


# Telemedicine as a counselling tool for nurses in Central Africa

María Rodríguez-Ortega<sup>1,2</sup>  | Yolanda Ortega-Latorre<sup>1,2</sup> | Enrique Montano-Navarro<sup>3</sup> | Alfonso Jaime Casado-Collado<sup>4</sup> | François Roger Nguemy<sup>5</sup> | Fleur Damou<sup>6</sup>

<sup>1</sup>San Juan de Dios Foundation, Madrid, Spain

<sup>2</sup>Health Sciences, Department of San Juan de Dios School of Nursing and Physical Therapy, Comillas Pontifical University, Madrid, Spain

<sup>3</sup>Centro de Salud Universitario Pinto, Madrid, Spain

<sup>4</sup>Departamento de Medicina Preventiva, Facultad de Medicina, Universidad Autónoma de Madrid, Madrid, Spain

<sup>5</sup>Hôpital Saint Vincent de Paul de Dschang, Dschang, Cameroon

<sup>6</sup>Centre de Santé Mère Nazaria Ignacia de Oyack, Oyack, Douala, Cameroon

## Correspondence

María Rodríguez-Ortega, School of Nursing and Physical Therapy, Comillas Pontifical University, Avda. San Juan de Dios, 1 -28350 Ciempozuelos, Madrid, Spain.

Email: [mrortega@comillas.edu](mailto:mrortega@comillas.edu)

## Abstract

**Aim:** Compare the use and trend of a telemedicine tool for clinical advice among nurses and other Cameroonian healthcare providers and explore its feasibility and accessibility.

**Design:** A comparative observational descriptive study.

**Methods:** The sample includes all telemedicine users who request advice from volunteer medical specialists in Spain on clinical cases through the telemedicine tool “diagnosis assistance” (DA). It consisted of a total of 296 Cameroonian health professionals (59% women), of whom 77 were nurses. The variables in which the trend was explored (2013–2022) were DAs entered by nurses versus other healthcare professionals, compared by primary specialty, comments and documents attached. Feasibility and accessibility were explored through an anonymous survey.

**Results:** There were 2527 DAs between 2013 and 2022, of which nurses introduced 68%. There is an increasing trend in the nurse/other healthcare providers ratio, with significant differences in the chi-square of the linear trend between 2015 and 2022 ( $\chi^2=395.05$ ;  $df=7$ ;  $p<.001$ ). The probability that a DA was requested by nurses ( $PR>1$ ) was observed in all years except for 2014, 2018 and 2019. The most tele-counselling requested by nurses was in the specialties of internal medicine, obstetrics and gynaecology, and dermatology. The exchange of comments and attachments was mainly conducted among nurses (74.9% and 50.4%, respectively). The users surveyed considered the tool valuable for diagnosis, applicable, with limitations due to cost, Internet quality or lack of time and effective at reducing hospital referrals.

**Conclusions:** Telemedicine for clinical advice has been used mostly and with increasing tendency by nurses, mainly in internal medicine, gynaecology and dermatology, being a useful and feasible resource that can contribute to improving clinical decision-making by African nurses.

**Impact:** The study addressed the problem of the shortage of health professionals in Central Africa and the search for alternatives that facilitate decision-making in this context. Tele-counselling tools through digital platforms that put Spanish specialists in contact with health professionals in Central Africa are mostly used by nurses working in rural health centres with a growing trend in their use. The research allows us to

determine that tele-counselling tools constitute a well-accepted resource, which has a positive impact in environments with a shortage of human health resources, favouring the safety of both the nursing professional, through support in decision-making, and the populations to whom they provide care, who benefit from a multidisciplinary approach to their processes.

**Reporting Method:** The study has adhered to STROBE guidelines.

**Patient or Public Contribution:** No Patient or Public Contribution.

#### KEYWORDS

Cameroon, distance counselling, inequalities in health, international cooperation, nursing, telemedicine

## 1 | INTRODUCTION

The work of nursing professionals has a crucial impact on population health. These professionals constitute the largest workforce for health care worldwide, accounting for two-thirds of the human resources for health (Rosa et al., 2021).

