



UNIVERSIDAD PERUANA
CAYETANO HEREDIA

ADHERENCIA Y PERCEPCIONES DE
LOS PACIENTES SOBRE EL PROYECTO
COVIDA: UN SERVICIO DE
TELEMONITOREO Y
TELEORIENTACIÓN LIDERADO POR
VOLUNTARIOS PARA LA GESTIÓN
COMUNITARIA DE COVID-19 EN
PERÚ: UN ESTUDIO DE MÉTODOS
MIXTOS

TESIS PARA OPTAR EL GRADO DE
MAESTRO EN GERENCIA EN SALUD

LEONARDO RONYALD ROJAS MEZARINA

LIMA – PERÚ

2025

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SECRETARIO

DEDICATORIA.

A mis padres por su apoyo constante y amor incondicional.

A Sofía, por ser mi compañera de ruta.

A Camila, por ser el motor de mi vida.

AGRADECIMIENTOS.

A la Unidad de Telesalud de la UNMSM mi más sincero agradecimiento por su valiosa contribución en el desarrollo del proyecto.

FUENTES DE FINANCIAMIENTO.

Financiamiento de CONCYTEC



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RESUMEN

Antecedentes: Durante la pandemia en Perú, el proyecto COVIDA propuso una forma innovadora de proporcionar telemonitoreo y teleorientación a las personas diagnosticadas con COVID-19, realizada por estudiantes de salud voluntarios. Sin embargo, no se ha descrito cómo se percibe esta interacción desde la perspectiva del usuario. **Objetivo:** El objetivo de este estudio es describir la adherencia y percepciones de los usuarios acerca del proyecto COVIDA. **Métodos:** Se realizó un estudio de métodos mixtos para evaluar la adherencia y las percepciones de los usuarios de COVIDA. Esta intervención de telesalud, implementada en Perú de agosto a diciembre de 2020, involucró llamadas telefónicas diarias realizadas por estudiantes voluntarios para monitorear a los usuarios registrados durante 14 días o hasta que se identificara una señal de advertencia. Los voluntarios también proporcionaron teleorientación para atender las necesidades y preocupaciones de los usuarios. El análisis cuantitativo describió las características de los usuarios y evaluó los factores relacionados con la adherencia al servicio. El análisis cualitativo a través de entrevistas semiestructuradas evaluó las percepciones de los usuarios sobre el servicio. **Resultados:** De los 778 usuarios inscritos en COVIDA, 397 (54.7%) eran mujeres y tenían una edad promedio de 41 años (DE: 15.3). Durante el monitoreo, 380 usuarios (44.4%) desarrollaron síntomas y 471 (55.5%) mostraron señales de advertencia para COVID-19. La mediana general de adherencia fue del 93% (p25: 36%, p75: 100%). Entre aquellos usuarios que no desarrollaron síntomas de advertencia, se observó un alto nivel de adherencia (>66%) predominantemente en usuarios que desarrollaron síntomas y aquellos con una prueba positiva de COVID-19 ($p < 0.05$). Los usuarios mencionaron que la

información proporcionada por los voluntarios era clara y valiosa y que su acompañamiento les proporcionó apoyo emocional. Las comunicaciones a través de llamadas telefónicas se desarrollaron fluidamente sin interrupciones.

Conclusiones: COVIDA representó un modelo alternativo asequible, bien aceptado y percibido para el telemonitoreo, teleorientación y apoyo emocional de estudiantes voluntarios a usuarios con enfermedades como el COVID-19 en un contexto de demanda abrumadora de servicios de salud.

PALABRAS CLAVES

TELEMONITOREO; VOLUNTARIOS; ADHERENCIA; COVID-19; PERÚ

ABSTRACT

Background: During the pandemic in Peru, the COVIDA project proposed an innovative way to provide telemonitoring and teleorientation to COVID-19 pandemics led by health student volunteers. However, it has not been described how this interaction is perceived from the user's perspective. **Objective:** The aim of this study is to describe the adherence and perceptions of users about COVIDA. **Methods:** A mixed-method study was conducted to evaluate the adherence and perceptions of COVIDA users. This telehealth intervention implemented in Peru from August to December 2020 involved daily phone-calls by volunteer students to monitor registered users for 14 days or until a warning sign was identified. The volunteers also provided teleorientation to address the users' needs and concerns. Quantitative analysis described the characteristics of users and assessed the factors related to adherence to the service. Qualitative analysis through semi-structured interviews evaluated the user's perceptions about the service. **Results:** Of the 778 users enrolled in COVIDA, 397 (54.7%) were female and had a mean age of 41 years (SD: 15.3). During the monitoring, 380 users (44.4%) developed symptoms, and 471 (55.5%) showed warning signs for COVID-19. The overall median of adherence was 93% (p25:36%, p75:100%). Among those users who did not develop warning symptoms, a high level of adherence (>66%) was seen predominantly in users that developed symptoms and those with a positive COVID-19 test ($p<0.05$). Users referred that the information provided by volunteers was clear and valuable and, their accompaniment provided them with emotional support. Communications via phone calls were developed fluently without interruptions. **Conclusions:** COVIDA represented an affordable, well-accepted, and perceived alternative

model for telemonitoring, teleorientation and emotional support from student volunteers to users with diseases such as COVID-19 in the context of overwhelmed demand for healthcare services.

KEYWORDS

TELEMONITORING; VOLUNTEERS; ENGAGEMENT; COVID-19; PERU

I. ARTÍCULO PUBLICADO

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JMIR FORMATIVE RESEARCH

Escobar-Agreda et al

Original Paper

Patient Engagement With and Perceptions of the COVIDA Project, a Volunteer-Led Telemonitoring and Teleorientation Service for COVID-19 Community Management: Mixed Methods Study

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Abstract

Background: During the pandemic in Peru, the COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) project proposed an innovative way to provide telemonitoring and teleorientation to COVID-19 patients, led by health care student volunteers. However, it has not been described how this interaction is perceived from the patient's perspective and which factors increase their engagement with this service.

Objective: The aim of this study is to describe the perceptions of patients about COVIDA and identify factors associated with their engagement with this service.

Methods: A mixed methods study was conducted to evaluate perceptions of patients that participated in the COVIDA project. This telehealth intervention organized by the National University of San Marcos was implemented in Peru from August to December 2020. The service involved daily phone calls by volunteer students to monitor registered COVID-19 patients until the completion of the 14th day of the illness or if a warning sign was identified. The volunteers also provided teleorientation to address the patients' needs and concerns. Quantitative analysis was performed to describe the characteristics of the patients and to assess the factors related to their engagement with the service, which was defined by the percentage of participants who completed the follow-up according to their individual schedule. Qualitative analysis through semistructured interviews evaluated the patients' perceptions of the service regarding the aspects of communication, interaction, and technology.

Results: Of the 770 patients enrolled in COVIDA, 422 (55.7%) were female; the median age was 39 (IQR 28-52) years. During the monitoring, 380 patients (49.4%) developed symptoms, and 471 (61.2%) showed warning signs of COVID-19. The overall median for engagement was 93% (IQR 35.7%-100%). Among those patients who did not develop warning signs, engagement was associated with the presence of symptoms (OR 3.04, 95% CI 2.22-4.17), a positive COVID-19 test at the start of follow-up (OR 1.97, 95% CI 1.48-2.61), and the presence of comorbidities (OR 1.83, 95% CI 1.29-2.59). Patients reported that the volunteers

provided clear and valuable information and emotional support. Communication via phone calls took place smoothly and without interruptions.

Conclusions: COVIDA represents a well-accepted and well-perceived alternative model for student volunteers to provide telemonitoring, teleorientation, and emotional support to patients with COVID-19 in the context of overwhelmed demand for health care services. The deployment of this kind of intervention should be prioritized among patients with symptoms and comorbidities, as they show more engagement with these services.

