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Perception of Telemedicine and Digital Healthcare in Kathmandu Valley

Raji Shrestha
Atharva Business College, Pokhara University, Nepal
rajishrestha1990@gmail.com
https://orcid.org/0009-0002-9720-3367

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Abstract

Background: Telemedicine and digital medicine have been developed as revolutionary tools for improving access to healthcare facilities especially in areas where there is geographic and infrastructural difficulty. Nepal stands at a unique position with respect to the delivery of health care services due to its challenging geography and rural environment. Despite efforts by the Nepalese government to develop the Digital Nepal Strategy (2019), inconsistency prevails regarding telemedicine applications.

Methods: A descriptive cross-sectional research design was adopted through an online survey conducted on 206 Nepalese citizens aged 18 and above. The data were collected from a structured questionnaire assessing awareness, perceptions related to environmental sustainability, accessibility, trust, and telemedicine. Analysis of the results was done through SPSS.

Results: Most participants belonged to the age group 18-25 (52.9%), while males made up 51.9% and females 48.1%. There were more urban respondents, making 56.8% of all participants. Awareness level was found significantly higher than neutral point ($M=3.46$, $t=7.640$, $p<.001$). Respondents saw the contribution of telemedicine towards environmental sustainability ($M=3.45$, $t=8.937$, $p<.001$) and improvement in rural healthcare services access ($M=3.36$, $t=4.556$, $p<.001$). Internet connectivity was indicated as one of the most important barriers ($M=3.52$, $t=6.795$, $p<.001$). Trust towards telemedicine was higher regarding minor illnesses ($M=3.37$, $t=4.493$, $p<.001$), while it increased with governmental regulation ($M=3.48$, $t=6.292$, $p<.001$). Finally, adoption rate was positively correlated with awareness level ($r=0.309$, $p<.01$) and environmental perception ($r=0.425$, $p<.01$).

Conclusion: The perceptions held by the Nepalese population towards telemedicine are largely positive as the use of technology is seen to have the potential of improving health accessibility and the environment. Nonetheless, issues such as internet availability and lack of emergency

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care need to be considered. Governmental regulation became a key factor to gain trust. These results can help policymakers create an efficient digital health approach based on the evidence.
Novelty: The current study provides empirical evidence concerning telemedicine perceptions in terms of awareness, environmental sustainability, accessibility, trust, and adoption.
Keywords: Digital Healthcare, Nepal, Perception, Telemedicine, Trust

1. Introduction

Telemedicine and digital health interventions have become revolutionary strategies aimed at improving access to health services. Recently, telemedicine and digital health interventions have gained significant attention as possible ways of increasing health access, especially in countries facing geographical and infrastructural difficulties with access to healthcare services. For example, Nepal is one of the developing countries that have struggled with providing adequate access to health due to the geography of the region and the underdeveloped healthcare system of the country (Poudel, Sharma, & Adhikari, 2022). However, the recent developments in terms of the utilization of telemedicine have shown some progress in health service delivery, mainly because of the current pandemic (Bhattarai & Maharjan, 2021). Moreover, the government of Nepal started working on the expansion of the telemedicine strategy through different frameworks, for instance, the Digital Nepal framework (2019).

Several telemedicine pilot projects and platforms established and supported by the Ministry of Health and Population (MoHP) of Nepal and NGOs can be considered key examples of utilizing telemedicine services in the country.

Utilization of telehealth services by Nepalese residents abroad amid the coronavirus disease has revealed its potentials and limitations. The frequent issues that led patients to seek telehealth included mental health problems, chronic illnesses, and skin-related ailments. Digital divide, cross-national regulation, and reluctance in using telemedicine were considered barriers that hindered the uptake of telehealth services. Efforts to tackle such barriers by means of training and government policies along with development of friendly applications can contribute to the long-term viability of telehealth services (Sapkota et al., 2022).

Various studies have attempted to investigate the level of knowledge and attitude towards telemedicine among Nepalese medical students. These kinds of studies can provide valuable information about the perception of future physicians and nurses on telemedicine and other forms of telehealth practices. For example, there was one cross-sectional study conducted among medical students of all levels of Bachelor of Medicine and Bachelor of Surgery from all 19 medical colleges in Nepal. In order to achieve long-term sustainability of telehealth services, such challenges need to be overcome through strategic steps like training, development of applications, and supportive government policies. Therefore, understanding the perception of telemedicine and telehealth among healthcare providers and laypeople is essential.

1.1 Statement of the Problem

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Even though telemedicine and other forms of digital healthcare have garnered a lot of attention in recent times in Nepal, the use and impact of these systems continue to be erratic and poor especially in rural areas. While telemedicine can help bridge the geographical and infrastructure gaps, it still relies heavily on the perception that the healthcare providers and consumers have towards these innovations (Bhattarai & Maharjan, 2021). Based on current studies, some barriers that could hinder the implementation and adoption of digital healthcare solutions include low literacy rates, distrust in technology, limited internet coverage, and even cultural hesitancy (Poudel, Sharma, & Adhikari, 2022). Other healthcare practitioners also fear that virtual consultation can undermine care quality while some even lack established protocols for conducting such practices. Despite government efforts like the Digital Nepal Framework 2019 and the programs of the Ministry of Health and Population, there seems to be a dearth in information that focuses on perceptions about telemedicine among certain demographics and regions. With limited knowledge, it becomes difficult to plan any interventions and ensure sustainable adoption of telemedicine in Nepal's public health sector.

1.2 Significance of Study

- Helps us understand the perception of telemedicine and digital health services among patients, medical professionals, and local communities in Nepal.
- Serves as an evidence-based guideline for making better policies related to digital health solutions.
- Gives us a clearer idea about the challenges encountered by rural people and marginalized sections when using digital health services.
- Suggests ways to make telemedicine more effective by improving platform design and user experience.
- Provides guidance to governments and non-governmental organizations to make sustainable digital health solutions.

1.3 Research Questions

- What is the degree of awareness about telemedicine among Nepali people and what influences their knowledge about it?
- How does Nepali population view telemedicine as environmentally sustainable form of healthcare service?
- How does telemedicine enhance access to healthcare in Nepal and what obstacles there exist?
- How much do Nepali people trust telemedicine and what are the reasons behind that?
- What are the main drivers for future implementation of telemedicine in Nepal?