However, official data reveal profound differences between different parts of the world. According to the WHO (World Health Organization, 2023), Cameroon has 1.92 nurse-midwives per 10,000 inhabitants compared to 124.60 in the US in 2020 (63.06 in Spain), with only 3.77% of its GDP allocated to healthcare compared to 18.82% in the US and 10.71% in Spain. Additionally, according to the World Bank (2023), health expenditure financed externally with international support, measured by the external health expenditure per capita (PPP) indicator, is lower in Cameroon than the average for sub-Saharan African countries (excluding high-income countries). This limited dedication of economic and human resources means that the healthy life expectancy at birth (years a person can expect to live in "full health") is 54.5 years, compared to 66.1 years in the US and 72.1 years in Spain.

The shortage of professionals means that nurses staff most healthcare centres in Cameroon. These nurses earn low salaries, work under high pressure to provide care, perform duties that exceed the competencies acquired during their training, and exhibit difficulties in reconciling family and work (World Health Organization, 2020).

According to Saralegui-Gainza et al. (2022), despite the need for an increase of more than 100% of nurses and midwives to meet the population's health needs, in Central Africa, there is either no growth trend or even a decrease in the number of professionals. This fact alerts us to the urgency of seeking measures to contribute to the increase of the nursing workforce in Cameroon, or, failing that, to increase in the short-term efficient strategies to support these professionals based on the self-management of their physical and personal resources as a possible solution to this structural inequity of the system.

## 2 | BACKGROUND

Technology through telemedicine makes it possible to carry out efficient health interventions that contribute to narrowing

### What does this paper contribute to the wider global clinical community?

This work contributes to the global clinical community by providing a telemedicine tool for clinical advice, which helps to improve the quality of care of nursing professionals working in contexts of professional loneliness due to the scarcity of human resources and geographical isolation. It contributes to the search for effective structural solutions to mitigate the shortage of health personnel, particularly nurses, in certain areas of the world. Offering these low-cost, low environmental impact resources in turn contributes to raising awareness of the inequalities in care that exist between different regions of the planet, creating proposals for improvement as a link in the chain that helps to break the circle of ignorance-indifference and promote social change.

health inequalities conditioned by various geopolitical aspects (Broomhead et al., 2021). The great potential of this tool in sub-Saharan Africa is to contribute to mitigating the shortage of human resources through remote assistance, which makes it possible to concentrate the few existing professionals in referral centres serving a large volume of the population (Wamala & Augustine, 2013). Another potential use of this type of assistance in disadvantaged or isolated rural environments is the better management of uncertainty, allowing health personnel to acquire more elements of judgement for making diagnostic and therapeutic decisions through consultation with specialists, avoiding travel or referrals to other care levels. Although local specialists can provide this tele-counselling, it would increase their extensive care burden and could be seen as an additional task (Biruk & Abetu, 2018). This aspect has been considered in specific cross-border projects that seek to link developed countries with Africa through innovative technologies to address unmet needs and generate development (Mars, 2013). These professional synergies allow the exchange of

knowledge between healthcare professionals, through dialogue between experts from different countries.

A meta-analysis published in 2013 (Wamala & Augustine, 2013) reported a growing development of telemedicine in some sub-Saharan African countries. However, a subsequent study (Olufunlayo et al., 2023) rated the maturity of nationally funded telemedicine, as is the case in Nigeria, at a beginner's level, with the onus being on policymakers to advance the implementation and deployment of telemedicine as part of quality digital health care, improve health equity and ensure continuity of healthcare services.

A recent study revealed that, despite the boom in telemedicine during the COVID-19 pandemic, there is unbalanced and fragmented progress in its development in Africa (Dodoo et al., 2022), with an unmistakable regional character, such that countries belonging to the West African region are the main drivers and the central region, the one with the lowest GDP, including Cameroon, are developing slower and have scarce contributions.

In Cameroon, the first records of telemedicine date back to 2004, with pilot experiences using mobile telephony in the field of maternal and child health (Dodoo et al., 2022). However, most reports are based on specific experiences in cardiology (Bediang et al., 2022; Gruber-Mösenbacher et al., 2021), neurology (Sarfo et al., 2017) or wound management (Kingue et al., 2013), with no global or governmental telemedicine programs that have demonstrated their efficacy, as in other African regions (Azevedo et al., 2021).