(JMIR Form Res 2024;8:e51237) doi: [10.2196/51237](https://doi.org/10.2196/51237)

KEYWORDS

telemonitoring; volunteers; engagement; COVID-19; Peru; telehealth; perceptions

Introduction

The COVID-19 pandemic has posed a significant public health challenge due to its widespread impact and COVID-19's capacity to lead to severe cases and fatalities in the population [1]. While timely medical care has been shown to prevent such outcomes [2], patients encounter challenges in seeking care due to difficulties in self-monitoring caused by a lack of knowledge of their symptoms and the possibility of developing severe conditions even without symptoms [3].

In this context, telemonitoring has emerged as an essential alternative to facilitate follow-up among patients with COVID-19 using information and communication technology (ICT) [4]. In Peru, one of the countries most affected by this disease worldwide [5], the government implemented some institutional initiatives to promote remote monitoring of these patients [6]. However, despite the high demand for services, the implementation of these interventions was limited by the lack of availability of health workers, for reasons including their loss during the pandemic [7].

Considering the willingness of health sciences students to participate in health interventions using ICT [8] and provide assistance in the context of emergencies [9], the Telehealth Unit of the National University of San Marcos (UNMSM) and the Peruvian National Institute of Health (INS-Peru) collaborated to design and implement the COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) project. This intervention was a telemonitoring and teleorientation service carried out by university student volunteers and supervised by a team of health care professionals [10] that aimed at the prompt identification of severe signs related to COVID-19.

Volunteer-based services for the remote monitoring of patients during the COVID-19 pandemic have been found helpful in the international context [11,12]. However, there is little evidence on this kind of intervention in resource-limited settings [13] or on patients' perspectives and level of engagement with aspects of these services [14] that are crucial to develop sustainable and patient-centered telehealth solutions that met their needs and preferences [15]. This study aims to describe the level of

engagement and patients' perceptions of their participation in a telemonitoring and teleorientation service (the COVIDA project) in Peru.

Methods

Study Design

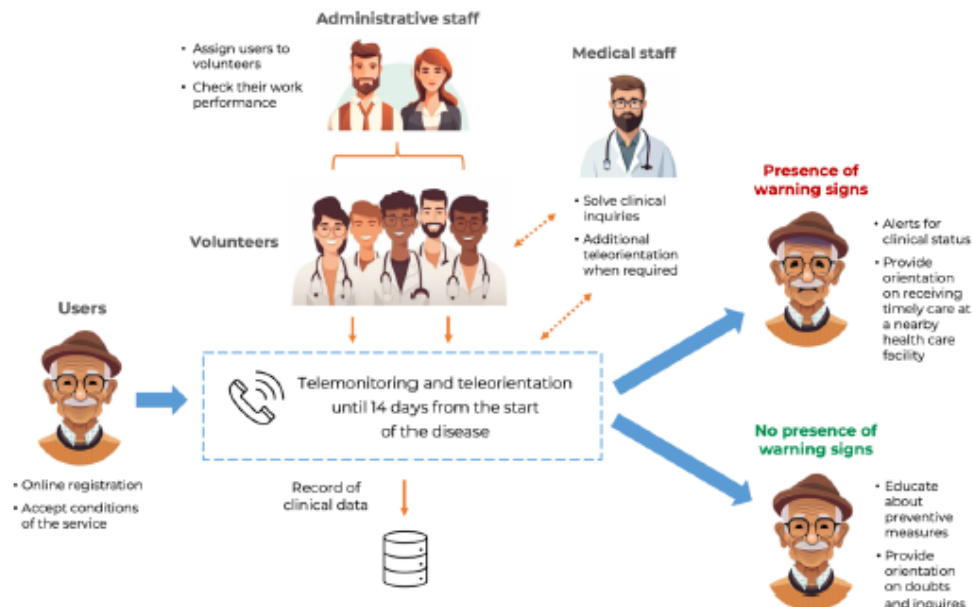
A mixed methods study with an explanatory sequential design was conducted, as is considered best practice in evaluating telehealth interventions [16]. First, a quantitative analysis was performed to gather information on patient characteristics and their level of engagement with the service. Then, a qualitative analysis was conducted to amplify the patient and volunteer experiences, providing deeper insights from the perspectives of both patients and health care providers.

The COVIDA Project

Design and Services

The COVIDA project consisted of a telemonitoring and teleorientation service provided in Peru between September to December 2020 after the end of the first wave of infections of COVID-19 in this country. The telemonitoring component involved daily phone calls to identify those with suspicions of developing severe COVID-19 symptoms based on warning signs, such as shortness of breath, chest pain, persistent fever, cyanosis, or low oxygen saturation levels (less than 93% when the patient had a pulse oximeter), following the World Health Organization guidelines [17]. Sociodemographic and clinical information from participants was registered in online forms using a free software application called KoboCollect (Kobo, Inc). Additionally, volunteers provided teleorientation to educate patients on adopting preventive behaviors, avoiding unsupervised medication, resolving their doubts and misconceptions about COVID-19, and guiding them to seek timely medical care when in the presence of warning signs. This teleorientation was provided via phone calls that were placed during the day according to the patient's availability and were expected to continue until the end of 14 days from the start of their illness, which was determined by the date of symptom onset, a recent positive test result, or the development of a warning sign (Figure 1).

Figure 1. Design of COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) for the telemonitoring and teleorientation of patients with COVID-19 in Peru. Warning signs included shortness of breath, chest pain, persistent fever, cyanosis, or having an oxygen saturation less than 93% (among patients with a pulse oximeter).



Patients, Volunteers, and Support Team

The COVIDA project was designed for adult patients (aged ≥ 18 years) in Peru who had tested positive for COVID-19, had related symptoms of the disease (Multimedia Appendix 1, Table S1), or had close contact with a positive case. The volunteers that provided the service were undergraduate or recent-graduate health students who received training from INS-Peru on essential aspects of COVID-19, communication skills in emergencies, and informatics applications for calls and virtual surveys. Patients and volunteers were recruited through social media, online newspapers, and the websites of UNMSM and INS-Peru [10,18].

Additionally, this intervention included an administrative support team in charge of gathering information on registered patients, assigning them to volunteers according to their availability, and checking their work performance, as well as a medical staff that oversaw inquiries made by the volunteers and provided additional teleorientation to patients with complex cases or when a patient requested (Figure 1).

Variables and Data Collection

For this study, we collected quantitative data from the telemonitoring registers of the COVIDA project provided by UNMSM. We used these data to describe the characteristics of the patients who participated in this service and their level of engagement. The characteristics evaluated included age, sex, region of origin, health insurance, presence of comorbidities, number of days of telemonitoring, development of symptoms, and development of warning signs. We defined the level of

patient engagement as the percentage of days on which the patient was effectively telemonitored according to what was planned for each case (see the Design and Services section).

We also conducted semistructured interviews with patients to explore their experiences and perceptions about their participation in the COVIDA project. The interviews were conducted via phone calls after the conclusion of the service and lasted approximately 10 to 15 minutes. We focused on evaluating 3 main aspects of their experience: communication, interaction, and technological aspects.

Analysis

Quantitative Component

We performed descriptive analyses of the sociodemographic and clinical characteristics of the patients who participated in the COVIDA project. Numerical data were summarized as means and SDs. For categorical data, we used frequencies and proportions. Bivariate analyses were performed to compare the characteristics of patients who developed warning signs with those who did not. We used the χ^2 test or Fisher exact test (if the data did not meet the Cochran criteria) to compare categorical data and a 2-tailed Student *t* test to compare numerical data.