1.4 Objectives of Study

- For understanding the extent to which telemedicine is used and awareness about telemedicine in Nepal.
- For analyzing the perceptions about the contributions of telemedicine to environmental sustainability.
- For understanding the availability, usability, and obstacles to implementing telemedicine in Nepal.

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- For finding out about the degree of trust in telemedicine and users' preference for telemedicine.

1.5 Research Hypothesis

- The following are the hypotheses developed based on the objectives of the research:
- H_1: A large number of participants are familiar with the services of telemedicine in Nepal.
- H_2: Telemedicine helps respondents to achieve environmental sustainability.
- H_3: Telemedicine helps to enhance the accessibility of health care to rural areas, though restricted due to poor internet connectivity.
- H_4: Confidence in telemedicine is high for minor health issues, though low in the absence of government regulations.
- H_5: Adoption of telemedicine is likely for insured patients under the influence of government policies.

1.6 Conceptual Framework

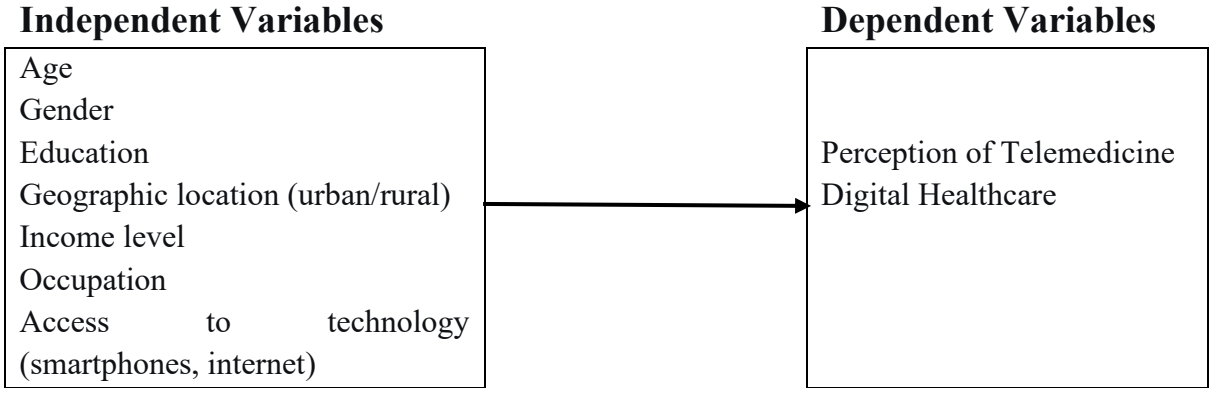
The conceptual framework lists key factors influencing telemedicine adoption. Digital Literacy refers to the ability to use technology effectively, which is essential for navigating telemedicine platforms. Socio-Demographic Factors include age, income, and education, which can affect access and willingness to use telemedicine. Perception of Telemedicine involves users' trust and confidence in its effectiveness and privacy. Access to Technology highlights the need for reliable internet and devices. Lastly, Awareness of Telemedicine emphasizes the importance of educating potential users about its availability and benefits. Together, these factors determine how widely and effectively telemedicine is adopted.

1.6.1 Independent Variables

- **Demographic Factors:** Age, gender, education, geographic location (urban/rural).
- **Socio-Economic Factors:** Income level, occupation, access to technology (smartphones, internet).

1.6.2 Dependent Variables

Perception of Telemedicine and Digital Healthcare (Measured in terms of acceptance, satisfaction, trust, and willingness to use).



1.6.3 Conceptual Relationship

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- Demographic and socio-economic factors (age, income, education, location) influence awareness and perception of telemedicine.
- Awareness and knowledge level affect acceptance and usage of digital healthcare services.
- Access to technology and internet acts as a facilitator or barrier to adopting telemedicine.
- Digital literacy influences the ease of using telemedicine platforms and shapes perception.
- Trust in digital healthcare systems (data privacy, provider reliability) directly impacts public perception.
- Positive perception leads to higher acceptance, satisfaction, and willingness to use telemedicine.
- Challenges and barriers (technical, economic, cultural) negatively affect perception and usage.

2. Literature Review

2.1 Introduction

This section provides a critical review of the existing literature on the perception of telemedicine and digital healthcare in Nepal. It synthesizes key findings, identifies research gaps, and highlights areas of consensus and debate to contextualize the present study within the broader research landscape. Digital health presents a transformative opportunity for healthcare delivery, particularly in countries like Nepal where geographical barriers and resource limitations create significant hurdles. This review explores different dimensions, including the perspectives of healthcare professionals, medical students, and patients. Additionally, it addresses the challenges and opportunities linked to implementing digital health interventions within the Nepalese context.

2.2 Overview of Digital Health and Telemedicine in Low-Resource Settings

This section starts by defining digital health and telemedicine, using established definitions from organizations such as the World Health Organization. The WHO defines telemedicine 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" (Parajuli, Bohara, KC, Mistry, & Yadav, 2022).

It provides a general background on the use of digital health and telemedicine in low-resource settings, discussing its potential to improve access to care, reduce costs, and enhance health outcomes. The section will also address the unique challenges faced by low-resource countries in implementing digital health initiatives, such as limited infrastructure, lack of technical expertise, policy-making gaps, language barriers, low user technical literacy, concerns of

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overreliance on technology, and regulatory barriers (Sapkota et al., 2022). Telemedicine's popularity in resource-poor countries has been rising, but it also faces unique barriers. These barriers include but are not limited to policy-making gaps, language barriers, low user technical literacy, concerns of overreliance on technology, and inadequate training for administrators and providers (Bhattarai et al., 2022).

2.3 Perception and Acceptance Among Healthcare Professionals

This section explores studies that investigate the perception and acceptance of telemedicine among doctors, nurses, and other healthcare professionals in Nepal. It examines factors that influence their attitudes towards digital health, such as their level of training, their experience with technology, and their perceptions of its impact on doctor-patient relationships. Younger generations are more familiar with technology, impacting their perception of digital health information (Duwadi, 2016).