Among the challenges to developing telemedicine programs in Africa, Dodoo et al. (2022) identifies, after analysing existing studies of the 41 sub-Saharan African countries with digital health strategies, that technological barriers ranging from the provision of tools and infrastructure to adequate connectivity are the main limitations. In this regard, according to Suzuki et al. (2020), an analysis of the economic situation of each region is needed to explore the possibility of efficiently implementing telemedicine in areas of Asia and Africa. Additionally, cultural and legal aspects, mainly related to confidentiality and the treatment of private data, as well as organizational aspects, such as the shortage of personnel and limited local institutional and political support in certain regions, are also limitations. Finally, individual barriers stand out, including experience of technological use, acceptability of the tool or relational differences between professionals. In this regard, multidisciplinary cooperation and consultation of doubt may not be common in rural Africa, since the scarcity of healthcare providers may have limited teamwork or clinical sessions (Mbunge et al., 2022).

Although telemedicine is a broad term that encompasses all health professionals in an interdisciplinary manner, in 2008 (Consejo Internacional de Enfermeras, 2008), the term telenursing was explicitly coined, using technology to strengthen the specific work roles of the nursing profession, such as prevention and health promotion or the control of non-communicable and chronic diseases. Toffoletto and Tello (2020) highlighted the extensive development of telenursing in Europe, the United States, and the Caribbean. However, there are few references mentioning the use of this modality by nurses in Africa beyond small local research. For example, in Uganda, Martin

and Balwanaki (2020) concluded that training in health technology would improve the delivery of high-quality, evidence-based care by nurses, with a direct positive effect on the health status of women, children and communities.

This research seeks to provide evidence of the existing gap in the healthcare work of nurses practising in low-income countries, especially in rural areas, with respect to countries with more resources, highlighting the impact of the scope of their healthcare practice and the leadership that this group acquires in this context.

The objective of this study was to assess the use of a tele-counselling tool for diagnostic assistance by nurses, compared to other health users, and explore its feasibility and accessibility in health centres, clinics and rural hospitals in Cameroon.

The topic addressed in this paper is of international relevance as it opens the door to possible strategies for cross-border collaboration in health, which can contribute to the development of nursing in Africa and other regions of the world with limited health resources.

### 3 | THE STUDY

This work aimed to compare the use and trend of a telemedicine tool for clinical advice among Cameroonian nurses and other healthcare providers adhering to the "Telemedicine: health that connects" program in sub-Saharan Africa. We also sought to explore its feasibility and accessibility to identify possible strategies to contribute to the development of nursing in Africa.

"*Telemedicina sanidad que conecta*" ("Telemedicine: health that connects") (Pérez-Manchón, 2015) is a project launched in 2013 in response to the demand from African healthcare professionals to improve their training to bring greater rigour to the diagnosis and treatment of their patients.

The project is led by a Spanish non-profit organization that, within a framework of international cooperation for development, seeks to respond to the training, diagnostic support and decision-making needs of health professionals working in rural Africa, promoting values such as efficiency, professional solidarity and sustainability of the planet, reducing the harmful effects of pollutants generated during travel and the spread of diseases across borders.

The project is based on the use of an online platform designed by a provider of health technology products, which, as an asynchronous or deferred telemedicine health social network, puts 71 volunteer medical specialists in Spain (e-health volunteers) in contact with 387 African healthcare professionals from five countries (Benin, Burkina Faso, Ivory Coast, Cameroon and the Democratic Republic of Congo). These professionals can select among different specialties (cardiology, surgery, dermatology, endocrinology, gynaecology, laboratory, internal medicine, neurology, dentistry, ophthalmology, otorhinolaryngology, paediatrics, radiology, traumatology and urology) to discuss difficulties in the management of clinical cases, using the Diagnosis Assistance (DA) tool, which facilitates bi-directional interactions through comments and attachments.

Currently, 71 centres are networked, of which three are clinics, 49 are health centres, 16 are hospitals, and three are universities.

## 4 | METHODS

### 4.1 | Study design

A comparative observational descriptive study evaluating the asynchronous interprofessional collaboration between volunteer specialists in Spain and Cameroonian healthcare workers using the Meeting platform from 2013 to 2017 and Sparkspace from 2018 to 2022 was performed.