Multivariable analysis was performed to evaluate patient characteristics that were related to higher engagement with the service among patients that did not develop warning signs. Considering that engagement was an outcome that was bound between 0 and 1, a fractional regression model was applied to calculate odds ratio (ORs) with the 95% CI using crude, fully

adjusted, and parsimonious models. Detailed information about these analyses is provided in [Multimedia Appendix 1](#). All analyses were conducted using Stata IC (version 17; StataCorp).

Qualitative Component

Five patients who agreed to interviews were selected. Semistructured interviews were conducted, recorded, transcribed, and compiled into a matrix for further thematic analysis [19].

Ethical Considerations

This study was approved by the Social Security (EsSalud) Institutional Review Board for COVID (ethics certificate 96; June 2020). This study was carried out respecting the Helsinki and Taipei declarations on research principles. The quantitative analysis involved secondary data from the COVIDA project provided by the UNMSM. These data were fully deidentified, ensuring that no personal information could be traced back to any individual and allowing all analyses to be conducted anonymously. For the qualitative component, participants were enrolled after completing an informed consent form, with their information managed confidentially and accessed only by the researchers involved in the study. Participants were informed of the study's purpose, and interviews were scheduled at a time

convenient for them to avoid disrupting their daily or work activities. As a result, no financial compensation was provided.

Results

Quantitative Results

Of the 1794 individuals who initially registered for COVIDA, 670 (37.3%) had a documented history of telemonitoring. In addition, telemonitoring records were identified for 108 patients who were not initially registered in the system. Finally, 8 of them were excluded due to being younger than 18 years, resulting in total cohort of 770 patients included in the analysis. The patients had a median age of 39 (IQR 28-52) years and were monitored for a median of 2 (IQR 1-4) days. A total of 422 (55.7%) were female, 474 (64.2%) were from Lima-Callao (the capital city), 523 (78.5%) reported having some form of health insurance, and 171 (22.2%) reported having at least 1 comorbidity (detailed clinical information is shown in [Multimedia Appendix 1](#), Tables S1 and S2). The characteristics of those that developed and did not develop warning signs during telemonitoring were similar, except for the presence of comorbidities, which was more common in those that developed warning signs ($P<.001$; [Table 1](#)).

Table 1. Characteristics of participants in the COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) project (Peru, 2020) overall and according to the development of warning signs during telemonitoring.

	All patients	With alarm signs	Without alarm signs	P value
Total, n (%)	770 (100)	241 (31.3)	529 (68.7)	.20 ^a
Age (years), median (IQR)	39.0 (28-52)	41.0 (29-51)	38.0 (28-53)	<.001 ^a
Telemonitoring time (days), median (IQR)	2.0 (1-4)	1.0 (1-3)	2.0 (1-4)	
Age categories (years), n (%)				.48 ^b
18-59	650 (86.1)	442 (85.5)	208 (87.4)	
≥60	105 (13.9)	75 (14.5)	30 (12.6)	
Sex				.25 ^b
Male	335 (44.3)	98 (41.2)	237 (45.7)	
Female	422 (55.7)	140 (58.8)	282 (54.3)	
Macroregion of origin, n (%)				.56 ^c
Lima-Callao	474 (64.2)	138 (60.3)	335 (65.8)	
Center	66 (8.9)	22 (9.6)	43 (8.4)	
North	126 (17.1)	47 (20.5)	81 (15.9)	
South	61 (8.3)	19 (8.3)	42 (8.3)	
West	11 (1.5)	3 (1.3)	8 (1.6)	
Health insurance, n (%)				.91 ^b
No	143 (21.5)	44 (21.1)	98 (21.4)	
Yes	523 (78.5)	165 (78.9)	359 (78.6)	
Presence of comorbidities, n (%)				<.001 ^b
No	599 (77.8)	165 (68.5)	434 (82)	
Yes	171 (22.2)	76 (31.5)	95 (18)	

^aMann-Whitney U test.^b χ^2 test.^cFisher exact test.

Patients in the COVIDA project had a median patient engagement of 93% (IQR 36%-100%). Among those who did not develop warning signs, the factors related to a higher engagement with the service were the presence of comorbidities

(OR 1.79, 95% CI 1.27-2.53), having a recent positive test for COVID-19 at registration (OR 1.99, 95% CI 1.51-2.62), or having COVID-19-related symptoms at registration (OR 2.96, 95% CI 2.18-4.01) (Table 2).

Table 2. Relationship of patient engagement (%) and sociodemographic and clinical characteristics among patients who did not develop warning signs during the COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) project.

Characteristics	Patient engagement (%)		
	Crude OR (95% CI)	Model 1 ^a : fully adjusted OR (95% CI)	Model 2: parsimonious OR (95% CI)
Age categories (years)			
18-59	Reference	Reference	— ^b
≥60	0.88 (0.59-1.31)	0.92 (0.65-1.33)	—
Sex			
Male	Reference	Reference	—
Female	1.09 (0.85-1.40)	1.06 (0.80-1.40)	—
Region			
Lima-Callao	Reference	Reference	—
Center	0.54 (0.35-0.84)	0.69 (0.40-1.16)	—
North	0.92 (0.66-1.30)	1.15 (0.79-1.66)	—
South	0.68 (0.43-1.06)	1.33 (0.80-2.22)	—
West	0.61 (0.20-1.84)	0.99 (0.20-4.78)	—
Health insurance			
No	Reference	Reference	—
Yes	1.26 (0.92-1.74)	1.13 (0.81-1.56)	—
Have comorbidities			
No	Reference	Reference	—
Yes	2.22 (1.59-3.10)	1.83 (1.29-2.59)	1.79 (1.27-2.53)
Have positive test at start			
No	Reference	Reference	—
Yes	2.69 (2.09-3.46)	1.97 (1.48-2.61)	1.99 (1.51-2.62)
Have symptoms at start			
No	Reference	Reference	—
Yes	3.13 (2.29-4.27)	3.04 (2.22-4.17)	2.96 (2.18-4.01)

^aModel 1 included covariables based on theoretical background.

^bNot applicable.

Qualitative Results

The following insights stem from a thematic analysis conducted to explore patients' perspectives on various facets of volunteer services. Three main themes emerged, shedding light on the services' communicational, interactive, and technological aspects.

Communicational Aspects: Clarity and Compassion

On the communicational aspects, patients reported that volunteers provided clear information using simple language. In addition, patients highlighted their willingness, kindness, and patience to provide explanations. In some cases, volunteers became emotional companions, offering comfort during anxiety and sadness related to the illness.

The volunteers attend you with patience and kindness, although I asked the same questions, they did not

hesitate to explain you again and nice so that you understand...when I complained that I was worried they were also kind. [Patient 3]

The lady who attended me, apart from worrying about my physical health, listened to me, I think she has been an important support, they were difficult times, and that someone listens to you helps you a lot, so I am grateful. [Patient 2]

Interactive Aspects: Challenges and Misconceptions

The interactive aspects of the service posed some challenges, as some patients needed clarification on whether the volunteer labor was supervised or if the volunteers were doctors. We supposed that these initial misconceptions were barriers to volunteer work.

I knew they were medical students from San Marcos, but I didn't understand how it worked, I think they

are supervised by doctors, but it has been a good service. [Patient 1]

In addition, some patients reported annoyance toward the frequent calls, including those made during nighttime hours, despite having initially agreed to this arrangement. This was more common in those who were asymptomatic or had milder symptoms.

I know they wanted to help us, but sometimes they called you late and asked you the same thing again, that generated a bit of annoyance to me. [Patient 4]

I think that if you were not so serious, they should not call you so much, just every couple of days, because we are also busy or else, they should notify us in advance at what time they would call us. [Patient 5]

Technological Aspects

Finally, regarding the technological aspects, patients did not report any significant issues and stated they communicated smoothly with volunteers without interruptions.