The section also discusses the challenges of integrating digital health into existing workflows and the need for adequate support and training for healthcare professionals (Bhattarai et al., 2022). It is important to consider how digital health technologies are described as promoting communication between healthcare providers and patients, encouraging lay people to engage in preventive health activities, and improving patient adherence to treatment protocols and their self-management of chronic diseases. My research will dig out what kinds of digital resources do the doctors in the Nepalese hospitals use to cater better care, and whether or not telemedicine is the alternative to e-health (Duwadi, 2016).

2.4 Knowledge and Attitudes of Medical Students

Medical students play a vital role in the future integration of telemedicine and digital healthcare into mainstream medical practice. Studies suggest that most medical students globally, including in developing countries like Nepal, exhibit moderate to high levels of knowledge about telemedicine concepts, especially in the wake of the COVID-19 pandemic, which accelerated digital health education and exposure (Gajarawala & Pelkowski, 2021). However, their practical experience with telemedicine tools remains limited due to lack of formal training and clinical application.

Attitudes toward telemedicine among medical students are generally positive. Many students recognize its potential to improve healthcare access in underserved areas, enhance patient monitoring, and reduce hospital overcrowding. Nevertheless, concerns exist regarding patient privacy, communication quality, diagnostic accuracy, and the ethical implications of remote care (Alipour, Safari, Khalili, & Aghaei, 2021). Furthermore, students have emphasized the need for structured training programs and curriculum integration to build competence in digital health technologies.

In Nepal, the awareness of telemedicine among medical students is growing, but institutional support for hands-on training is still lacking. A study conducted by Upadhyay, Singh, and Dahal (2020) noted that although students showed enthusiasm for telehealth, many felt unprepared to deliver care through digital platforms. This highlights the need for curriculum reforms that incorporate telemedicine training into medical education to prepare future healthcare professionals for a digitally connected world.

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2.5 Use of Telehealth Services by Nepali Migrants

Nepali migrants, both internal and international, face numerous barriers to accessing timely and culturally appropriate healthcare. Telehealth services offer a promising alternative to bridge the gap caused by distance, language, and healthcare system unfamiliarity. Many Nepali migrants, particularly those in Gulf countries, Malaysia, and South Korea, rely on digital platforms such as video consultations, mobile apps, and social media to connect with healthcare providers back home for second opinions, mental health support, and primary care consultations (Maharjan, Karki, & Shrestha, 2021).

The use of telehealth among this population has increased, especially after the COVID-19 pandemic disrupted physical access to healthcare. Migrants often prefer Nepali-speaking doctors and culturally relevant medical advice, which they can obtain more easily via telemedicine platforms operated from Nepal. However, despite increased utilization, migrants face challenges including limited digital literacy, cost of private teleconsultation platforms, and lack of awareness about available services (Dhungel, Adikari, & Subedi, 2022).

A study by Maharjan, Karki, and Shrestha (2021) highlights that while Nepali migrants express a positive attitude toward telehealth, the sustainability and quality of such services depend on government regulation, technological infrastructure, and the inclusion of migrant needs in national digital health strategies. Enhancing awareness campaigns and offering subsidized or free access to verified telehealth platforms could significantly improve healthcare outcomes for this vulnerable group.

2.6 Challenges and Opportunities for Implementation

The implementation of telemedicine and digital healthcare in Nepal presents a mix of persistent challenges and emerging opportunities. One of the foremost challenges is infrastructure limitations, particularly in rural and remote areas where internet connectivity, stable electricity supply, and digital devices are either lacking or unreliable (Upadhyay, Singh, & Dahal, 2020). Additionally, low digital literacy among both healthcare providers and patients hampers the effective use of telehealth services. Many users, especially the elderly and those in rural regions, struggle to operate smartphones or access virtual consultation platforms (Koirala, Neupane, & Acharya, 2022).

Regulatory and policy gaps also present major obstacles. Nepal lacks a comprehensive legal framework to govern telemedicine, including guidelines on data privacy, licensing, and standard protocols. This creates concerns about the quality of care, medical liability, and patient confidentiality. Moreover, the skepticism and resistance among healthcare professionals, due to lack of training and concerns about diagnostic accuracy in virtual settings, further delay widespread adoption.

Despite these barriers, there are significant opportunities. The increasing penetration of mobile phones and expansion of 4G networks provide a strong foundation for scaling up digital health services. Government initiatives like the e-Health Strategy (2017) and public-private partnerships are also fostering growth. Telemedicine can dramatically improve access to healthcare in remote regions, reduce travel costs, and ease the burden on overpopulated

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hospitals (MoHP, 2017). Furthermore, the COVID-19 pandemic has accelerated awareness and acceptance of telehealth, making this a key moment to invest in its long-term development.

2.7 Digital Health and Doctor-Patient Communication

Digital health technologies, including telemedicine, mobile health apps, and virtual consultation platforms, are reshaping the traditional dynamics of doctor–patient communication. These tools offer faster, more flexible, and often more affordable interactions, especially beneficial in geographically challenged regions like Nepal. Through video calls, instant messaging, and remote monitoring tools, doctors can provide consultations without the need for in-person visits, which enhances accessibility and continuity of care (Sharma, Shrestha, & Sapkota, 2022). However, digital health can also alter the quality and depth of communication. In virtual environments, non-verbal cues such as body language, eye contact, and gestures—are limited or lost, which may affect emotional connection, trust-building, and diagnostic accuracy. Patients may find it difficult to fully express their symptoms, and doctors might miss subtle clinical signs. This is especially true in Nepal where digital literacy and language barriers can further hinder clear communication (Ahikari, Mishra, & Maharjan, 2021).

Despite these limitations, when implemented with training and culturally appropriate design, digital health platforms can enhance communication efficiency, facilitate better follow-up, and improve patient engagement. Features such as digital records, chat-based follow-ups, and multilingual interfaces can improve information exchange and decision-making. To ensure effective doctor–patient communication, it is essential to integrate telemedicine training into medical curricula and promote user-friendly technologies that accommodate Nepal's diverse population.

