level of agreement toward all the factors. For the technological context, perceived usefulness had the highest mean score of 2.56. This was followed by perceived ease of use, with a mean score of 2.51. Meanwhile, habits received the lowest mean score of 2.25. For the individual dimension, attitude received a mean score of 2.55 while compatibility was rated slightly lower but still falls within totally agree category. The respondents report a high level of agreement towards the organization dimension of teledermatology use. The level of agreement for both components are almost equal with facilitators with mean of 2.42 and subjective norms with 2.41.

Table 3. Difference of factors in relation to demographic profiles

Factors	Age Group	Sex	Position	Yrs In Service
Perceived Usefulness	0.163	0.502	0.062	0.636
Perceived Ease of Use	0.030 *	0.993	0.003*	0.300
Attitude	0.126	1.000	0.100	0.415
Compatibility	0.443	0.959	0.002 *	0.314
Subjective Norm	0.407	0.507	0.050	0.100
Facilitators	0.269	0.268	0.022*	0.766
Habits	0.272	0.6598	0.074	0.376

Note: Statistical measures used include Kruskal-Wallis H test, Mann-Whitney U Test

*significant at $\alpha=0.05$

For each predictor i (Perceived Usefulness, Perceived Ease of Use, Attitude, Compatibility, Subjective Norm, Facilitators, Habit, and Intention to Use) across each demographic factor j (Age Group, Sex, Position, and Years in Service), the following hypotheses were established:

H_{02} : $B_{ij} = 0$ (There is no significant difference in the level of acceptance of teledermatology based on demographic factor j .)

H_{a2} : $B_{ij} \neq 0$ (There is a significant difference in the level of acceptance of teledermatology based on demographic factor j .)

The hypothesis testing results indicate that the null hypothesis was rejected for specific acceptance factors. Perceived Ease of Use was found to be significantly affected by age group and position, suggesting that differences in these demographic variables influence how easily teledermatology is adopted. Additionally, Compatibility and Facilitators showed significant differences based on position, indicating variations in acceptance levels across different roles within the healthcare system.

Conversely, the null hypothesis was not rejected for all other cases, demonstrating that sex and years in service do not significantly affect teledermatology acceptance. No significant differences were found in perceived usefulness, attitude, subjective norm, habit, or intention to use teledermatology based on these demographic factors. These results suggest that most acceptance factors are not influenced by demographic variables, except for the specific differences identified in Perceived Ease of Use, Compatibility, and Facilitators.

DISCUSSION

A total of 87 primary healthcare workers are included in this study. The demographic and professional distribution of respondents in this study aligns with broader national trends in healthcare workforce composition and distribution in geographically isolated and disadvantaged areas (GIDAs). Nearly one out of ten respondents hailed from San Agustin, while the rest were almost evenly distributed among the three rural health unit (RHU) geographies. This pattern is consistent with the uneven distribution of healthcare workers in GIDAs, which is often influenced by reliance on temporary deployment programs to augment workforce shortages (11). In terms of age, the majority of respondents were aged 30–39 (40%), with only 5% being senior citizens. This reflects national findings that younger professionals dominate the health workforce in underserved areas, likely due to targeted deployment initiatives and the higher attrition of older professionals in these settings (11, 12). Additionally, the study's predominantly female sample (90%) underscores the feminization of healthcare professions in the Philippines, particularly among nurses and midwives, which is a well-documented trend influenced by both historical and cultural factors (11).

Regarding professional roles, the data reveal a reliance on community-based and mid-level healthcare workers, with 49% being Barangay Health Workers (BHWs) and 30% being nurses. In contrast, doctors and medical technologists comprise only 6% and 1% of the workforce, respectively. This composition highlights the critical role of BHWs and nurses in addressing healthcare needs in underserved areas, given the limited availability of physicians and other specialists (11, 12).

Results show that the respondents has a high level of agreement toward the technological dimension of teledermatology use. The perceived usefulness had the highest mean score indicating that healthcare workers strongly recognize the benefits of teledermatology in improving their efficiency and accessibility to dermatological care. The mean for perceived ease of use reflect that teledermatology systems are generally regarded as intuitive and straightforward to operate. Among the three factors, habits has the lowest mean score suggesting that while the technology has become part of healthcare workers' routines, it may require more time and exposure to solidify habitual usage.

The totally agree interpretation of score for perceived usefulness can be attributed to the perception that teledermatology can help healthcare professionals monitor their patients more rapidly. This finding highlights that speed and efficiency in patient monitoring are key advantages of adopting teledermatology. These statements reinforce the notion that teledermatology not only streamlines patient management but also enhances the overall efficiency of healthcare providers. Furthermore, the results suggest that respondents see teledermatology as beneficial for patient care. The findings of this study indicate that healthcare workers perceive teledermatology as highly beneficial. This aligns with existing literature, which consistently highlights teledermatology's ability to enhance efficiency, accessibility, and quality of care.

Regarding skill acquisition, respondents agree that they could easily learn how to use telemedicine and that acquiring the necessary skills would be easy. While the agreement levels are slightly lower than other aspects, the overall perception remains positive. This indicates that while learning to use telemedicine may require some initial effort, it is not perceived as a major barrier.

Results suggest that teledermatology systems are generally regarded as intuitive and user-friendly. These findings also align with previous research, which has shown that healthcare providers find teledermatology systems straightforward to use, particularly when integrated into routine workflows (18).