I have been able to communicate fluently with the volunteers, there were no inconveniences in the phone calls. [Patient 2]

Discussion

The COVIDA project, a volunteer-led telemonitoring and teleorientation service for COVID-19 patients, has been met with a positive reception and a high level of patient engagement. A contributing factor to this success appears to be the effective communication between patients and volunteers, facilitated by the simplicity of the technology used, which relied on phone calls. This approach enabled the delivery of consistent monitoring quality to patients regardless of their access to pulse oximeters, as these demand some considerations for their proper use [20] and require internet connectivity, which can be notably limited in countries such as Peru [21], and necessitate proficient use of digital devices [4], a skill that may be lacking due to low digital literacy levels in our population, as observed in older adults [22]. Notably, no technical challenges were reported by any patient involved in our study during the monitoring period.

Another factor that might have contributed to the strong engagement with the COVIDA project is the integration of teleorientation and support alongside telemonitoring. Interviewed patients mentioned that this service offered clear and useful information about COVID-19 and facilitated a space where they felt listened to and received emotional support to encompass challenging times. These aspects could potentially contribute to diminishing the psychological distress experienced by COVID-19 patients, which is often associated with their uncertainty about the illness [23,24]. This finding is consistent with the study of Chakeri et al [25] in 2020, which found that interventions designed to provide information and maintain communication with COVID-19 patients can significantly reduce their levels of stress and anxiety.

None of the sociodemographic characteristics of the patients in our study were related to their level of engagement with the service, which contrasts with other international studies that

observed higher levels of engagement among older adults compared to younger adults. In our country this relationship may be attenuated by the low level of digital literacy of older adults, as discussed previously [22]. On the other hand, patients with clinical characteristics such as the presence of symptoms, comorbidities, and a positive confirmatory test at the start of telemonitoring showed an increased level of engagement. This could be due to the presence of more warning signs in patients with comorbidities. Additionally, a sense of intrusiveness was reported in interviews with asymptomatic patients regarding the daily monitoring schedule, which could increase their probability of dropping out of the service. These findings suggest the need for offering varying schedules for telemonitoring based on patient preferences, focusing more on patients with risk factors or those who are symptomatic. Moreover, complementing remote monitoring with medical devices, when available, could improve engagement among asymptomatic patients or those who may feel annoyed with frequent calls [26].

The involvement of students as volunteers plays a pivotal role in the sustainability of the COVIDA project. Previous studies have shown that students are a valuable asset in community health initiatives due to their willingness to engage in such endeavors [27,28]. During the first year of the COVID-19 pandemic in Peru, the availability of students increased as numerous educational activities in hospitals were suspended due to the high risk of contracting the disease [29]. While other telemonitoring programs have depended exclusively on the participation of health professionals [30], this initiative has shown that, with adequate training and supervision, these activities could be performed by students in health career programs. This approach is particularly significant in contexts where there is a limited availability of human resources for health, such as Peru, which experienced significant disruptions and constraints in the health care workforce during the COVID-19 pandemic [7].

The participation of administrative and clinical staff was another important aspect of the sustainability of the COVIDA project. As the telemonitoring and teleorientation activities were carried out voluntarily by students, the availability of some of them could have been modified or suspended during the intervention, affecting the continuity and quality of the monitoring provided. For this reason, the administrative staff were responsible for assigning patients to the volunteers, confirming their availability daily, and reassigning work to another volunteer if necessary. Additionally, the clinical staff clarified any doubts the volunteers had about using the online tools available in the intervention or aspects of COVID-19. They also provided additional teleorientation to patients with complex cases or to others requiring it. This support was essential to ensure the smooth running of the project and the provision of high-quality monitoring to patients.

This study has some limitations that need to be highlighted. First, there was a high rate of participants with no telemonitoring information among those initially registered. According to the data provided for analysis, some telemonitored patients had no initial registration. This could be due to misregistration of the identification code of patients. In COVIDA, patient

identification codes were the number of their national identification document registered manually on each telemonitoring contact. Using web-based forms specialized for the follow-up of patients could have helped prevent the loss of information in telemonitoring interventions caused by misregistration of identifiers. Despite these limitations, our study demonstrated that the COVIDA project was an affordable and well-accepted initiative in identifying and guiding people suspected of developing severe COVID-19 in Peru. The project was also a sustainable intervention in its context, with an overwhelming demand for attention and limited economic and human resources.

The COVIDA project has presented a promising model for providing telemonitoring and teleorientation services for

COVID-19 that has been well received and is sustainable. Given its characteristics, it could be adapted to monitoring other diseases where a severe or fatal outcome should be prevented in the short term, such as diabetes or hypertension. However, further research is needed to evaluate the clinical effectiveness of such interventions in preventing severe outcomes like hospitalization, intensive care unit admission, and death. Additionally, it is crucial to address scalability issues in future studies to ensure that similar interventions can be implemented on a larger scale and in other settings. Overall, the COVIDA project has demonstrated the potential of telemonitoring and teleorientation in resource-constrained settings and highlights the need for continued research and innovation in this area.

Acknowledgments

The realization of the COVIDA (Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19) project was aided by a research grant provided by the National Council of Science, Technology, and Innovation (FONDECYT-CONCYTEC; resolution No. 037-2020-FONDECYT) and the collaborative participation of researchers from the National University of San Marcos and the Peruvian National Institute of Health. We would like to express our sincere gratitude to all the students and medical professionals who contributed as volunteers in the COVIDA project, providing telemonitoring and teleorientation to participants. Their dedication, hard work, and drive to help others have been instrumental in the success of this intervention.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Supplementary information and Tables S1-S4.
[\[DOCX File, 35 KB-Multimedia Appendix 1\]](#)

References

- Jordan RE, Adab P, Cheng KK. Covid-19: risk factors for severe disease and death. *BMJ*. Mar 26, 2020;368:m1198. [doi: [10.1136/bmj.m1198](#)] [Medline: [32217618](#)]
- Adhikari SP, Meng S, Wu Y, Mao Y, Ye R, Wang Q, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infect Dis Poverty*. Mar 17, 2020;9(1):29. [FREE Full text] [doi: [10.1186/s40249-020-00646-x](#)] [Medline: [32183901](#)]
- Byambasuren O, Cardona M, Bell K, Clark J, McLaws M, Glasziou P. Estimating the extent of asymptomatic COVID-19 and its potential for community transmission: systematic review and meta-analysis. *J Assoc Med Microbiol Infect Dis Can*. Dec 2020;5(4):223-234. [FREE Full text] [doi: [10.3138/jammi-2020-0030](#)] [Medline: [36340059](#)]
- Dauletbaev N, Kuhn S, Holtz S, Waldmann S, Niekrenz L, Müller BS, et al. Implementation and use of mHealth home telemonitoring in adults with acute COVID-19 infection: a scoping review protocol. *BMJ Open*. Sep 27, 2021;11(9):e053819. [FREE Full text] [doi: [10.1136/bmjopen-2021-053819](#)] [Medline: [34580103](#)]
- Ministerio de COVID-19 - Crisis del coronavirus. Ministerio de Sanidad, CSSE (JHU). 2021. URL: <https://datosmacro.expansion.com/otros/coronavirus> [accessed 2024-08-20]
- Má-Cárdenas LF, Tellez-Gutierrez C, Carrasco-Buitrón A, Inglis-Cornejo AC, Romero-Arzapalo M, López-Artica C, et al. Telemonitoreo y teleorientación desarrollados por el Ministerio de Salud del Perú en tiempos de pandemia por COVID 19. *An Fac Med*. Jul 13, 2021;82(1):85-86. [doi: [10.15381/anales.v82i1.20783](#)]
- Murillo-Peña J, Mendoza-Arana P, Rojas-Mezarina L, Huamán-Angulo L, Peralta-Quispe F, Riega-López P. Changes in the density of human resources in health during the COVID-19 epidemic in Peru, April - August 2020. *An Fac Med*. 2021;82(1):5-12. [FREE Full text] [doi: [10.15381/anales.v82i1.20822](#)]
- Chahuara Rojas ME, Placencia Medina MD, Vargas Herrera J, Silva Valencia J, Ruiz Masa JC, Rojas-Mezarina L. Implementation of telemedicine in rural and marginal areas of Peru: knowledge, interest and perceptions of newly graduated young doctors who are performing the rural and urban margin health care service. In: *Memorias de la Décima Octava Conferencia Iberoamericana en Sistemas, Cibernética e Informática: CISC 2019*. Winter Garden, FL. International Institute of Informatics and Systemics; Jan 2019:80-84.