2.8 Conceptual Review

Here the review of literature is divided into two parts. The literature review has been conducted based on the settings order and divided into different periods as under:

2.8.1 Review of Global Studies

Telemedicine and digital healthcare have been widely studied across various countries, showing diverse perceptions influenced by socio-economic, cultural, and technological factors. Globally, telemedicine is recognized as a critical tool to improve healthcare access, especially in underserved and rural areas. Numerous studies have documented positive perceptions among patients and healthcare providers regarding convenience, cost-effectiveness, and improved health outcomes. For instance, Kruse et al. (2017) conducted a systematic review of telemedicine adoption worldwide and reported that over 70% of patients found telemedicine easy to use and effective for managing chronic conditions. Similarly, a study by Gajarawala and Pelkowski (2021) emphasized how telehealth has transformed healthcare delivery, especially during the COVID-19 pandemic, by enabling remote consultations and reducing infection risks.

However, despite these advantages, challenges persist globally. Issues such as concerns over data privacy, lack of personal interaction, limited digital literacy, and infrastructural barriers were commonly reported. A cross-sectional survey by Alipour, Safari, Khalili, and Aghaei

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(2021) noted that while healthcare providers showed a positive attitude towards telemedicine, they expressed concerns about diagnostic accuracy and medico-legal liabilities. Moreover, the digital divide remains a critical factor limiting equitable access to telehealth, especially in low- and middle-income countries (LMICs) where internet penetration and smartphone ownership are lower (Smith et al., 2020).

The theoretical framework often applied in these studies includes the Technology Acceptance Model (TAM), which explains that perceived ease of use and perceived usefulness strongly influence the acceptance of telemedicine technologies. Furthermore, the Unified Theory of Acceptance and Use of Technology (UTAUT) incorporates social influence and facilitating conditions as significant predictors of telehealth adoption (Venkatesh, Morris, Davis, & Davis, 2003). These models help explain the variability in telemedicine acceptance across different populations and inform strategies to enhance uptake.

2.8.2 Review of Nepalese Study

In Nepal, telemedicine and digital healthcare are relatively nascent fields, but their relevance has grown significantly, especially following the COVID-19 pandemic and governmental efforts to improve e-health services. Studies on perception in Nepal reveal a mixed but generally optimistic outlook toward telemedicine, tempered by infrastructural and socio-cultural challenges.

Upadhyay, Singh, and Dahal (2020) evaluated telemedicine services in Nepal and identified that while urban populations and healthcare professionals showed awareness and willingness to adopt digital healthcare, rural communities faced considerable barriers. These included poor internet connectivity, lack of electricity, and low digital literacy. Furthermore, trust issues and concerns about the quality of virtual consultations emerged as important factors affecting acceptance.

A qualitative study by Koirala, Neupane, and Acharya (2022) explored barriers and facilitators to telemedicine adoption in Nepal, highlighting that while the government's e-Health Strategy provides a roadmap for digital health expansion, implementation remains slow. Key challenges include inadequate training for healthcare workers, absence of legal and regulatory frameworks, and cultural resistance to replacing face-to-face consultations. However, opportunities exist in expanding mobile network coverage, growing smartphone penetration, and increasing health awareness driven by digital campaigns.

Moreover, research focusing on specific groups such as medical students (Upadhyay, Singh, & Dahal, 2020) and migrant workers (Maharjan, Karki, & Shrestha, 2021) shows that younger, more educated populations are more receptive to telehealth innovations. This points to the critical role of education and targeted awareness programs in improving acceptance.

Despite limited resources, Nepal's telemedicine initiatives such as pilot projects in rural districts have demonstrated potential to reduce healthcare disparities by connecting remote patients with specialists in urban centers (Gurung, Shrestha, & Karki, 2019). The Nepalese experience underscores the importance of context-specific strategies that address technological, educational, and cultural dimensions simultaneously.

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3. Methods and Materials

3.1 Introduction

This section describes the methodology used in the study, including aspects such as the research design, sampling procedure, data collection methods and research instruments used. It also details the approach and procedures adopted for data analysis, as well as the ethical considerations followed during data collection. In order to study the perception of telemedicine and digital healthcare in Nepal, a clear methodology is needed to ensure that the research results are practical and generalizable.

3.2 Research Approach

To understand the perception, this study employed a quantitative research approach, which was ideal for testing hypotheses. Quantitative methods allow for the objective measurement of variables and use of statistical techniques to analyze the relationships among them. Quantitative methods involved the systematic empirical investigation of observable phenomena using statistical, mathematical, or computational techniques.

3.3 Research Design

This study utilized a descriptive cross-sectional design. The primary goal was to assess the existing levels of awareness, attitudes, and practices without manipulating any variables. This design helped identify patterns and trends among people of Nepal regarding their understanding and implementation of Telemedicine and Digital Healthcare.

3.4 Setting of the Study

The research was conducted across people of Nepal. The study was conducted using an online Google Forms survey among people of Nepal. The research focused on assessing the perception of telemedicine and digital healthcare among various populations, including medical students, healthcare professionals, and general community members. Both urban and rural healthcare facilities, educational institutions, and digital health platforms formed the basis for data collection and analysis.

3.5 Study Population

The study included people of Nepal who were at least 18 years old and above. Participants were selected to represent diverse socio-demographic backgrounds in order to gain comprehensive insights into the perception and acceptance of telemedicine and digital healthcare. This mix of respondents helped capture varying levels of awareness, accessibility, and usage patterns across different regions and professional roles.

3.6 Sample Size Determination

The sample size calculator result (95% Cl and 7% margin of error) indicates that a minimum of 196 individuals are required for the study to achieve statistically valid results. This calculation is based on a confidence level of 95%, which means there is a 95% chance that the results from the sample will accurately reflect the views or characteristics of the entire population. A margin of error of 7% has been selected, indicating that the true population value is expected to fall within ±7% of the observed sample value. The population proportion has been set at 50%, which is the most conservative estimate and is typically used when the actual

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proportion is unknown, ensuring a larger and more reliable sample size. Additionally, the population size field was left blank, assuming an unlimited or very large population. In summary, to meet these statistical parameters, data should be collected from at least 196 participants.

3.7 Criteria for Sample Selection

Inclusion Criteria:

- Individuals aged 18 years and above.
- Participants residing in Nepal, including both urban and rural areas.

Exclusion Criteria:

- People with no access to digital devices or who have never heard of telemedicine or digital healthcare.

3.8 Sampling Technique

To choose participants, a convenience sampling technique was employed.

3.9 Description of the Tool

A thorough questionnaire is used as the data collecting method in this study to assess the level of perception of people of Nepal towards Telemedicine and Digital Healthcare. This questionnaire was administered in English and most questions are rated on a scale of Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree.

