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ORIGINAL ARTICLE

Use of telemedicine among patients at a Social Health Insurance hospital in northern Peru, 2023

Luis Miguel Vega Cruz[1,a] | Miguel Alberto Rivera Espino[2,b] | Antonio Elías Zavaleta Moreno[1,c] | Edgardo Linares Reyes[3,d] | Carlos Guillermo Carcelén Reluz[1,e]

[1] Universidad Nacional Mayor de San Marcos, Lima, Perú.
[2] Universidad Nacional Federico Villareal, Lima, Perú.
[3] Universidad Nacional de Trujillo, Trujillo, La Libertad, Perú.
[a] MD.
[b] Doctor of Medicine.
[c] MD, Specialist in Clinical Pathology.
[d] MD, Specialist in Internal Medicine.
[e] Doctor of Environmental and Climate History.

Keywords:
medical technology; healthcare services; health policy; right to health; patient (source: MeSH-NLM).

ABSTRACT

Objective. To determine the characteristics of the intention to use telemedicine among patients at Hospital II Chocope of the Social Health Insurance (EsSalud) in La Libertad region, Peru, 2023. **Methods.** A quantitative, cross-sectional, and correlational study was conducted. The study population comprised 2,746 outpatients, from which a sample of 338 patients was drawn. Data were collected through a survey using two validated and reliable questionnaires. Inferential analysis was performed using simple linear regression. **Results.** Perceptions related to consumer, service, and technology factors were predominantly medium, reported by 49.1 %, 52.4 %, and 47.9 % of participants, respectively. Similarly, the intention to use telemedicine was predominantly medium (49.1 %). A strong and direct correlation was observed between the evaluated factors and the intention to use telemedicine ($p < 0.001$). **Conclusions.** The adoption of telemedicine is influenced by multiple factors, including institutional support, perceived service quality, ease of use, patient trust, and the availability of appropriate technology.

Uso de telemedicina en pacientes de un hospital del Seguro Social de Salud del Norte del Perú, 2023

Palabras clave:
tecnología médica; servicio de salud; política de la salud; derecho a la salud; paciente (fuente: DeCs-BIREME).

RESUMEN

Objetivo. Determinar las características en la intención de uso de la telemedicina en pacientes del Hospital II Chocope del Seguro Social (EsSalud), en la región de La Libertad, Perú, 2023. **Métodos.** El enfoque fue cuantitativo, transversal y correlacional. La población de estudio estuvo conformada por 2746 pacientes de la consulta externa, y la muestra por 338 pacientes. La técnica fue la encuesta y el instrumento fueron dos cuestionarios válidos y confiables. El análisis inferencial incluyó el uso de la regresión lineal simple. **Resultados.** Se observó que el nivel de la percepción respecto a los factores relacionados con el consumidor, con el servicio y el tecnológico, tuvo una predominancia del nivel medio según el 49,1 %, 52,4 % y 47,9 % de pacientes, respectivamente. Así mismo, el nivel de intención de uso de la telemedicina tuvo una predominancia del nivel medio, según el 49,1 %. Se encontró una correlación directa y de grado alto entre los factores evaluados y la intención de uso de la telemedicina ($p < 0,001$). **Conclusiones.** La adopción de la telemedicina depende de múltiples factores, incluyendo el apoyo institucional, la calidad percibida del servicio, la facilidad de uso, la confianza del paciente y la tecnología disponible.

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Correspondence:
Luis Miguel Vega Cruz
luismiguel.vega@unmsm.gob.pe

INTRODUCTION

Telemedicine has advanced significantly in response to the COVID-19 pandemic, allowing essential medical services to continue being provided, particularly for patients who do not need to visit a healthcare facility but still benefit from remote monitoring [1,2]. In this context, the provision of health services through telemedicine depends not only on technological considerations but also on social and cultural factors [3]. However, challenges remain, such as the lack of standardization in care approaches among different providers.