9. Huapaya JA, Maquera-Afaray J, García PJ, Cárcamo C, Cieza JA. [Knowledge, practices and attitudes toward volunteer work in an influenza pandemic: cross-sectional study with Peruvian medical students]. *Medwave*. May 08, 2015;15(4):e6136-e6136. [doi: [10.5867/medwave.2015.04.6136](https://doi.org/10.5867/medwave.2015.04.6136)] [Medline: [26010125](#)]
10. UNMSM e INS participan en Proyecto COVIDA para detectar casos comunitarios graves de coronavirus. Instituto Nacional de Salud - INS. Apr 2020. URL: https://cdn.www.gob.pe/uploads/document/file/1201039/BOLETIN_ABRIL_2020_TERMINADO.pdf [accessed 2024-08-30]
11. Wong GJ, Douglas K, Fuest S, McDonnell PJ, Forget N. COVID-19 home monitoring: an institutional approach to bridging care during a pandemic. *Telemed J E Health*. Jul 2022;28(7):1044-1049. [doi: [10.1089/tmj.2021.0317](https://doi.org/10.1089/tmj.2021.0317)] [Medline: [35012381](#)]
12. Akama-Garren E, Shah S, Zinzuwadia A, Bartuska A, Hashimoto M, Chu J, et al. Outcomes of a student-led telemedicine clinic in response to COVID-19. *J Ambul Care Manage*. 2021;44(3):197-206. [FREE Full text] [doi: [10.1097/JAC.0000000000000380](https://doi.org/10.1097/JAC.0000000000000380)] [Medline: [34016847](#)]
13. D'Souza K, Singh S, Westgard C, Barnhardt S. A qualitative assessment of barriers and facilitators of telemedicine volunteerism during the COVID-19 pandemic in India. *Hum Resour Health*. Mar 22, 2024;22(1):21. [FREE Full text] [doi: [10.1186/s12960-024-00897-x](https://doi.org/10.1186/s12960-024-00897-x)] [Medline: [38520012](#)]
14. Kirkland E, Schumann SO, Schreiner A, Heinkelman M, Zhang J, Marsden J, et al. Patient demographics and clinic type are associated with patient engagement within a remote monitoring program. *Telemed J E Health*. Aug 2021;27(8):843-850. [FREE Full text] [doi: [10.1089/tmj.2020.0535](https://doi.org/10.1089/tmj.2020.0535)] [Medline: [34115942](#)]
15. Madanian S, Nakarada-Kordic I, Reay S, Chetty T. Patients' perspectives on digital health tools. *PEC Innov*. Dec 2023;2:100171. [FREE Full text] [doi: [10.1016/j.pecinn.2023.100171](https://doi.org/10.1016/j.pecinn.2023.100171)] [Medline: [37384154](#)]
16. Caffery LJ, Martin-Khan M, Wade V. Mixed methods for telehealth research. *J Telemed Telecare*. Oct 2017;23(9):764-769. [doi: [10.1177/1357633X16665684](https://doi.org/10.1177/1357633X16665684)] [Medline: [27591744](#)]
17. Early warning signs/indicators for severe COVID-19: based on information as at 19 August 2020. World Health Organization. Regional Office for Africa. 2020. URL: <https://apps.who.int/iris/handle/10665/334018> [accessed 2024-08-19]
18. Facultad de Medicina UNMSM. Convocamos a los estudiantes de ciencias de la salud (internos y estudiantes de últimos años) a participar en el Proyecto COVIDA. X; Jun 19, 2020. URL: <https://x.com/MedicinaUNMSM/status/1274060799754076160> [accessed 2024-08-19]
19. Campbell K, Orr E, Durepos P, Nguyen L, Li L, Whitmore C, et al. Reflexive thematic analysis for applied qualitative health research. *Qual Rep*. Jun 20, 2021;26(6):2011-2028. [doi: [10.46743/2160-3715/2021.5010](https://doi.org/10.46743/2160-3715/2021.5010)]
20. Luks AM, Swenson ER. Pulse oximetry for monitoring patients with COVID-19 at home. Potential pitfalls and practical guidance. *Ann Am Thorac Soc*. Sep 2020;17(9):1040-1046. [FREE Full text] [doi: [10.1513/AnnalsATS.202005-418FR](https://doi.org/10.1513/AnnalsATS.202005-418FR)] [Medline: [32521167](#)]
21. Alvarez-Risco A, Del-Aguila-Arcentales S, Yáñez JA. Telemedicine in Peru as a result of the COVID-19 pandemic: perspective from a country with limited internet access. *Am J Trop Med Hyg*. May 17, 2021;105(1):6-11. [FREE Full text] [doi: [10.4269/ajtmh.21-0255](https://doi.org/10.4269/ajtmh.21-0255)] [Medline: [33999847](#)]
22. Flores Cabello LM. La alfabetización digital en el público adulto mayor. Un acercamiento desde la comunicación de las relaciones públicas en Perú. *ComHumanitas*. Sep 25, 2020;11(2):65-80. [doi: [10.31207/RCH.V11I2.239](https://doi.org/10.31207/RCH.V11I2.239)]
23. Guo Q, Zheng Y, Shi J, Wang J, Li G, Li C, et al. Immediate psychological distress in quarantined patients with COVID-19 and its association with peripheral inflammation: a mixed-method study. *Brain Behav Immun*. Aug 2020;88:17-27. [FREE Full text] [doi: [10.1016/j.bbi.2020.05.038](https://doi.org/10.1016/j.bbi.2020.05.038)] [Medline: [32416290](#)]
24. Park H, Lee N, Lee J, Lee D, Kim K, Kim H, et al. Stress experience of COVID-19 patients as reported by psychological supporters in South Korea: a qualitative study. *Front Psychiatry*. 2022;13:834965. [FREE Full text] [doi: [10.3389/fpsyg.2022.834965](https://doi.org/10.3389/fpsyg.2022.834965)] [Medline: [35422718](#)]
25. Chakeri A, Jalali E, Ghadi M, Mohamadi M. Evaluating the effect of nurse-led telephone follow-ups (tele-nursing) on the anxiety levels in people with coronavirus. *J Family Med Prim Care*. Oct 2020;9(10):5351-5354. [FREE Full text] [doi: [10.4103/jfmpc.jfmpc_847_20](https://doi.org/10.4103/jfmpc.jfmpc_847_20)] [Medline: [33409214](#)]
26. Parretti C, Tartaglia R, La Regina M, Vennari F, Sbrana G, Mandò M, et al. Improved FMEA methods for proactive health care risk assessment of the effectiveness and efficiency of COVID-19 remote patient telemonitoring. *Am J Med Qual*. 2022;37(6):535-544. [FREE Full text] [doi: [10.1097/TMQ.000000000000089](https://doi.org/10.1097/TMQ.000000000000089)] [Medline: [36250651](#)]
27. Buckland R. Medical student volunteering during COVID-19: lessons for future interprofessional practice. *J Interprof Care*. 2020;34(5):679-681. [doi: [10.1080/13561820.2020.1822790](https://doi.org/10.1080/13561820.2020.1822790)] [Medline: [32962471](#)]
28. McKinnon T, Watson A, Richards L, Sears J, Brookes MJ, Green CA. The Volunteers in Research programme: supporting COVID-19 research and improving medical training in parallel. *Clin Med (Lond)*. May 2021;21(3):182-188. [FREE Full text] [doi: [10.7861/clinmed.2020-1072](https://doi.org/10.7861/clinmed.2020-1072)] [Medline: [34001569](#)]
29. Albitres-Flores L, Pisfil-Farroñay YA, Guillen-Macedo K, Niño-García R, Alarcon-Ruiz CA. Interns' perceptions about the medical internship suspension during the COVID-19 quarantine. *Rev Peru Med Exp Salud Publica*. Dec 02, 2020;37(3):504-509. [doi: [10.17843/rpmesp.2020.373.5729](https://doi.org/10.17843/rpmesp.2020.373.5729)] [Medline: [33295553](#)]
30. Martínez-García M, Bal-Alvarado M, Santos Guerra F, Ares-Rico R, Suárez-Gil R, Rodríguez-Álvarez A, en nombre del Equipo de Seguimiento Compartido TELEA-COVID Lugo, et al. Equipo TELEA COVID-19 (Lugo). [Monitoring of