### 4.2 | Inclusion criteria

The study sample includes all platform users utilizing the DA service requesting advice on clinical cases.

### 4.3 | Measurements

The variables explored in the trend (2013–2022) are DAs entered by nurses versus total DAs. Entries by a primary specialty and the number of comments and files associated with the DA in both groups are also compared.

To explore the trend of DAs introduced by nurses versus those introduced by other healthcare providers, the proportion ratio (PR), equivalent to the relative risk in clinical epidemiology and the proportion difference (PD) per year were calculated.

The feasibility and accessibility of the tool were explored utilizing a survey administered by the non-governmental organization to the nurses in the field who had the highest number of entries on the platform. The anonymously answered survey includes seven indicators related to the tool: difficulties in accessing the program,

time spent (skill), means of connection, centre's commitment to the program, benefits of telemedicine, barriers to the application of the advice received and differences between cases consulted and not consulted. Response to the questionnaire was voluntary, and anonymity was guaranteed through the distribution of an electronic link. The objectives of the study and information on how the responses and other respondent data would be used were attached to the cover letter of the questionnaire. Informed consent was requested separately at the beginning of the questionnaire.

### 4.4 | Ethical aspects

The study is in accordance with the guidelines established in the Code of Good Scientific Practice of the Spanish National Research Council and the ethical principles for medical research involving human subjects of the Declaration of Helsinki. The informed consent of the participants and the commitment to data confidentiality were obtained through a contract created by the Foundation responsible for the Project, which links the Spanish specialist volunteers with the users of the platform in central Africa within the framework of Law 45/2015, of October 14, on Volunteering. The collaboration document requires compliance with the General Data Protection Regulation of the European Union and is kept by the Foundation responsible for the Project. Approval by an ethics committee was not necessary, since the research does not provide direct data on the participants due to the descriptive nature of the study.

## 5 | RESULTS

The DAs introduced by 296 Cameroonian healthcare workers (59% women) participating in the program, including 77 nurses, were analysed.

Figure 1 shows the increasing linear trend of DAs introduced by nurses. As shown in Tables 1 and 2, of the 2527 total DAs, 68%

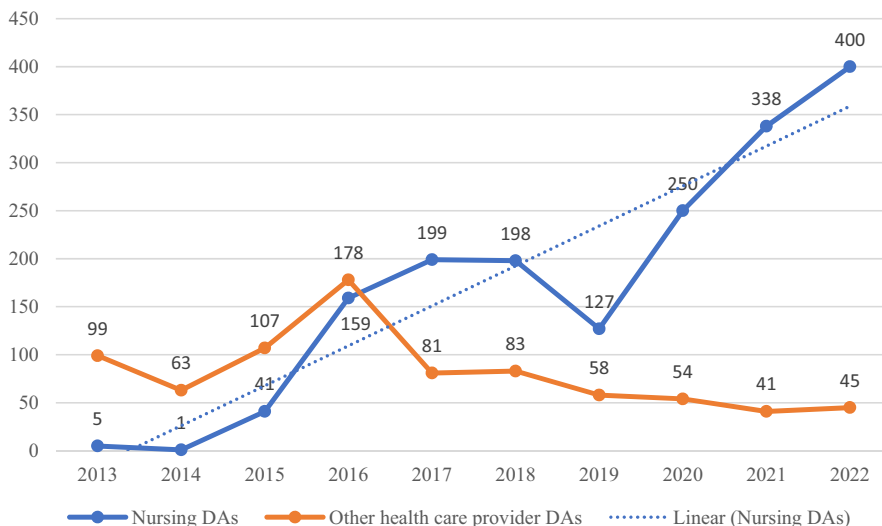


FIGURE 1 Trend in the use of telemedicine.