Peru's healthcare system faces a crisis aggravated by the COVID-19 pandemic, resulting in a shortage of medical professionals and inadequate facilities [5]. The Peruvian government has promoted the use of telemedicine in primary care, achieving nearly 25 million consultations. Nonetheless, after the end of the lockdown, many patients still preferred in-person care [6]. In Ministry of Health (MINSA) hospitals, the average waiting time is 1.3 days, while in Social Security (EsSalud) hospitals it reaches 6.5 days [7]. The Teleatiendo telemedicine website, launched by MINSA, provided 4,300 consultations in its first two weeks and eventually reached 14 million consultations nationwide [8]. A study by NeoConsulting [1,9] reported that 37 % of patients in Lima who used telemedicine were satisfied, 24 % were dissatisfied, and 39% remained neutral.

On the other hand, Adepoju et al. [2], in Texas, found that non-Hispanic white patients were 61 % more likely to have a telemedicine visit. Similarly, in China, Du et al. [3] found low telemedicine use in rural areas and identified barriers such as lack of knowledge, trust, demand, and insufficient social support. In the same way, Ferucci et al. [10], in Alaska, identified that factors associated with telemedicine use included age, male sex, geographic region, and annual visit rate. In Lima, Fuentes et al. [11] found that 33 % of patients who had used telemedicine would not use it again due to the reduction of lockdown measures.

Factors associated with the adoption of telemedicine are understood as the combination of organizational, technological, and social elements involved in its implementation and acceptance. These include organizational aspects such as financing, training, and processes; technological aspects such as risks, security, and privacy; and social aspects such as user acceptance and regulation [12]. Among the user-related factors, one of the most important is social influence [13]. Likewise, socioeconomic level [14], service-related factors [15], technological factors, and the perception of security and confidentiality [16] all play a crucial role in whether users trust telemedicine.

The intention to use telemedicine can be explained through the Unified Theory of Acceptance and Use of Technology (UTAUT) [17]. This theory considers effort expectancy, performance expectancy, and social influences as key elements in the adoption of telemedicine compared to traditional medical care [18]. Facilitating conditions also play an important role in telemedicine adoption [19], as do hedonic motivation and habit [20,21].

Finally, the objective of this study was to determine the characteristics of the intention to use telemedicine among patients of Hospital II Chocope of EsSalud, in the La Libertad region of northern Peru, in 2023.

METHODS

Study type and area

This was a quantitative, cross-sectional, and correlational study [22,23]. It was conducted at Hospital II Chocope of EsSalud, located in the Department of La Libertad, in northern Peru, during 2023.

Population and sample

The study population consisted of 2,746 patients from Hospital II Chocope of EsSalud who met the inclusion criteria: being regular patients, aged 18 years or older, and of either sex. Patients who declined to participate voluntarily were excluded. The sample consisted of 338 patients selected through simple random probabilistic sampling.

Variables and data collection instruments

The independent variable included all factors associated with the use of telemedicine, while the dependent variable was the intention to use telemedicine; both were measured using two questionnaires.

The first instrument, developed by the authors, assessed factors related to telemedicine and was based on the Technology Acceptance Model (TAM). It

included three dimensions: consumer-related factors (social, economic, and demographic influences on acceptance; high: 21-28, medium: 14-20, low: 7-13), service-related factors (individualized attention, speed, trust, satisfaction, familiarity, and cost; high: 24-32, medium: 16-23, low: 8-15), and technological factors (ease of use, data protection, security, technological quality, and accessibility; high: 15–20, medium: 10-14, low: 5-9). The intention-to-use variable was categorized as high (60-80), medium (40-59), and low (20-39). This questionnaire included 20 items rated on a Likert scale from "strongly disagree" (1) to "strongly agree" (5). It was validated by three experts and showed adequate reliability, with a Cronbach's alpha of 0.828 and McDonald's omega of 0.884.

The second instrument evaluated patients' perception of their intention to use telemedicine across the following dimensions: effort expectancy (high: 9-12, medium: 6-8, low: 3-5), performance expectancy (high: 16-20, medium: 10-15, low: 4-9), social influence (high: 8-10, medium: 5-7, low: 2-4), facilitating conditions (high: 8-10, medium: 5-7, low: 2-4), hedonic motivation (high: 8-10, medium: 5-7, low: 2-4), and habit (high: 11-15, medium: 7-10, low: 3-6). The intention-to-use variable was categorized as high (48-64), medium (32-47), and low (16-31). This questionnaire, also developed by the authors and adapted from UTAUT [17], contained 16 items rated on the same Likert scale. It was validated by expert judgment and demonstrated high internal consistency, with a Cronbach's alpha of 0.863 and McDonald's omega of 0.876.