COVID-19 patients by telemedicine with telemonitoring]. *Rev Clin Esp.* Nov 2020;220(8):472-479. [FREE Full text] [doi: 10.1016/j.rce.2020.05.013] [Medline: 33994572]

Abbreviations

COVIDA: Collaboration Network of Volunteer Brigade Members for the Investigation, Detection, and Primary Management of Community Cases Affected by COVID-19

ICT: information and communication technology

INS-Peru: Peruvian National Institute of Health

UNMSM: National University of San Marcos

Edited by A Mavragani; submitted 26.07.23; peer-reviewed by V Chongsuvivatwong, T Karhula, P Kumwichee; comments to author 26.11.23; revised version received 05.02.24; accepted 04.04.24; published 13.09.24

Please cite as:

Escobar-Agreda S, Silva-Valencia J, Soto-Becerra P, Reategui-Rivera CM, De la Cruz-Torraiva K, Chahuara-Rojas M, Hernandez-Iriarte B, Espinoza-Herrera DH, Delgado CA, Matassini S, Vargas-Herrera J, Rojas-Mezarina L

Patient Engagement With and Perceptions of the COVIDA Project, a Volunteer-Led Telemonitoring and Teleorientation Service for

COVID-19 Community Management: Mixed Methods Study

JMIR Form Res 2024;8:e51237

URL: <https://formative.jmir.org/2024/1/e51237>

doi: 10.2196/51237

PMID:

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II. DISCUSIÓN

El proyecto COVIDA se implementa gracias al financiamiento que el Consejo Nacional de Ciencia, Tecnología e Innovación (Concytec) otorgó por concurso a los proyectos destinados a incrementar la generación de nuevo conocimiento científico, desarrollo, innovación y/o adaptación de tecnologías, productos, mecanismos o servicios, que respondan a las nuevas necesidades como consecuencia de la pandemia del Coronavirus COVID-19 en el Perú [1]. Este proyecto se trata de un servicio de telemonitoreo y teleorientación que se ofreció entre septiembre y diciembre del año 2020 terminando la primera ola de contagios de COVID-19. El aspecto de telemonitoreo se trató de llamadas telefónicas diarias para identificar a las personas sospechosas de desarrollar síntomas graves de COVID-19 en función de los signos que tuviera la persona, como dificultad para respirar, dolor en el pecho, fiebre persistente, cianosis o niveles bajos de saturación de oxígeno (menos del 93% cuando la persona tuviera un oxímetro de pulso), siguiendo las directrices de la Organización Mundial de la Salud [2]. La teleorientación se realizó con el objetivo de educar a los pacientes sobre la adopción de comportamientos preventivos, evitar la medicación sin supervisión, resolver sus dudas y conceptos erróneos sobre el COVID-19 y guiarlos para que busquen atención médica oportuna cuando estén en presencia de signos de alarma. Esta teleorientación se proporcionó a través de llamadas telefónicas que se realizaron durante el día de acuerdo con la disponibilidad del paciente y se esperaba que continuaran hasta el final de los 14 días desde el inicio de su enfermedad, que estaba determinada por la fecha de inicio de los síntomas, un resultado positivo reciente de la prueba o el desarrollo de una señal de advertencia. Asimismo, la información sociodemográfica y clínica de los participantes al programa se registró en

formularios en línea utilizando una aplicación de software libre llamada KoboCollect (Kobo, Inc.). Cabe resaltar que las actividades de difusión como la organización y capacitación de los voluntarios se realizaron de manera virtual y a distancia dado el contexto de aislamiento social obligatorio en el país debido a la pandemia [3].

A nivel internacional, se han reportado experiencias de intervenciones de telemonitoreo para pacientes con COVID-19, enfocadas en identificar el agravamiento de la enfermedad y facilitar su manejo adecuado y oportuno. A diferencia del diseño implementado en el proyecto COVIDA, estas intervenciones se han basado principalmente en la participación de profesionales de la salud en entornos hospitalarios, particularmente en establecimientos del segundo nivel de atención [4]. Además, varios de estos modelos han integrado el uso de tecnologías complementarias, como dispositivos para el monitoreo remoto de oxígeno [5] y aplicaciones móviles para el registro de datos de pacientes [6].

El proyecto desarrolló un modelo con la combinación de telemonitoreo y teleorientación con la participación de estudiantes de ciencias de la salud con un enfoque colaborativo para abordar la demanda de atención durante la pandemia. Este modelo no solo proporcionó una respuesta efectiva a corto plazo, sino que también es aplicable a largo plazo en el manejo de enfermedades crónicas como la diabetes o hipertensión. Al combinar el monitoreo clínico con la educación y el apoyo emocional, se fortaleció el compromiso de los pacientes, especialmente aquellos con comorbilidades.

En el proyecto COVIDA, la participación de estudiantes voluntarios y el uso de llamadas telefónicas permitieron implementar este servicio de manera efectiva en

un contexto marcado por la limitada disponibilidad de personal de salud y el acceso restringido a tecnologías en países como el Perú. Iniciativas similares que involucran a estudiantes voluntarios también han demostrado ser útiles en otros contextos a nivel internacional [7], lo que refuerza la viabilidad y pertinencia de estos modelos de atención durante emergencias sanitarias, como la pandemia de COVID-19.

El uso de herramientas informáticas como KoboCollect® facilitó la recopilación de datos, pero se observó que la falta de acceso a dispositivos médicos como oxímetros y la baja alfabetización digital en áreas rurales limitó la efectividad del monitoreo remoto. La implementación de tecnologías más avanzadas, como aplicaciones móviles conectadas a dispositivos médicos, podría mejorar la precisión del monitoreo y reducir la dependencia de la intervención humana. Integrar sistemas de identificación automatizados evitaría errores en la recolección de datos, un desafío recurrente [8].