TABLE 1 Evolutionary comparison of diagnostic assistances introduced by nurses and other healthcare providers.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Nursing DAs	5	1	41	159	199	198	127	250	338	400	1718
Other healthcare provider DAs	99	63	107	178	81	83	58	54	41	45	809
Total DAs	104	64	148	337	280	281	185	304	379	445	2527
% of nursing DAs	4.81	1.56	27.70	47.18	71.07	70.46	68.65	82.24	89.18	89.89	
PR		0.325	17.730	1.703	1.506	0.991	0.974	1.198	1.084	1.008	
PD		-3.250	0.261	0.195	0.239	-0.006	-0.018	0.136	0.069	0.007	

Note: PR (proportion ratio) = % Nursing DA year<sub>n</sub> / % Nursing DA year<sub>n-1</sub>. PD (proportion difference) = PR year<sub>n</sub> / PR year<sub>n-1</sub>.  $\chi^2 = 395.05$ ;  $df = 7$ ;  $p < .001$  (years 2013 and 2022).

Abbreviation: DA, diagnostic assistance.

TABLE 2 Interactions registered in the main specialties and their comparison between nurses/totals.

Medical specialization	DAs		
	Nurses	Total	Percentage of nurses (%)
Internal medicine	330	444	74.32
Obstetrics and gynaecology	294	453	64.90
Dermatology	182	240	75.83
Neurology	167	205	81.46
Paediatrics	162	204	79.41
Other	583	981	59.43
Total	1718	2527	67.99

	Comments associated with DAs			
	Nurses	Total	Percentage of nurses (%)	Comments/DAs per nurse
Internal medicine	1853	2458	75.39	5.6
Obstetrics and gynaecology	1582	2114	74.83	5.4
Neurology	867	1026	84.50	5.2
Dermatology	826	1065	77.56	4.5
Paediatrics	801	946	84.67	4.9
Other	3008	4316	69.69	5.1
Total	8937	11,925	74.94	5.2

	Files associated with DAs			
	Nurses	Total	Percentage of nurses (%)	Files/DAs per nurse
Dermatology	443	602	73.59	2.4
Internal medicine	319	536	59.51	1.0
Obstetrics and gynaecology	314	633	49.61	1.0
Neurology	158	236	66.95	0.9
Paediatrics	133	232	57.33	0.8
Other	754	1966	38.35	1.3
Total	2121	4205	50.44	1.2

were requested by local nurses. The chi-square test comparing DA requests made by nursing professionals and other healthcare professionals from 2015 to 2022 shows statistically significant differences ( $\chi^2 = 395.05$ ;  $df = 7$ ;  $p < .001$ ). Moreover, requests for advice requested by nurses increased annually (PR > 1, positive DP) except in 2014, 2018 and 2019.

The specialties with the most significant tele-counselling demand (Table 2) among nurses are internal medicine (330 DAs), which generates the highest number of associated comments (1853) with a ratio of comments and cases entered by nurses of 5.6, followed by gynaecology and dermatology, which is the specialty in which nurses have exchanged the highest number of attachments (443), with a ratio of files to cases introduced by nurses of 2.4. The use of interactions in the form of cases, comments and attachments is higher among nurses (>50%) in the five main specialties.

The survey on the feasibility and accessibility of the tool was sent to 15 Cameroonian nurses more active in the use of the platform, as they entered 82% of the DAs requested by nurses, being completed by 13 of them (86.6%). As shown in Table 3, the main constraints to the use of the platform were the cost of the Internet (38%), its quality (53%) and lack of time (77%). Most respondents spent less than 60 minutes uploading a case, accessing the platform via cell phone or computer. Sixty-two per cent of respondents report their health centre's commitment to the program. Regarding the benefits of telemedicine, most of the respondents highlighted prevention (69%), diagnosis (77%), treatment (54%) and training (77%). The main barrier to applying the advice received was the patients' lack of return visits. Finally, respondents consider that the tool reduced hospital stay length (54%), transfer to other centres (62%) and patient recovery time (39%) and increased the number of patients in the centre (38%).

## 6 | DISCUSSION

Telemedicine allows the creation of knowledge communities to provide clinical decision support in the context of healthcare profession shortages and loneliness of care (Chukwunke et al., 2017), as in rural African health centres and hospitals where nurses mainly provide care without nearby medical support (Qin et al., 2013; Ruhmel et al., 2022).

TABLE 3 Percentage of responses from health professionals in the field (n = 13).