Data collection techniques and procedures

The data collection technique used was the survey. Permission was requested from Hospital II Chocope EsSalud after explaining the study's purpose and benefits. The questionnaires were administered to patients as they attended their scheduled appointments. Before completing the instruments, participants received an informed consent form explaining the study's objectives. Each patient required approximately ten minutes to complete both questionnaires, and data collection for the entire sample took place over one month.

Data analysis

Data processing was conducted using Microsoft Excel and IBM SPSS v27. A database was created, coded, and analyzed according to the study objectives. Descriptive statistics included simple frequencies and percentages to identify the levels of each variable and dimension. Inferential analysis used Pearson's correlation coefficient (R), the coefficient of determination (R^2), and adjusted R^2 to determine the influence of one variable on another. Statistical significance was set at $p < 0.05$.

Ethical considerations

The study adhered to the ethical principles of autonomy, beneficence, non-maleficence, and justice, in accordance with the Declaration of Helsinki and current Peruvian regulations. Informed consent was obtained from all participants, guaranteeing confidentiality according to Law No. 29733, the Personal Data Protection Law. The study was reviewed and approved by the Institutional Research Ethics Committee of the Universidad Nacional Mayor de San Marcos (UNMSM), ensuring compliance with ethical and methodological standards.

RESULTS

Table 1 shows that patients' perceptions regarding the use of telemedicine were predominantly at a medium level (51.8 %), followed by a low level (25.7 %) and a high level (22.5 %). Regarding the dimensions, consumer-related factors were mainly at a medium level (49.1 %), as were service-related factors (52.4 %) and technological factors (47.9 %).

Table 2 shows that the intention to use telemedicine also exhibited a predominance at a medium level (49.1 %), followed by a high level (27.5%) and a low level (23.4 %). Likewise, the dimensions effort expectancy (42.9 %), technological performance improvement (50.6 %), social influence (46.7 %), facilitating conditions (52.1 %), hedonic motivation (50.6 %), and habit (52.4 %) were also predominantly medium.

Table 3 demonstrates that Pearson's correlation coefficient (r) indicates a direct and strong relationship between the evaluated factors and the intention to use telemedicine. Furthermore, the adjusted R^2 coefficient showed that 68.7 % of the variability in the intention to use telemedicine was explained by the evaluated factors. A direct and strong correlation was also confirmed between the consumer-related

Table 1. Perceptions regarding the use of telemedicine among patients at Hospital II Chocope (EsSalud)

Variable	n = 338					
	High		Medium		Low	
	fi	%	fi	%	fi	%
Perception of telemedicine use	76	22.5	175	51.8	87	25.7
Dimensions						
Consumer-related factor	79	23.4	166	49.1	93	27.5
Service-related factor	87	25.7	177	52.4	162	47.9
Technological factor	88	26.0	162	47.9	89	26.3

factor and the intention to use telemedicine; this relationship was highly significant ($p < 0.001$). The adjusted R^2 coefficient indicated that 74.2 % of the variability in the intention to use telemedicine was attributable to the consumer-related factor. Similarly, a direct and strong correlation was observed between the service-related factor and the intention to use telemedicine, also highly significant ($p < 0.001$). The adjusted R^2 coefficient showed that 69.3 % of the variability in intention to use telemedicine was explained by the service-related factor. Furthermore, there was a direct and strong correlation between the technological factor and the intention to use telemedicine ($p < 0.001$), with an adjusted R^2 coefficient of 70.8 %, indicating the proportion of variability in the intention to use telemedicine explained by technological factors among patients at Hospital II Chocope, EsSalud, La Libertad.

DISCUSSION

In relation to the previous section, a direct, strong, and highly significant correlation ($p < 0.001$) was

Table 2. Intention to use telemedicine among patients at Hospital II Chocope (EsSalud)

Intention variable	n = 338					
	High		Medium		Low	
	fi	%	fi	%	fi	%
Intention to use telemedicine	93	27.5	166	49.1	79	23.4
Dimensions						
Effort expectancy	96	28.4	145	42.9	97	28.7
Technological performance improvement	96	28.4	171	50.6	71	21.0
Social influence	81	24.0	158	46.7	99	29.3
Facilitating conditions	79	23.4	176	52.1	83	24.6
Hedonic motivation	71	21.0	171	50.6	96	28.4
Habit	87	25.7	177	52.4	74	21.9