3.10 Data Collection Procedure

The questionnaire was made available for participants to fill out online. Before starting the survey, each participant was asked for their informed consent. Convenience and a greater response rate were ensured by using electronic surveys. All responses were anonymized, and data were gathered in a private and secure manner.

3.11 Plan of Analysis

The data collected from the structured questionnaire were analyzed using Statistical Package for Social Sciences (SPSS). The analysis included both descriptive and inferential statistics to address the research objective.

4. Results

4.1 Introduction

This section describes the data analysis methodologies used to assess the perception of telemedicine and digital healthcare in Nepal. The study aims to determine whether telemedicine improves healthcare access, particularly in remote areas, and to provide insights for policymakers to enhance digital health strategies.

4.2 Demographic Variables

The information was gathered via an online survey sent to college students at different campuses. This segment provides the demographic characteristics of the respondents and describe the techniques employed to examine and understand the primary data collected via the survey. This method enables a thorough grasp of the demographic traits of the respondents.

Table 1: Age Group

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Age Group	Frequency	Percent
18-25	130	63.1
25-35	49	23.8
35-45	18	8.7
45 and above	9	4.4
Total	206	100.0

Source: Field Survey 2025

Table 1 presents the age distribution of a sample of 206 individuals, categorized into five age groups. The majority (63.1%) are aged 18-25, making it the largest demographic. The 25-35 group follows at 23.8%, while smaller proportions are in the 35-45 (8.7%), 45 and above (4.4%) categories.

Table 2: Gender

Gender	Frequency	Percent
Female	99	48.1
Male	107	51.9
Total	206	100.0

Source: Field Survey 2025

Table 2 displays the gender distribution of the same sample of 206 individuals. The data shows a near-even split, with 51.9% male and 48.1% female respondents. Since there are no missing values, the valid percent matches the raw percentage. The cumulative percent indicates that all responses are accounted for by the two categories. The slight male majority (51.9%) suggests a relatively balanced gender representation in the sample, with no significant disparity between male and female participants.

Table 3: Location

Location	Frequency	Percent
Urban	117	56.8
Rural	89	43.2

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Location	Frequency	Percent
Total	206	100.0

Source: Field Survey 2025

Table 3 breaks down the respondents' locations into urban (56.8%) and rural (43.2%) areas. With no missing data, the valid percent aligns perfectly with the raw percentages. The distribution shows a moderate urban majority, with urban dwellers making up slightly more than half of the sample (56.8%), while rural residents account for the remaining 43.2%. The cumulative percent confirms that all responses are captured within these two categories. This suggests that the survey had a somewhat higher representation from urban areas but still maintained a substantial rural participation.

Table 4: Occupation

Occupation	Frequency	Percent
Students	118	57.3
Employed (private sector)	67	32.5
Employed (government sector)	21	10.2
Total	206	100.0

Source: Field Survey 2025

Table 4 presents the occupational distribution of the 206 respondents. The majority (57.3%) are students, indicating that over half of the sample falls into this category. The remaining respondents are divided between those employed in the private sector (32.5%) and the government sector (10.2%). The cumulative percentage shows that 89.8% of respondents are either students or private-sector employees, while the remaining 10.2% work in government jobs. Since there are no missing values, the valid percent matches the raw percentages. This distribution suggests that the survey sample is predominantly student-based, with employed individuals mostly working in the private sector rather than government roles.

Table 5: Education Level

Education Level	Frequency	Percent
Higher Secondary (+2)	50	24.3
Undergraduate	93	45.1
Graduation	44	21.4

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Education Level	Frequency	Percent
Master's or above	19	9.2
Total	206	100.0

Source: Field Survey 2025

Table 5 outlines the educational background of the 206 respondents. The largest group consists of undergraduates (45.1%), followed by those with higher secondary (+2) education (24.3%) and graduates (21.4%). A smaller proportion (9.2%) hold a master's degree or higher. The cumulative percentage shows that nearly 70% have completed at least higher secondary or undergraduate education, while 90.8% have attained graduation or below. Only 9.2% have advanced degrees. This suggests that the sample is mostly composed of students and early-career individuals, with relatively few holding postgraduate qualifications. The absence of missing data ensures the percentages are fully representative.

4.3 Testing of Hypothesis

Table 6: H_1 (A majority of respondents are aware of telemedicine services in Nepal.)

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
awareness_mean	7.640	205	.000	.46359	.3440	.5832

Table 6 presents the one-sample t-test conducted to compare the mean awareness score against a test value of 3 (likely a neutral midpoint on a Likert scale). The results show a significant difference ($t = 7.640$, $df = 205$, $p < .001$), with the mean awareness score (3.46) being 0.46 points higher than the test value. The 95% confidence interval (0.34 to 0.58) confirms that the true population mean lies within this range, further supporting that awareness levels are statistically significantly above the neutral value of 3. This suggests that respondents, on average, have moderately higher-than-neutral awareness on the measured construct. The very small p-value (.000) reinforces the strength of this finding.

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Table 7: H_2 (Respondents perceive telemedicine as contributing to environmental sustainability.)

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Environmental impact mean	8.937	205	.000	.45267	.3528	.5525

Table 7 presents the one-sample t-test results indicating a statistically significant difference between the observed mean score for environmental impact perception and the neutral test value of 3. With a strong t-value of 8.937 (df = 205, p < .001), the mean environmental impact perception score is 0.45 points higher than the neutral benchmark. The 95% confidence interval (0.35 to 0.55) does not include zero, confirming that respondents' perception of environmental impact is significantly above the neutral level. This suggests that, on average, participants demonstrate moderate to strong awareness or concern about environmental issues, as their responses consistently lean toward the higher end of the scale. The extremely small p-value (.000) further validates the reliability of this finding.

Table 8: H_3 (Telemedicine improves healthcare access for rural populations but is hindered by internet connectivity.)