1. Difficulties in accessing the program				
	None	Some	Many	NA
Internet costs	8	23	38	31
Internet quality	15	31	53	1
Platform complications	54	8	8	30
Attach images	38	15	24	23
Time constraints	8	0	77	15
Ability	54	8	8	30
Willingness/interest	46	16	0	38
2. Time to upload case (dexterity)				
	<30 min	30–60 min	>60 min	
	46	46	8	
3. Connection medium				
	Never	Sometimes	Many times	NA
Smartphone	15	15	69	1
Computer	31	0	54	15
Tablet	62	0	15	23
4. Centre's commitment to the program				
	None	Little	Quite a lot	NA
	15	15	62	8
5. Benefits of telemedicine				
	None	Some	A lot	NA
Prevention	8	16	69	7
Diagnosis	8	8	77	7
Treatment	8	23	54	15
Patient recovery	8	38	31	23
Training	0	16	77	7
6. Barriers to the application of advice				
	Few	Some	A lot	NA
The answers arrive late.	15	54	8	23
The patients do not understand the suggested treatments.	23	31	0	46
Lack of suggested treatments.	54	15	0	31
Lack of suggested diagnostic equipment.	15	55	15	15
The patient does not return for consultation.	8	31	38	23
The patient cannot afford tests/treatments.	15	47	15	23
7. Differences between consulted and non-consulted cases				
	Increased	Decreased	There are none	NA
Length of hospital stay	8	54	8	30
Transfer to other centres	8	62	0	30
Patient recovery time	15	39	8	38
Number of patients in the centre	38	8	8	46

Abbreviation: NA, no answer.

Megbowon and David (2023) determined that Information and Communication Technologies (ICT) are indispensable stimuli for overcoming international health goals in Africa. In their analysis, they found that Cameroon ranks among the African countries with the greatest barriers to health development and a significant gender gap.

This paper analyses the use of a telemedicine platform by health professionals working in rural areas of Cameroon. The historical series analysed shows an increasing trend in the use of telemedicine for tele-counselling by local nurses, which has not been observed among other medical professionals. This increasing use among nurses coincides with the alarming decline of these professionals in the country, reduced to one-fifth since 2004 (Drennan & Ross, 2019; World Health Organization, 2023).

As shown in Figure 1, most active users of the platform, from the point of view of DAs, are nurses (1718), despite constituting only a quarter of the program's healthcare professionals, demonstrating their need for care accompaniment, which can be mitigated by tele-counselling. The platform has been used in health centres/dispensaries and rural hospitals in Cameroon, where health care is provided by nurses and, to a lesser extent, by general practitioners, with private financing and with a significant limitation of diagnostic and therapeutic resources, which sometimes forces patients to be referred with the consequent loss of traceability. The scarcity of the Internet, the low security of the network with respect to patient privacy, the fact that only 5% of consultations are computerized, as well as the limited digital literacy hinder the creation of network communities, having to be stimulated privately by offering connections, devices, training for its use and the link with remote specialists (Abiodun et al., 2020; Fundación Recover, 2022).

This context highlights the need to prioritize investment in these types of resources in support of an Advanced Practice in Nursing or Midwifery, which is being put forward as a proposal to mitigate the shortage of physicians in these rural settings (International Council of Nurses, 2020).

Gray et al. (2024) urge the pursuit of initiatives for greater education, advanced roles and leadership opportunities among nurses. Nurses are responding to shortages by gaining authority to diagnose, prescribe medications, order diagnostic tests and therapeutic interventions, and admit, discharge and refer patients (Ndirangu-Mugo et al., 2024).

In this sense, the tool has been used as a multidisciplinary clinical session between nurses and specialists. Most of the cases introduced by nurses are related to general pathology, generating requests for DAs in the specialty of internal medicine (330). Each clinical case generates a debate (average of more than four comments per case), sharing images and follow-up until resolution. Obstetrics and gynaecology is the specialty that has generated the most total cases (453) and the second most frequently consulted among nurses (Table 2), reflecting the scarce number of these specialists available and the low number of deliveries attended by qualified personnel in Cameroon (World Health Organization, 2023), 69% compared to more than 99% in the USA and Spain. A similar trend



is happening throughout sub-Saharan Africa (Warren et al., 2023). Kimani and Gatimu (2023) found that the lack of investment, training opportunities, heavy workload, burnout, shortage of supplies and emigration are the causes of the shortage of these professionals. Thus, the implementation of effective support systems for nurses and midwives such as regional and international support networks (Cato et al., 2019) through telemedicine has been proposed to improve this situation.