Durante la intervención se evidenció un alto nivel de adherencia y no se reportaron problemas asociados con aspectos tecnológicos como falta de acceso telefónico o problemas de comunicación vía telefónica por problemas de alfabetización digital. Sin embargo, cabe recalcar que la mayoría de los usuarios inscritos al servicio provenían de zonas urbanas, donde la intervención fue promocionada principalmente a través de internet mediante la página web del INS. Esta concentración en áreas urbanas plantea un reto significativo para la escalabilidad de este tipo de servicios de telesalud en zonas rurales y remotas, donde el acceso a tecnologías e internet es aún más limitado [9]. Aun así, el uso de tecnologías

simples, como las llamadas telefónicas, representa una alternativa viable para extender estos servicios a sectores con menos recursos.

Si bien los voluntarios desempeñaron un papel clave en la ejecución del proyecto, depender exclusivamente de ellos podría no ser sostenible. Un enfoque más robusto implicaría la creación de un cuerpo permanente de telemonitoreo supervisado por profesionales de la salud, complementado con voluntarios capacitados. La variabilidad en el compromiso de los estudiantes voluntarios, especialmente cuando la pandemia disminuyó, afectó la continuidad del monitoreo, lo que subraya la necesidad de una gestión eficiente y supervisión continua [10].

La teleorientación no solo brindó información médica, sino que también jugó un papel fundamental en la reducción de la ansiedad y el estrés de los pacientes, lo cual es especialmente relevante en contextos de incertidumbre como una pandemia. Este componente emocional fue crucial para mejorar la experiencia del paciente y contribuyó significativamente al alto nivel de compromiso observado. Incluir estrategias de apoyo emocional en futuros programas de telemonitoreo puede mejorar aún más los resultados clínicos y la satisfacción del paciente [11].

Una de las principales limitaciones de la intervención fue la dependencia de la disponibilidad y participación de voluntarios, lo que representa un desafío para la sostenibilidad y escalabilidad a largo plazo. En el Perú la participación de estudiantes se vio facilitada por una suspensión de sus actividades académicas [12], sin embargo, esta situación podría verse afectada por factores externos, como la carga académica o disponibilidad de tiempo, lo que hace difícil garantizar la continuidad del modelo en contextos similares. Además, el contexto de la intervención estuvo marcado por un acceso limitado a tecnologías avanzadas, lo

que restringió la posibilidad de implementar dispositivos de alta precisión, como pulsioxímetros, o aplicaciones móviles integradas con sistemas de registro médico. Estas tecnologías podrían haber optimizado el monitoreo en tiempo real y permitido alertas tempranas, mejorando así la calidad de la atención [13].

Una limitación estructural crítica en el contexto peruano que guarda relación con la integración y escalabilidad de nuestra intervención es la falta de un sistema interoperable que permita la integración masiva de la historia clínica electrónica a nivel nacional. A pesar de los esfuerzos normativos realizados en los últimos años [14], el país enfrenta desafíos significativos para consolidar un sistema de salud digital que centralice la información de los pacientes y permita su integración con soluciones tecnológicas, como los sistemas de telemonitoreo como el propuesto en el proyecto COVIDA. La interoperabilidad resulta clave para garantizar que la información esté disponible en tiempo real, lo cual incrementaría la eficiencia y la precisión de las intervenciones en telesalud [15].

Asimismo, es imperativo abordar las brechas en infraestructura digital y conectividad, especialmente en zonas rurales y remotas, donde estas carencias limitan el acceso a servicios de telesalud. Sin mejoras en este ámbito, existe el riesgo de agravar las inequidades en salud, beneficiando únicamente a aquellos con acceso a la tecnología y excluyendo a las poblaciones más vulnerables [16].

En ese sentido, las políticas de salud pública deben priorizar la inversión en infraestructura tecnológica, la implementación de sistemas interoperables de información en salud y el desarrollo de soluciones digitales integradas. Además, futuros estudios deberían enfocarse en evaluar el impacto a largo plazo de estas intervenciones, analizando no solo su efectividad y accesibilidad, sino también su

sostenibilidad. De esta manera, se contribuiría a reducir las desigualdades en salud y fortalecer la atención primaria en el país, garantizando que modelos como el del proyecto COVIDA puedan replicarse con éxito en contextos de recursos limitados.

No obstante, el estudio presenta importantes fortalezas, entre ellas su enfoque colaborativo, que permitió involucrar a estudiantes voluntarios en un rol activo de apoyo a los pacientes durante una situación de emergencia sanitaria. Esta participación no solo fue efectiva, sino que también demostró la voluntad de los estudiantes de contribuir a mitigar la limitada disponibilidad de personal de salud, algo que ya se había observado previamente en contextos de epidemias en el Perú [17]. Además, el uso de métodos mixtos en el análisis constituye un aporte significativo, ya que permitió integrar datos cuantitativos y cualitativos, brindando una comprensión profunda y holística del impacto de la intervención y de la experiencia de los pacientes. Este enfoque es particularmente relevante en el estudio de intervenciones de telesalud, dada su complejidad y la necesidad de analizar tanto los resultados en salud como las percepciones de los beneficiarios [18].

La interoperabilidad limitada entre los sistemas de salud y las plataformas tecnológicas fue una barrera para un seguimiento eficiente de los pacientes. Implementar sistemas de integración más robustos permitiría un monitoreo más preciso y evitaría la pérdida de datos [19]. La falta de personal médico para complementar el trabajo de los voluntarios también fue un obstáculo, especialmente en áreas con menos recursos sanitarios. Además, en algunas regiones donde ya existían sistemas de telemonitoreo, la colaboración no fue tan efectiva, lo que plantea la necesidad de una mayor coordinación con las redes de salud locales.

El proyecto COVIDA, además, proporcionó a los pacientes un espacio para expresar sus inquietudes y recibir apoyo emocional, ayudándoles a sobrellevar momentos difíciles. Este respaldo emocional puede analizarse a través de marcos teóricos como el Modelo de Creencias en Salud (HBM), que destaca cómo la intervención pudo mejorar la autoeficacia de los pacientes y reducir la incertidumbre, fortaleciendo su adherencia a las recomendaciones dadas por los voluntarios y su participación dentro del servicio [20]. Asimismo, la Teoría del Apoyo Social subraya la importancia del acompañamiento emocional e informativo brindado, mitigando el malestar psicológico y reduciendo el estrés asociado a la enfermedad [21]. Desde la Teoría del Autocuidado de Orem, esta intervención facilitó que los pacientes fortalecieran su capacidad de autocuidado con el apoyo externo necesario proveniente de los voluntarios, mientras que la Teoría de la Comunicación en la Atención en Salud respalda cómo la comunicación empática establecida a través de las llamadas telefónicas facilitó la expresión de dudas y mejoró el seguimiento de las indicaciones brindadas [22].

En conclusión, el Proyecto COVIDA demostró ser un modelo eficaz de telemonitoreo y teleorientación, con potencial para replicarse en el manejo de enfermedades crónicas y otras emergencias sanitarias. Para garantizar su viabilidad a largo plazo, es fundamental integrar tecnologías más avanzadas y crear estructuras permanentes que aseguren la continuidad de la atención, independientemente de la disponibilidad de voluntarios. Las lecciones aprendidas pueden ser aplicadas en contextos de recursos limitados, mejorando la equidad y calidad en el acceso a la salud.