Test Improves Rural Access

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper

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	Test Value = 3				95% Confidence Interval of the Difference	
Telemedicine improves healthcare access for rural populations in Nepal.	4.556	205	.000	.364	.21	.52

Table 8 presents the one-sample t-test assessing whether respondents agree that telemedicine improves healthcare access for rural populations in Nepal, using a neutral midpoint test value of 3 (e.g., on a Likert scale from 1 = "Strongly Disagree" to 5 = "Strongly Agree"). The results show a statistically significant positive agreement ($t = 4.556$, $df = 205$, $p < .001$), with the mean response (3.36) being 0.36 points higher than the neutral value. The 95% confidence interval (0.21 to 0.52) confirms that the true population mean lies above 3, indicating moderate but clear support for the statement. This suggests that respondents, on average, perceive telemedicine as beneficial for enhancing rural healthcare access in Nepal, with the small p-value (.000) reinforcing the robustness of the finding.

Test Internet Limits Effectiveness

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Internet connectivity issues limit telemedicine's	6.795	205	.000	.524	.37	.68

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	Test Value = 3				95% Confidence Interval of the Difference	
effectiveness in Nepal.						

Table 8 also presents the one-sample t-test evaluating whether respondents believe internet connectivity issues limit telemedicine's effectiveness in Nepal, using a neutral midpoint of 3 (e.g., on a 1-5 Likert scale). The results reveal a statistically significant agreement ($t = 6.795$, $df = 205$, $p < .001$), with the mean response (3.52) being 0.52 points higher than the neutral value. The 95% confidence interval (0.37 to 0.68) confirms that the true population mean falls significantly above 3, indicating strong consensus that internet connectivity is a barrier.

Table 9: H_4 (Trust in telemedicine is higher for minor illnesses but lower without government regulation.)

Test Suitable for Minor Illnesses

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Telemedicine is suitable only for minor illnesses, not emergencies.	4.493	205	.000	.374	.21	.54

Table 9 presents the one-sample t-test results indicating respondents significantly agree ($t=4.493$, $p<.001$) that telemedicine is primarily suitable for minor illnesses rather than emergencies, with mean agreement 0.37 points above the neutral value (95% CI: 0.21-0.54). This suggests a prevailing perception that telemedicine has limitations in handling critical health situations, reflecting cautious optimism about its appropriate use cases. While recognizing telemedicine's value for routine care, respondents appear to maintain reservations

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about its emergency applications, possibly due to concerns about diagnostic accuracy or treatment capabilities in urgent scenarios. The strong statistical significance (p=.000) reinforces this as a consistent viewpoint across the sample.

Test Government Regulation Needed

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Government regulation would increase my confidence in telemedicine providers.	6.292	205	.000	.476	.33	.62

Table 9 also presents the one-sample t-test revealing strong agreement (t=6.292, p<.001) that government regulation would enhance confidence in telemedicine providers, with mean scores 0.48 points above neutral (95% CI: 0.33-0.62). This statistically significant finding (p=.000) demonstrates widespread public demand for regulatory oversight in Nepal's telemedicine sector. Respondents clearly perceive government involvement as crucial for establishing trust, likely seeking quality assurance, standardized practices, and accountability mechanisms. The results suggest policy interventions could significantly boost telemedicine adoption by addressing current credibility gaps through proper regulatory frameworks.

Table 10: H_5 (Respondents are more likely to adopt telemedicine if supported by insurance and government policies.)

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
adoption_mean	9.668	205	.000	.55825	.4444	.6721

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Table 10 presents the one-sample t-test results demonstrating strong statistical evidence (t=9.668, p<.001) that telemedicine adoption attitudes in Nepal significantly exceed neutral expectations, with mean scores 0.56 points above the test value (95% CI: 0.44-0.67). This highly significant finding (p=.000) indicates widespread positive predisposition toward telemedicine adoption among respondents. The consistent positive deviation from the neutral point suggests robust acceptance and willingness to utilize telemedicine services, likely driven by recognized benefits in healthcare accessibility. These results imply favorable conditions for telemedicine implementation in Nepal, though actual adoption may still depend on addressing practical barriers like internet connectivity and regulatory frameworks previously identified. The narrow confidence interval reinforces the reliability of this positive adoption trend across the population.

4.4 Correlation Analysis

Table 11: Check relationship between awareness and adoption.

Correlations

	awareness_mean	adoption_mean	
awareness_mean	Pearson Correlation	1	.309**
	Sig. (2-tailed)		.000
	N	206	206
adoption_mean	Pearson Correlation	.309**	1
	Sig. (2-tailed)	.000	
	N	206	206

**. Correlation is significant at the 0.01 level (2-tailed).

Table 11 presents the correlation analysis revealing a statistically significant positive relationship (r = 0.309, p < 0.01) between awareness of telemedicine and its adoption. This moderate correlation suggests that higher awareness is associated with greater willingness to adopt telemedicine services in Nepal. While the relationship is significant at the 99% confidence level, the strength of the correlation indicates that awareness is just one of several factors influencing adoption. This finding implies that public education and awareness campaigns could help drive telemedicine adoption, though other barriers (such as internet access and trust in providers) likely play additional roles. The large sample size (N = 206) strengthens the reliability of these results.

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Table 12: Check relationship between awareness and environmental impact.

Correlations

	awareness_mean	environmentalimpact_mean	
awareness_mean	Pearson Correlation	1	.487**
	Sig. (2-tailed)		.000
	N	206	206
environmentalimpact_mean	Pearson Correlation	.487**	1
	Sig. (2-tailed)	.000	
	N	206	206

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12 presents the correlation analysis revealing a strong positive relationship ($r = 0.487$, $p < 0.01$) between awareness of telemedicine and perceptions of its environmental impact. This statistically significant finding indicates that respondents with higher awareness of telemedicine tend to more strongly recognize its potential environmental benefits (or reduced negative impacts). The robust correlation (nearly 0.5) suggests these constructs are meaningfully related, possibly because environmentally-conscious individuals seek telemedicine information more actively, or because learning about telemedicine highlights its ecological advantages over traditional healthcare. With $p < .001$ in a substantial sample (N=206), this result reliably confirms that environmental considerations are an important component of telemedicine awareness in Nepal, potentially informing both policy and public communication strategies.

Table 13: Check relationship between environmental impact and adoption.