Table 3. Factors associated with the use of telemedicine among patients at Hospital II Chocope of EsSalud, La Libertad Region, Peru, 2024

	R	R squared	Adjusted R squared	Standard error	*p*-value
Associated factors	0.709	0.846	0.687	5.65	< 0.001
Consumer-related factor	0.721	0.926	0.740	6.46	< 0.001
Service-related factor	0.659	0.887	0.693	7.42	< 0.001
Technological factors	0.687	0.899	0.708	6.24	< 0.001

observed between the evaluated factors and the intention to use telemedicine. In addition, the adjusted R^2 coefficient indicates that 68.7% of the variability in the intention to use telemedicine is explained by the evaluated factors among patients at Hospital II Chocope in La Libertad. This contrasts with the findings of Mackwood et al. [4], who investigated telemedicine use and reported that patients preferred in-person care due to dissatisfaction with digital services and technological limitations in both urban and rural areas. In this regard, factors associated with the adoption of telemedicine include organizational aspects such as financing, training, and processes; technological aspects involving risks, security, and privacy; and social aspects such as user acceptance [12]. Recent studies have shown that factors such as trust in physicians, ease of use, service quality, data accuracy, and security influence the adoption of telemedicine [18,24]. These findings highlight the need to comprehensively address these areas to promote greater acceptance and use of telemedicine among patients.

Furthermore, a predominance of the medium level was observed in consumer-related, service-related, and technological factors. These findings are consistent with Ferucci et al. [1], who found associations between demographic, economic, and social factors and telemedicine use, as well as with Adepoju et al. [2], who reported that telemedicine use varied significantly by race and health insurance availability. The consumer-related factor evaluates perceptions about telemedicine shaped by economic conditions, demographic characteristics, and preferences for primary physicians [13-15,25]. Regarding the service-related factor, personalization and trust are crucial for telemedicine adoption, while the technological factor centers on security and accessibility, especially in rural areas where internet connectivity is less stable [12,26-28]. In summary, improving ease of use, service quality, and technological infrastructure is essential for fostering higher telemedicine adoption among patients.

Additionally, a predominance of medium intention to use telemedicine was found in 49.1% of patients, followed by high (27.5 %) and low (23.4 %) levels. The dimensions of effort expectancy, technological performance improvement, social influence, facilitating conditions, hedonic motivation, and habit were also predominantly medium. These results align with those of Guevara [29], who reported average levels in several factors and in the intention to use telemedicine among hypertensive patients. The UTAUT and UTAUT2 theories propose that effort expectancy, performance expectancy, and social influence determine the intention to use new technologies [30]. Therefore, improving ease of use, service quality, and technological infrastructure is essential to increase telemedicine adoption among patients at Hospital II Chocope, EsSalud, La Libertad.

Similarly, strong and highly significant correlations ($p < 0.001$) were found between consumer-related, service-related, and technological factors and the intention to use telemedicine, explaining 74.2 %, 69.3 %, and 70.8 % of the variability, respectively. These findings are consistent with Fuentes and Novaro [11], as well as Cardozo [30], who reported significant influences of performance expectancy, effort expectancy, and hedonic motivation on telemedicine adoption. Theoretically, effort expectancy, performance expectancy, social influence, facilitating conditions, hedonic motivation, and habit are key predictors of technology adoption [30,31]. Altogether, the results indicate that the intention to use telemedicine is strongly influenced by consumer-related, service-related, and technological factors.

Addressing and optimizing these factors is crucial to promote greater adoption and satisfaction with telemedicine among patients at Hospital II Chocope of EsSalud in the La Libertad region.

The main strength of this study lies in the design and initial application of two original instruments to evaluate factors influencing telemedicine adoption and the intention to use it among patients at Hospital II Chocope of EsSalud, providing contextualized tools for local healthcare environments. The quantitative approach, supported by statistical analyses such as Pearson's correlation coefficient and adjusted R^2, revealed a strong correlation between both scales—an additional finding that suggests a meaningful relationship between the analyzed factors and the intention to use telemedicine. These instruments may be applied in future studies in similar settings, such as public hospitals with comparable socioeconomic and demographic populations, or adapted to assess telemedicine in rural environments or health systems with varying levels of digitalization, provided that validation is performed with larger samples.