III. REFERENCIAS BIBLIOGRÁFICAS

1. Degc. Proyectos Especiales: Modalidad - Necesidades Emergentes al COVID-19 2020-02 - COVID-19 CONCYTEC [Internet]. Gob.pe. COVID-19 CONCYTEC; 2020 [citado el 16 de septiembre de 2024]. Disponible en: <http://covid19.concytec.gob.pe/index.php/oportunidades-fondos-nacionales/item/46-proyectos-especiales-modalidad-necesidades-emergentes-al-covid-19-2020-02>
2. World Health Organization. Regional Office for Africa. Early warning Signs/indicators for severe COVID-19: based on information as at 19 August 2020 [Internet]. World Health Organization. Regional Office for Africa; 2020 [citado el 16 de septiembre de 2024]. Report No.: WHO/AF/ARD/DAK/13/2020. Disponible en: <https://apps.who.int/iris/handle/10665/334018>
3. UNMSM e INS participarán en Proyecto COVIDA para detectar casos comunitarios graves de coronavirus. Instituto Nacional de Salud - INS. Abr 2020. URL: https://cdn.www.gob.pe/uploads/document/file/1201039/BOLETIN_ABRIL_2020_TERMINADO.pdf [citado el 16 de septiembre de 2024]
4. Remote home monitoring (virtual wards) for confirmed or suspected COVID-19 patients: a rapid systematic review. Vindrola-Padros, Cecilia et al. eClinicalMedicine, Volume 37, 100965
5. Greenhalgh T, Knight M, Inada-Kim M, Fulop N J, Leach J, Vindrola-Padros C et al. Remote management of covid-19 using home pulse

- oximetry and virtual ward support *BMJ* 2021; 372 :n677 doi:10.1136/bmj.n677
6. Dauletbaev N, Kuhn S, Holtz S, et al Implementation and use of mHealth home telemonitoring in adults with acute COVID-19 infection: a scoping review protocol *BMJ Open* 2021;11:e053819. doi: 10.1136/bmjopen-2021-053819.
 7. Wong GJ, Douglas K, Fuest S, McDonnell PJ, Forget N. COVID-19 home monitoring: An institutional approach to bridging care during a pandemic. *Telemed J E Health*. 2022;28(7):100890. doi:10.1089/tmj.2021.0317
 8. Patnaik S, Brunskill E, Thies W. Evaluating the accuracy of data collection on mobile phones: A study of forms, SMS, and voice. En: 2009 International Conference on Information and Communication Technologies and Development (ICTD) [Internet]. 2009 [citado el 27 de septiembre de 2024]. p. 74–84. Disponible en: <https://ieeexplore.ieee.org/document/5426700>
 9. Gurupur VP, Miao Z. A brief analysis of challenges in implementing telehealth in a rural setting. *Mhealth*. 2022 Apr 20;8:17. doi: 10.21037/mhealth-21-38. PMID: 35449506; PMCID: PMC9014233.
 10. AlOmar RS, AlShamlan NA, AlAmer NA, Aldulijan F, AlMuhaidib S, Almukhadhib O, et al. What are the barriers and facilitators of volunteering among healthcare students during the COVID-19 pandemic? A Saudi-based cross-sectional study. *BMJ Open*. el 1 de febrero de 2021;11(2):e042910.

11. Andersen TO, Andersen PRD, Kornum AC, Larsen TM. Understanding patient experience: a deployment study in cardiac remote monitoring. En: Proceedings of the 11th EAI International Conference on Pervasive Computing Technologies for Healthcare [Internet]. New York, NY, USA: Association for Computing Machinery; 2017 [citado el 27 de septiembre de 2024]. p. 221–30. (PervasiveHealth '17). Disponible en: <https://dl.acm.org/doi/10.1145/3154862.3154868>
12. Albitres-Flores L, Pisfil-Farroñay YA, Guillen-Macedo K, Niño-García R, Alarcon-Ruiz CA. Interns' perceptions about the medical internship suspension during the COVID-19 quarantine. *Rev Peru Med Exp Salud Publica*. 2020 Dec 2;37(3):504-509. Spanish, English. doi: 10.17843/rpmesp.2020.373.5729. PMID: 33295553.
13. Smit K, Venekamp RP, Geersing GJ, Rutten FH, Schoonhoven L, Zwart DL. Patients' and GPs' views and expectations of home monitoring with a pulse oximeter: a mixed-methods process evaluation of a pilot randomised controlled trial. *Br J Gen Pract*. 2023;73(737):e894-e902. doi:10.3399/BJGP.2023.0139.
14. Rojas Mezarina L, Cedamano Medina CA, Vargas Herrera J. Registro Nacional De Historias Clínicas Electrónicas en Perú [carta]. *Rev Peru Med Exp Salud Publica*. 2015;32(2):395-6.
15. Bautista Altamirano CH. LA TELESALUD EN PERÚ. DIAGNÓSTICO Y PROPUESTAS DE MEJORA. Gob. gest. pública [Internet]. 2022 Sep. 14 [cited 2024 Dec. 23];2(1). Available from:

<https://portalrevistas.aulavirtualusmp.pe/index.php/RevistaGobierno/G/article/view/2302>

16. Haimi, M. The tragic paradoxical effect of telemedicine on healthcare disparities- a time for redemption: a narrative review. BMC Med Inform Decis Mak 23, 95 (2023). <https://doi.org/10.1186/s12911-023-02194-4>
17. Huapaya JA, Maquera-Afaray J, García PJ, Cárcamo C, Cieza JA. Conocimientos, prácticas y actitudes hacia el voluntariado ante una influenza pandémica: estudio transversal con estudiantes de medicina en Perú. Medwave. 2015;15(4):e6136. doi:10.5867/medwave.2015.04.6136.
18. Caffery LJ, Martin-Khan M, Wade V. Mixed methods for telehealth research. Journal of Telemedicine and Telecare. 2017;23(9):764-769. doi:10.1177/1357633X16665684
19. Mucchi L, Jayousi S, Gant A, Paoletti E, Zoppi P. Tele-Monitoring System for Chronic Diseases Management: Requirements and Architecture. Int J Environ Res Public Health. el 13 de julio de 2021;18(14):7459.
20. Becker MH. Historical origins of the Health Belief Model. Health Educ Monogr. 1974;2(4):328-335.
21. Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. Psychological Bulletin, 98(2), 310–357. <https://doi.org/10.1037/0033-2909.98.2.310>
22. Street RL Jr, Makoul G, Arora NK, Epstein RM. How does communication heal? Pathways linking clinician-patient

communication to health outcomes. Patient Educ Couns. 2009
Mar;74(3):295-301. doi: 10.1016/j.pec.2008.11.015. Epub 2009 Jan 15.
PMID: 19150199.

IV. ANEXO (Cuando se trata de un artículo con autor secundario)

Lima, 16 de septiembre del 2024

Universidad Peruana Cayetano Heredia (UPCH)

Estimados miembros de la Unidad de Posgrado,

Mi nombre es Stefan Alexis Escobar Agreda, investigador principal del artículo titulado "Patient Engagement With and Perceptions of the COVIDA Project, a Volunteer-Led Telemonitoring and Teleorientation Service for COVID-19 Community Management in Peru: Mixed Methods Study," publicado en la revista científica *JMIR Formative Research* (<https://formative.jmir.org/2024/1/e51237/>).

Mediante la presente, quiero describir la contribución de Leonardo Ronyald Rojas Mezarina en el desarrollo de este proyecto, la cual se centró en la gestión del equipo de voluntarios, la implementación adecuada de las plataformas tecnológicas utilizadas durante el proyecto, y la interpretación y discusión de los resultados.

De forma específica, la labor de Leonardo incluyó la selección de herramientas tecnológicas que garantizaran tanto la eficiencia operativa de los servicios de telemonitoreo y teleorientación como la seguridad de los datos sensibles de los pacientes. Asimismo, participó activamente en la supervisión del servicio y en asegurar que los voluntarios estuvieran capacitados para cumplir con los protocolos del proyecto. Finalmente, colaboró en la interpretación, revisión crítica y discusión de los resultados, contribuyendo significativamente a la redacción de la versión final del manuscrito publicado.

Agradezco su atención y quedo a su disposición para cualquier consulta adicional.

Atentamente,



Stefan Alexis Escobar Agreda

Investigador Principal

DNI: 