Correlations

	environmentalimpact_mean	adoption_mean	
environmentalimpact_mean	Pearson Correlation	1	.425**
	Sig. (2-tailed)		.000
	N	206	206

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	environmentalimpact_mean	adoption_mean	
adoption_mean	Pearson Correlation	.425**	1
	Sig. (2-tailed)	.000	
	N	206	206

**. Correlation is significant at the 0.01 level (2-tailed).

Table 13 presents the analysis showing a moderately strong positive correlation ($r = 0.425$, $p < 0.01$) between perceptions of telemedicine's environmental impact and willingness to adopt it. This statistically significant relationship suggests that respondents who recognize telemedicine's environmental benefits are more likely to embrace its use. The finding implies that environmental considerations play a meaningful role in healthcare decisions, and highlighting telemedicine's eco-friendly advantages (e.g., reduced travel emissions) could encourage adoption. With high significance ($p < .001$) and a robust sample (N=206), this correlation reinforces that sustainability messaging may be an effective strategy in promoting telemedicine in Nepal.

5. Discussion

The findings of this study provide significant insights into the perception of telemedicine and digital healthcare in Nepal, revealing a population that is generally aware and receptive to these services while simultaneously facing practical barriers and expressing concerns about specific limitations.

The first hypothesis (H_1) regarding awareness of telemedicine services was supported, with respondents demonstrating significantly above-neutral awareness levels ($M=3.46$, $t=7.640$, $p<.001$). This finding aligns with previous research conducted in Nepal, which noted growing awareness of telemedicine among urban populations and healthcare professionals (Upadhyay, Singh, & Dahal, 2020). The moderate awareness levels observed in this study are consistent with findings from similar LMIC contexts, where telemedicine awareness has increased following the COVID-19 pandemic (Gajarawala & Pelkowski, 2021). However, the awareness level of 3.46 on a 5-point scale suggests there remains substantial room for improvement, particularly in rural areas where digital literacy and access to information may be limited (Koirala, Neupane, & Acharya, 2022).

The second hypothesis (H_2) concerning environmental sustainability perceptions was also supported, with respondents perceiving telemedicine as contributing to environmental sustainability ($M=3.45$, $t=8.937$, $p<.001$). This finding represents a novel contribution to the literature, as environmental sustainability is an often-overlooked dimension of telemedicine perception in previous Nepalese studies. The positive perception aligns with broader global discussions about telemedicine's potential to reduce carbon emissions through decreased

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patient travel and healthcare facility operations (Smith et al., 2020). This finding has important policy implications, suggesting that environmental messaging could be leveraged to promote telemedicine adoption in Nepal, particularly given the country's vulnerability to climate change and its commitment to sustainable development goals.

The third hypothesis (H_3) regarding telemedicine's impact on rural healthcare access and internet connectivity barriers was partially supported. Respondents agreed that telemedicine improves healthcare access for rural populations ($M=3.36$, $t=4.556$, $p<.001$), confirming the potential of telemedicine to bridge geographical healthcare gaps identified in previous studies (Gurung, Shrestha, & Karki, 2019). However, respondents also strongly agreed that internet connectivity issues limit telemedicine's effectiveness ($M=3.52$, $t=6.795$, $p<.001$), consistent with findings from Upadhyay, Singh, and Dahal (2020) who identified poor internet connectivity as a major barrier in rural Nepal. This dual finding highlights the paradox of telemedicine in Nepal: the technology holds tremendous promise for reaching underserved populations, but the very infrastructure limitations that necessitate telemedicine also hinder its implementation. This suggests that telemedicine expansion must be accompanied by parallel investments in digital infrastructure, particularly in rural and remote areas.

The fourth hypothesis (H_4) concerning trust in telemedicine was supported, with respondents indicating that telemedicine is more suitable for minor illnesses than emergencies ($M=3.37$, $t=4.493$, $p<.001$) and expressing strong desire for government regulation to increase confidence ($M=3.48$, $t=6.292$, $p<.001$). These findings echo concerns raised by healthcare professionals in other studies regarding diagnostic accuracy and medico-legal liabilities in virtual consultations (Alipour, Safari, Khalili, & Aghaei, 2021). The strong endorsement of government regulation suggests that Nepalese respondents seek institutional safeguards similar to those found in traditional healthcare settings. This finding aligns with the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasize that trust and facilitating conditions significantly influence technology adoption (Venkatesh, Morris, Davis, & Davis, 2003).

The fifth hypothesis (H_5) regarding adoption drivers was strongly supported, with respondents showing high willingness to adopt telemedicine if supported by insurance and government policies ($M=3.56$, $t=9.668$, $p<.001$). This finding has significant policy implications, suggesting that Nepal could substantially increase telemedicine uptake through policy interventions such as regulatory frameworks and insurance coverage. This is consistent with recommendations from Sapkota et al. (2022), who emphasized the need for government support to promote telemedicine sustainability.

The correlation analyses provided additional insights into the relationships between key constructs. The positive correlation between awareness and adoption ($r=0.309$, $p<.01$) suggests that awareness campaigns could effectively drive telemedicine uptake, consistent with the findings of Upadhyay, Singh, and Dahal (2020) who emphasized the importance of education in improving acceptance. The stronger correlation between awareness and environmental perceptions ($r=0.487$, $p<.01$) indicates that environmental consciousness may be more closely tied to awareness than adoption itself, suggesting that environmental messaging could be

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particularly effective in raising awareness even if not directly driving adoption. The moderate correlation between environmental perceptions and adoption ($r=0.425$, $p<.01$) confirms the potential value of emphasizing telemedicine's sustainability benefits in promotional efforts.

These findings contribute to the growing body of literature on telemedicine in LMICs, extending previous research by providing quantitative evidence on the relationships between awareness, environmental perceptions, trust, and adoption in the Nepalese context. The study also highlights the multidimensional nature of telemedicine perception, encompassing practical, environmental, and trust-related considerations that interact in complex ways.

6. Conclusion and Recommendation

6.1 Conclusion

The findings collectively highlight several key insights into telemedicine awareness, adoption, and perceptions in Nepal. First, the data reveals that respondents generally exhibit above-neutral awareness levels regarding telemedicine, with a particularly strong recognition of its potential to improve healthcare access in rural areas. However, concerns about internet connectivity as a limiting factor and reservations about telemedicine's suitability for emergencies suggest that while the population sees value in telemedicine, practical and infrastructural barriers remain significant challenges. Additionally, the strong public endorsement for government regulation indicates a desire for formal oversight to build trust and confidence in telemedicine services, pointing to an opportunity for policymakers to establish frameworks that ensure quality and reliability.