For the statements for habits, the scores corresponds to the perception that respondents feel comfortable with information and communication technologies. This indicates that most healthcare workers have a positive relationship with technology, which may facilitate the adoption of teledermatology systems. Despite these positive perceptions, the study found that habitual use of teledermatology received the lowest score, which suggests that more time and exposure are needed for consistent adoption. Additionally, Dowling in 2020 found that while primary care providers in rural settings valued teledermatology, its use was often limited by access to technology, training opportunities, and administrative support (14).

Furthermore, provider willingness plays a crucial role in habitual use. A study by Giansanti in 2023 reported that teledermatology adoption varied depending on provider confidence and the availability of institutional guidelines. Similarly, Coustatte et al. noted that teledermatology's habitual use in rural areas was dependent on factors such as reimbursement policies, perceived diagnostic accuracy, and workflow efficiency (15, 16).

For the individual dimension the high mean score for attitude indicates that respondents generally have a positive perception of teledermatology, which recognizes its potential benefits in improving dermatological care delivery. This aligns with previous research that highlights attitude as a key determinant in the acceptance of teledermatology. For instance, a study by Acoba et al. in 2023 found that dermatologists in the Philippines demonstrated a strong positive attitude toward teledermatology, citing its advantages in expanding patient access and improving efficiency (17). Similarly, Reinders et al. in 2024 reported that dermatologists and nurses generally expressed favorable attitudes toward digital health solutions, including teledermatology, due to their potential in streamlining workflows and reducing patient wait times (18).

Findings suggest that while teledermatology aligns with healthcare workers' professional needs, certain challenges remain in fully integrating it into existing work environments. Compatibility with existing clinical workflows is essential for sustained teledermatology adoption, and mismatches between technology and routine practices may create barriers to widespread use. One potential explanation for the slightly lower score in compatibility is workflow disruption and the need for additional training and experience critical for its integration into routine practice.

Results also show that both structural enablers and social influences play a crucial role in the adoption of teledermatology. Previous research has highlighted how organizational facilitators, such as administrative support, adequate funding, and integration into clinical workflows, significantly impact the successful implementation of teledermatology (19, 20). When healthcare institutions provide sufficient resources and training, healthcare professionals are more likely to engage with the technology, as demonstrated in studies that found strong institutional backing led to increased teledermatology adoption in both rural and urban healthcare settings (21, 22).

The findings of this study suggest that the respondents' experiences with teledermatology are shaped by both structural support and social influences within their organizations. The high level of agreement with facilitators indicates that respondents likely perceive their institutions as providing adequate resources, administrative backing, and training opportunities that make teledermatology easier to implement in their daily practice. This aligns with studies showing that strong institutional support enhances the adoption of new healthcare technologies by integrating them into clinical workflows and ensuring accessibility to necessary tools.

Moreover, the nearly equal agreement with subjective norms suggests that social expectations within their professional environment significantly impact their willingness to use teledermatology. Healthcare workers may feel encouraged to adopt the technology because their colleagues, supervisors,

and professional networks endorse its use, creating a culture where teledermatology is seen as a standard and accepted practice. This finding reinforces the idea that both logistical and social enablers must be present for successful technology adoption in healthcare settings.

The analysis of demographic factors in relation to the level of acceptance of teledermatology among primary healthcare workers revealed significant differences in certain areas. As shown in Table 3, age group was found to have a significant effect on perceived ease of use, indicating that different age groups may experience varying levels of comfort or difficulty when engaging with the technology. Furthermore, the position of healthcare personnel played a crucial role, with significant differences observed in ease of use, compatibility, and facilitators.

This suggests that individuals in different roles within the healthcare system may have distinct experiences and levels of support in adopting teledermatology. However, no significant differences were detected in relation to sex or years in service across any of the acceptance factors, implying that these demographic characteristics do not substantially impact perceptions of teledermatology in the sample studied.

The findings of this study highlight the impact of demographic factors on the acceptance of teledermatology among primary healthcare workers, with age and professional position emerging as significant variables influencing ease of use, compatibility, and facilitators. The significant effect of age on perceived ease of use suggests that different age groups experience varying levels of comfort and proficiency with teledermatology. Previous studies have found that younger healthcare professionals often exhibit greater familiarity with digital health technologies, leading to a higher ease of use and faster adaptation. The younger practitioners were more likely to integrate teledermatology into their routine practice compared to older professionals who expressed concerns about usability. These results suggest that age-targeted training initiatives could help bridge the gap in perceived ease of use across different age groups.

These findings of this study suggest that the respondents' experience and acceptance of teledermatology are shaped significantly by their age and professional position rather than their gender or years of service. Younger healthcare workers appear to be more comfortable and proficient with teledermatology, likely due to their familiarity with digital health technologies, whereas older professionals may require additional support and training. This reflects a generational gap in technological adaptation that could be addressed through targeted training initiatives.

The absence of significant differences based on sex or years in service suggests that these factors do not inherently shape respondents' acceptance of teledermatology. This implies that regardless of experience length or gender, healthcare workers' teledermatology adoption depends on other factors such as resources and training provided to them. Thus, improving accessibility to training and ensuring role-specific support could enhance teledermatology implementation across various healthcare professionals.

CONCLUSION

This study showed that the teledermatology is acceptable among primary health care workers in Isabela, Philippines. Respondents totally agree to all the statements under the technological, individual and organizational context.

Among the predictors, use of teledermatology is highly influenced by perceived usefulness, attitude, and perceived ease of use. The level of acceptance is not affected by sex and years in service. However, perceived ease of use is affected by age and position. In conclusion, the findings highlight the acceptance of teledermatology among primary health care workers in Isabela, Philippines.

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