Similarly, the shortage of dermatologists in the region (Mosam & Todd, 2021) dictates that nurses in these settings must attend consultations concerning this specialty. The platform grants local nurses the opportunity to enter images associated with cases, being of particular significance in this specialty based on visual imaging of lesions (Gonçalves-Bradley et al., 2020; Trinidad et al., 2022; Williams & Kovarik, 2018). In this regard, local nurses have been able to widely apply this resource, with dermatology being the specialty in which most attachments have been shared (443 images in 182 dermatological cases entered by nurses).

On the other hand, to make progress in the use of these international collaboration tools, it is necessary to continue to collect information (Khanal et al., 2015) on the experiences developed through informal reports that allow us to evaluate on the ground the use made by nurses and to detect obstacles in their implementation. To this end, several indicators recommended by the Pan American Health Organization (Pan American Health Organization, 2016) were explored through an anonymous survey (Table 3) administered to local nurses who have used the platform the most. The opinion of the healthcare professionals who completed the questionnaire highlights the cost (38%), the Internet quality (53%) and the lack of time (77%) as the main limitations for using the platform.

Promoting the agility of broadband and technological use are significant challenges for developing these projects. In this sense, the responsible organization has progressively increased the technological supply through the provision of digital interfaces, mainly mobile telephony (used by 69% to introduce a DA) and has provided training tools for its efficient use (92% spend less than 1 h to upload a case), which allows speeding up the process and may justify the upward trend in its use (Figure 1).

However, to ensure the program's sustainability, governments and centres must commit to encouraging its use, maintaining its infrastructure and safeguarding the ethical aspects related to the privacy of shared data (Jarva et al., 2024; Marengo et al., 2022). In this sense, the results show that 62% of respondents consider that the directors of their centres are quite committed to the project, which undoubtedly influences the sustainability of the program since institutional support is one of the key factors contributing to its success (Ionescu et al., 2022).

On the other hand, knowing the platform's limitations from the point of view of local healthcare workers is the first step to improving the program. For example, according to the survey, the lack of time is the primary limiting factor for using the platform. These limiting aspects for the use of telemedicine have been objectified in the National Digital Health Strategic Plan of Cameroon,

(Ministry of Public Health of the Republic of Cameroon, 2024), which was implemented in 2020. The plan notes that nurses face intrinsic difficulties in the use of telemedicine due to the qualitative and quantitative shortage of personnel competent in the use of technology, as well as the need to dedicate themselves mainly to their technical work, feeling that ICTs are a complementary burden that takes them away from their main tasks. This plan provides specific measures budgeted until 2024 under the heading "Services and Applications Component" that promote the development of telemedicine as a driver for assisting people living in areas where access to services is limited, as well as for supporting local staff. Recently, the World Bank (2024) has promoted this plan through the Digital Transformation Acceleration Project (PATNuC). These structural measures will undoubtedly boost the development of telemedicine as a tool for strengthening health care in the region. However, it is still necessary to promote its use and guarantee the sustainability of the system. Regarding this point, the organization responsible for the project adds incentives, such as training grants or telemedicine prizes, with the aim of achieving greater adherence of the personnel.

Additionally, the survey allows us to know the opinion of the nurses regarding the specific use of the platform as a tool. Asynchronous work makes the availability of time and dedication of the volunteers in Spain and nurses in Cameroon more flexible. However, it can also influence the fact that more than 50% of the respondents consider that the response arrives late on some or many occasions or that the patient is lost due to not returning to the consultation, which makes us rethink the objectives for improving the program, including aspects related to the awareness of the volunteer to answer more rapidly. Furthermore, those surveyed pointed out the lack of diagnostic (70%) and economic resources (62%) in a mostly private system as occasional or frequent limitations to the applicability of the advice. For this reason, those responsible for the project favour the recognition of the in situ context in which tele-counselling takes place through interprofessional meetings between volunteer specialists in Spain and local nurses to mitigate the barriers to applicability (Fundación Recover, 2022). In addition, the promotion of visits and volunteer work in the field will favour trust between professionals, understanding of the context and orientation of remote assistance. Other measures, such as social service grants provided by the organization to finance care-related expenses, can help nurses use the resource with greater confidence in its effectiveness. Finally, the platform offers the possibility of requesting specific training, an aspect not analysed in this study, which allows for deeper and better management of certain pathologies like the "specialization" of the nursing profession mentioned previously (Gray et al., 2024). This training will help to collect and transmit more information when requesting a DA based on the most complete anamnesis possible and a correct systematic examination, guiding the management of cases toward a more accurate diagnosis and treatment.