The correlation analyses further enrich these insights by demonstrating meaningful relationships between awareness, environmental perceptions, and adoption. Notably, higher awareness of telemedicine is linked to a greater appreciation of its environmental benefits, suggesting that educational campaigns could simultaneously promote both health and sustainability goals. Moreover, the positive association between environmental impact perceptions and adoption indicates that emphasizing telemedicine's ecological advantages—such as reduced carbon footprints from fewer patient travels—could serve as an effective strategy to encourage its use. These correlations underscore that telemedicine's appeal in Nepal extends beyond mere convenience, tapping into broader societal values like environmental consciousness and trust in regulated systems.

In conclusion, the study paints a picture of a population that is receptive to telemedicine but faces tangible barriers such as internet reliability and concerns about emergency care limitations. The findings advocate for a multi-faceted approach to telemedicine promotion, combining infrastructure improvements, public education, and robust regulatory frameworks. By addressing connectivity issues, clarifying telemedicine's appropriate use cases, and leveraging its environmental benefits, stakeholders can foster greater adoption. Ultimately, these efforts could help bridge healthcare gaps in Nepal, particularly in underserved rural areas, while aligning with sustainable development goals. The data not only identifies challenges but also offers actionable pathways to make telemedicine a more viable and trusted component of Nepal's healthcare system.

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6.2 Recommendation

To address the infrastructural barriers identified in the study, the Nepalese government and private stakeholders should prioritize investments in reliable and high-speed internet connectivity, particularly in rural and remote areas. Public-private partnerships could be leveraged to expand broadband access, while mobile network operators should be encouraged to improve coverage and affordability. Additionally, healthcare providers could adopt low-bandwidth telemedicine solutions that function effectively even with limited internet connectivity, ensuring uninterrupted service delivery.

Educational campaigns and awareness programs are essential to improve public understanding of telemedicine's benefits, appropriate use cases, and environmental advantages. The government, in collaboration with healthcare NGOs and media, should launch targeted initiatives to dispel misconceptions—particularly regarding telemedicine's limitations in emergencies—while highlighting its strengths in managing chronic conditions, follow-ups, and minor illnesses. Training programs for healthcare professionals and community health workers can further enhance telemedicine literacy, ensuring both providers and patients use these services effectively. Integrating telemedicine awareness into school and university curricula could also foster long-term acceptance among younger generations.

Finally, establishing a robust regulatory framework is crucial to building public trust and ensuring the quality and security of telemedicine services. A dedicated regulatory body could oversee compliance, monitor service quality, and address grievances, thereby increasing confidence among users. Policymakers should also explore incentives for healthcare providers to adopt telemedicine, such as tax breaks or grants, while ensuring interoperability between different telemedicine platforms. By combining infrastructure improvements, public education, and strong governance, Nepal can harness telemedicine's full potential to bridge healthcare gaps and promote sustainable, inclusive healthcare delivery.

Author Contribution

Raji Shrestha: Conceptualization, methodology, investigation, formal analysis, writing—original draft preparation, writing—review and editing, data curation, visualization, project administration.

Conflict of Interest

The author declares no conflict of interest regarding the publication of this paper.

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Appendix: Questionnaire

Section A: Demographics

Age:

- ☐ 18-25
- ☐ 25-35
- ☐ 35-45
- ☐ 45 and above

Gender:

- ☐ Male
- ☐ Female

Location:

- ☐ Urban
- ☐ Rural

Occupation:

- ☐ Students
- ☐ Employed (private sector)
- ☐ Employed (government sector)

Education Level:

- ☐ Higher Secondary (+2)
- ☐ Undergraduate
- ☐ Graduation
- ☐ Master's or above

Section B: Perception of Telemedicine & Digital Healthcare in Nepal

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

1. Awareness & Familiarity

Statement	1	2	3	4	5
I am aware of telemedicine services available in Nepal (e.g., online consultations, e-pharmacies).	☐	☐	☐	☐	☐
I understand how telemedicine reduces the need for physical hospital visits.	☐	☐	☐	☐	☐

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Statement	1	2	3	4	5
I have used telemedicine services (or know someone who has) in Nepal.	☐	☐	☐	☐	☐
Social media/news has informed me about telemedicine's benefits.	☐	☐	☐	☐	☐

2. Environmental Sustainability

Statement	1	2	3	4	5
Reduced travel for medical appointments lowers air pollution in urban areas like Kathmandu.	☐	☐	☐	☐	☐
Digital prescriptions (e-pharmacy) reduce paper/plastic waste compared to traditional methods.	☐	☐	☐	☐	☐
Telemedicine aligns with global sustainability goals (e.g., SDGs) for healthcare.	☐	☐	☐	☐	☐
I consider telemedicine's environmental benefits when choosing healthcare options.	☐	☐	☐	☐	☐

3. Accessibility & Practicality

Statement	1	2	3	4	5
Telemedicine improves healthcare access for rural populations in Nepal.	☐	☐	☐	☐	☐
Internet connectivity issues limit telemedicine's effectiveness in Nepal.	☐	☐	☐	☐	☐
Telemedicine is more time-efficient than in-person hospital visits.	☐	☐	☐	☐	☐
Telemedicine reduces costs (transport, waiting time) for patients.	☐	☐	☐	☐	☐

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4. Trust & Reliability

Statement	1	2	3	4	5
I trust the diagnosis/treatment provided through telemedicine platforms.	☐	☐	☐	☐	☐
Telemedicine is suitable only for minor illnesses, not emergencies.	☐	☐	☐	☐	☐
Government regulation would increase my confidence in telemedicine providers.	☐	☐	☐	☐	☐
I prefer hybrid models (online + occasional in-person visits) for healthcare.	☐	☐	☐	☐	☐

5. Future Adoption & Advocacy

Statement	1	2	3	4	5
I would recommend telemedicine to friends/family for its convenience and eco-benefits.	☐	☐	☐	☐	☐
Nepal government should invest in telemedicine infrastructure (e.g., rural internet).	☐	☐	☐	☐	☐
Medical colleges should train students in telemedicine practices.	☐	☐	☐	☐	☐
I would use telemedicine more if it were integrated with insurance schemes.	☐	☐	☐	☐	☐

Thank you!