However, this study has limitations, such as being conducted exclusively in a single hospital, which restricts the generalizability of the results, and the use of self-administered questionnaires, which may introduce social desirability or self-perception bias. These limitations suggest the need to complement the findings with mixed-methods approaches in future research.

Conclusions

The results of this study demonstrate that consumer-related, service-related, and technological factors show a direct and highly significant correlation with the intention to use telemedicine among patients at Hospital II Chocope of EsSalud ($p < 0.001$). In particular, the consumer-related factor showed an adjusted R^2 of 74.2 %, followed by the service-related factor with 69.3 % and the combined evaluated factors with 68.7 %, indicating that these elements explain a considerable proportion of the variability in intention to use. These figures confirm that improving patient experience, service quality, and technological accessibility is essential to increase telemedicine adoption in the hospital context.

Furthermore, the perception of factors related to telemedicine and the intention to use it were mostly at a medium level, with 51.8 % and 49.1 % of patients, respectively. This reflects medium acceptance of the service and suggests that opportunities remain to strengthen positive perceptions and increase willingness to use telemedicine. Elements such as effort expectancy, technological performance, social influence, facilitating conditions, hedonic motivation, and habit also appeared at medium levels, indicating the need for strategic interventions to optimize telemedicine implementation in the hospital.

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Authorship contribution

LMVC: conceptualization, methodology, software, validation, formal analysis, investigation, data curation, writing - original draft, writing - review and editing, supervision, project administration, and funding.

MARE: supervision.

AEZM: supervision.

ELR: supervision.

CGCR: validation, supervision.

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Conflict of interest statement

The authors declare no conflicts of interest.

ANNEXES

Annex 1. Data collection instruments

Questionnaire on consumer, service, and technological factors

Dear patient,

We invite you to participate in this questionnaire, which aims to assess your perception of the factors that influence the use of telemedicine at Hospital II Chocope – EsSalud. Your responses will be highly valuable for improving the quality and accessibility of our telemedicine services. This questionnaire consists of several statements. Please indicate your level of agreement with each one using a Likert scale ranging from: "Strongly disagree" (1), "Disagree" (2), "Undecided" (3), "Agree" (4), and "Strongly agree" (5).

Informed consent:

Your participation is voluntary, and your responses will remain anonymous and confidential. The information collected will be used exclusively for research purposes to improve our services. By continuing with this questionnaire, you are giving your informed consent to participate. If you have any questions or concerns, please feel free to contact our staff.

We sincerely appreciate your time and participation.

Instructions:

Please read each statement and mark the option that best reflects your opinion. There are no right or wrong answers; we are interested in knowing your personal perspective.

Thank you very much for your participation!

Items	Response options				
	1	2	3	4	5
1. You consider that the opinion of your acquaintances is important when deciding to receive telemedicine care.					
2. You consider that the Internet and social media make the use of telemedicine feasible.					
3. You consider that telemedicine appointments would allow you to save money.					
4. You consider that the use of telemedicine generates better social relationships within the healthcare system.					
5. You consider that telemedicine reduces geographical barriers to accessing health services.					
6. You consider that the use of telemedicine improves knowledge and advances in health.					
7. You consider that telemedicine provides equal opportunities for care, without discrimination based on race, gender, or education level.					
8. You believe that telemedicine takes into account user needs, recommendations, or complaints expressed through social media comments.					
9. You consider that telemedicine reduces waiting times for medical care.					
10. You consider that telemedicine reduces the time required to schedule a medical appointment.					
11. You consider that telemedicine gives patients greater confidence when describing symptoms of an illness or condition.					
12. You consider that the quality of medical care provided through telemedicine could be reliable.					
13. You have knowledge about how telemedicine services are provided.					
14. You have sought information about telemedicine and its benefits.					
15. You consider that telemedicine allows the healthcare system to save money, which could be used for better treatments.					
16. You consider that you know how to use digital devices (cell phone, laptop, computer, tablet) that allow access to telemedicine.					
17. You consider that technological resources are trustworthy for protecting your privacy.					
18. You consider that equipment (microphone, webcam) and computer systems (websites) are safe for protecting your personal data.					
19. You believe that the hospital has adequate software and hardware for telemedicine services.					
20. You consider that telemedicine increases accessibility and proximity to healthcare personnel.					