Furthermore, exploring the decrease in referrals (62%) and admission times (54%), even if it means an increase in hospitalizations

(38%), demonstrates the tool's profitability, since it could reduce costs and discomfort to the patient by avoiding unnecessary transfers (Gentili et al., 2022) which in turn contributes to environmental sustainability.

Despite the achievements of the telemedicine tool introduced with the efforts of a non-profit organization, the success of these programs will only be viable in the long term if national and international public authorities include telemedicine and tele-counselling in their health policies. Several telemedicine networks such as the RAFT Telemedicine Network (*Réseau en Afrique Francophone pour la Telemedicine*) (Bagayoko et al., 2006) or the Fundamental of Modern Telemedicine for Africa (FOMTA) (Albarrak et al., 2021) aim to connect developing countries with one another and with European countries for distance medical education and teleconsultation. After several decades of development, there are still barriers to implementation, such as the high cost of the systems, especially for rural areas, resistance to change, slow clinical acceptance of telemedicine, lack of availability of ICT infrastructure (Internet connection, high-speed broadband), lack of standards, regulation and accreditation of providers, as well as systems to protect patients and ensure long-term sustainability (Combi et al., 2016; Shibabaw et al., 2024).

A limitation of the study is that, although the survey was answered by the majority of the most active users of the platform, the small sample size does not allow generalizable conclusions to be drawn. More studies using validated surveys and larger samples are needed.

There is also a need for more studies that highlight the loneliness of nursing care in certain regions, as well as the search for and analysis of proposals for improvement through technology as a fundamental strategy to mitigate the current inequity since awareness is a first step to break the circle of ignorance-indifference and promote social change.

## 7 | CONCLUSION

Telemedicine for clinical advice has been used chiefly and with an increasing tendency by nurses, mainly in internal medicine, obstetrics and gynaecology, and dermatology, being a valuable and feasible resource.

Enhancing telemedicine-based support programs contributes to improving nurses' clinical decision-making as part of the possible structural solutions to staffing shortages.

This research provides evidence of the effective use of telemedicine tools by nursing professionals, highlighting their role in facilitating the support of nursing profiles that assume the role of physicians in health centres and rural hospitals, emphasizing the spirit of solidarity and the sense of belonging to a network of local and international professionals, and urges governments in sub-Saharan Africa and the international community to invest in these simple, low-cost and easily implementable tools to strengthen the work of nurses in the context of professional shortages. In addition, an effort is invited

to bring the application of health technologies to the African continent, working to eliminate the barriers that impede their development, with the ultimate goal of ensuring universal quality health coverage and digital security worldwide.

## AUTHOR CONTRIBUTIONS

Conceptualization: MRO, YOL, EMN; Methodology: MRO, YOL, EMN; Software: MRO, YOL, EMN; Validation: MRO, YOL, EMN, AJCC; Formal analysis: MRO, YOL, EMN, AJCC; Investigation: MRO, FRN, FD; Resources: MRO, FRN, FD; Data curation: MRO, FRN, FD; Writing – original draft: MRO, YOL; Writing – Review & Editing: MRO, YOL, EMN; Visualization: MRO, YOL; Supervision: MRO; Project administration: MRO; Funding acquisition: MRO.

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## CONFLICT OF INTEREST STATEMENT

There is no conflict of interests to declare.

## PEER REVIEW

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## STATISTICS

The authors agree to take responsibility for ensuring that the choice of statistical approach is appropriate and is conducted and interpreted correctly as a condition to submit to the Journal.

## ORCID

María Rodríguez Ortega  <https://orcid.org/0000-0002-3721-9626>

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