Questionnaire on intention to use telemedicine

Dear patient,
We invite you to participate in this questionnaire, which aims to assess your perception of the intention to use telemedicine at Hospital II Chocope – EsSalud. Your responses will help improve the quality and accessibility of our telemedicine services. The questionnaire consists of several statements. Please indicate your level of agreement using the Likert scale: "Strongly disagree" (1), "Disagree" (2), "Undecided" (3), "Agree" (4), and "Strongly agree" (5).

Informed consent:
Your participation is voluntary, and your responses will be anonymous and confidential. The collected information will be used exclusively for research purposes. By continuing with this questionnaire, you agree to participate voluntarily. If you have any questions, please contact our staff.

Thank you sincerely for your time and cooperation.

Instructions:
Read each statement and mark the option that best reflects your opinion. There are no right or wrong answers; we are interested in your personal perspective.

Thank you for your participation!

Items	Response options				
	1	2	3	4	5
DIMENSION 1: Effort Expectancy					
I believe that having medical consultations through telemedicine would be easy for me.					
I believe that during telemedicine consultations, I would understand the doctor well.					
I believe that teleconsultations would be easy to use.					
DIMENSION 2: Performance Expectancy					
Telemedicine consultations would be useful in my daily life.					
Telemedicine consultations would help with important aspects of my healthcare.					
Telemedicine consultations would make interactions with my doctor more comfortable.					
Telemedicine consultations would be useful because they would save me waiting time at the clinic.					
DIMENSION 3: Social Influence					
People in my environment who are important to me think it is good for me to use telemedicine.					
People I consider knowledgeable think it is good for me to use telemedicine.					
DIMENSION 4: Facilitating Conditions					
I would have the necessary knowledge to use telemedicine services.					
I would have the necessary computer resources to use telemedicine consultation services.					
DIMENSION 5: Hedonic Motivation					
If I had a medical need, using telemedicine consultations would feel like a friendly procedure.					
Telemedicine consultations would be pleasant to use, saving time and effort.					
DIMENSION 6: Habit					
Using telemedicine consultations when needed could become a routine way of addressing my health-related concerns.					
In the future, I could become familiar with using telemedicine consultations if necessary.					
Telemedicine consultations could become a habitual practice in the future care of my health.					

Annex 2. Technical sheets of the instruments

Instrument 1: Questionnaire on factors

Technical Sheet

Objective: To assess patients' perceptions of the factors influencing telemedicine use at Hospital II Chocope – EsSalud.

Format: The questionnaire consists of 20 items.

Mode of application: Group or individual.

Responses: Participants indicate their level of agreement using a Likert scale from "Strongly disagree" (1) to "Strongly agree" (5).

Informed consent: Provided to ensure voluntariness and confidentiality, and that responses are used exclusively for research.

Instructions: Participants are asked to read each statement and mark the option that best reflects their opinion. No right or wrong answers.

Anonymity: Responses are anonymous and confidential.

Duration: Approximately 10 minutes.

Target population: Patients of Hospital II Chocope – EsSalud.

Developed by: Miguel Ángel Vega Cruz.

Creation date: 2023.

Validity: Content validity conducted by a panel of 3 experts.

Reliability: Internal consistency measured by Cronbach's alpha (0.828) and McDonald's omega (0.884).

Instrument 2: Questionnaire on intention to use telemedicine

Technical Sheet

Objective: To assess the perception of patients at Hospital II Chocope – EsSalud regarding their intention to use telemedicine, in order to improve the quality and accessibility of remote health services.

Format: The questionnaire consists of 16 items.

Mode of application: Group or individual.

Responses: Likert scale from "Strongly disagree" (1) to "Strongly agree" (5).

Informed consent: A brief consent ensures voluntariness, confidentiality, and research-only use of responses.

Instructions: Clear directions for marking the option that best reflects the participant's opinion. No right or wrong answers.

Anonymity: Responses are anonymous and confidential.

Duration: Approximately 10 minutes.

Target population: Patients at Hospital II Chocope – EsSalud.

Developed by: Luis Miguel Vega Cruz.

Creation date: 2023.

Reliability: Internal consistency measured by Cronbach's alpha (0.863) and McDonald's omega (0.876).