

Nurses' willingness to resort to telemonitoring in users with chronic conditions: a cross-sectional study

Disposição de enfermeiros para o uso do telemonitoramento em usuários com condições crônicas: estudo transversal

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Submission: 10/21/2022

Approved: 06/19/2023

ABSTRACT

Objective: To verify Primary Care nurses' willingness to resort to Telemonitoring in the follow-up of users with arterial hypertension and/or diabetes mellitus. **Method:** A cross-sectional study conducted with nurses working in the municipalities from the 15th Health Region of Paraná. Of all the 289 individuals invited, 65 answered the online questionnaire made available in May and June 2021 via *Google Forms*. The nurses included were those working in the health units from the 15th Health Region and who answered the questionnaire sent. No exclusion criteria were adopted, even when a nurse left some questions unanswered. Chi-square, Fisher's Exact and Prevalence Ratio tests were used in the analysis. **Results:** An association was observed between less time since graduation and the perception that Telemonitoring without in-person assistance is insufficient to follow up the users; in addition, it was noticed that the Telemonitoring variables favor communication with the patients and can streamline the work performed by the team. More willingness to use Telemonitoring was perceived among those who underwent training. **Conclusion:** The absence of training sessions and the insufficiency of devices and human resources affect and may preclude Telemonitoring.

Descriptors: Primary Health Care; Nurses; Information and Communication Technologies; Chronic Condition.

RESUMO

Objetivo: Verificar a disposição de enfermeiros da Atenção Primária em utilizar o telemonitoramento no acompanhamento de usuários com hipertensão arterial e/ou diabetes mellitus. **Método:** Estudo transversal realizado com enfermeiros atuantes nos municípios da 15^a Regional de Saúde do Paraná. Dos 289 convidados, 65 responderam ao questionário online disponibilizado em maio e junho de 2021 no *Google Forms*. Foram incluídos os enfermeiros que atuavam nas unidades de saúde da 15^a Regional de Saúde e que responderam ao questionário enviado. Não foi adotado nenhum critério de exclusão, mesmo quando o enfermeiro deixava alguma questão em branco. Na análise, foram utilizados os testes Qui-quadrado, Exato de Fisher e Razão de Prevalência. **Resultados:** Entre as variáveis analisadas, observou-se associação entre ter menos idade e menor tempo de formado e a percepção de que o telemonitoramento sem atendimento presencial é insuficiente para acompanhar os usuários, e das variáveis "telemonitoramento favorece a comunicação com o paciente" e "é possível" com "otimiza o trabalho da equipe". E também maior disposição para uso foi observada entre os que receberam capacitação. **Conclusão:** Ausência de capacitações e insuficiência de equipamentos e recursos humanos são fatores que afetam e podem inviabilizar o uso do telemonitoramento.

Descritores: Atenção Primária à Saúde; Enfermeiros; Tecnologias da Informação e Comunicação; Condição Crônica.

INTRODUCTION

Primary Health Care (PHC) is the first health care level, and it is characterized by a set of actions at the individual and collective levels, which cover health promotion and protection, disease prevention, diagnosis, treatment, rehabilitation, harm reduction and health maintenance⁽¹⁾. It is also responsible for providing integral, comprehensive and easily accessible care to the population for long periods, especially those diagnosed with Chronic Non-Communicable

Diseases (CNCDS), ensuring referral and counter-referral and favoring health care continuity and integrality⁽¹⁾.

However, PHC faces challenges from poor planning and management of the Unified Health System (*Sistema Único de Saúde, SUS*), which has hindered controlling these conditions⁽²⁾. Thus, despite the existence of public policies targeted at preventing risk factors, managing and treating chronic conditions, lack of control and hospitalizations due to Arterial Hypertension (AH) and/or Diabetes Mellitus (DM), among other conditions, they continue to occur and this points to the need to seek other health care strategies⁽³⁾.

Among the new proposals for the care and management of chronic conditions, supported self-care and clinical management associated with the use of Information and Communication Technologies (ICTs), stand out, both aimed at monitoring, educating and training people with CNCDS⁽⁴⁾.

ICTs are technological resources used in different settings, but in the health area, their purpose is to seek and offer knowledge for the social demands of care and to favor dissemination and access to diverse information through computers and electronic communication networks, in addition to promoting remote interaction between the actors involved in the different social contexts⁽⁵⁾. The adoption of ICTs by the SUS represents an advance in implementing of policies targeted at expanding and improving healthcare practices⁽⁶⁾. An important study that analyzed Telehealth in Brazil identified that the technology made it possible to qualify and increase care resoluteness, reduce distances and isolation between care levels and lower the number of referrals and inequities in health⁽⁷⁾.

Telemonitoring stands out among the available ICTs, which consists of remotely monitoring individuals via telephone calls, not offering in-person assistance. Its use in health helps minimize barriers and enhance the interaction between the people involved in a quick and accessible way, favoring the implementation of the necessary care measures to preserve the patients' well-being⁽⁸⁾. It is worth highlighting the contributions of the review that synthesized studies in the United Kingdom, identifying that this strategy enhances the management of long-term chronic health conditions such as AH, DM and Chronic Obstructive Pulmonary Disease (COPD)⁽⁸⁾.

In this sense, it is essential that health professionals and patients accept ICTs to ensure success in using technology in care. The perception

of the tool's potential, the compatibility of this technology with clinical practices and its technological proficiency are intervening factors in its acceptance and use process⁽⁵⁾.

In addition, the incorporation of ICTs in the work process requires involvement and effort on the part of professionals, and it is important to identify to what extent they are willing to use these technologies to organize and optimize routine care and even to guide patients and family members regarding use of these resources⁽⁹⁾.

The role and influence of ICTs in everyday life and work processes have been explored in the literature, pointing out that managers recognize the importance of their implementation, although they need to prioritize their practical use⁽¹⁰⁾. However, little is known about the professionals' perception regarding their use.

Thus, as there is still not enough data in the national territory on health professionals' willingness to use ICTs, not even on the human and structural resources that the services have for this use, the objective of this study was to verify Primary Care nurses' willingness to use Telemonitoring to follow-up users with arterial hypertension and/or diabetes mellitus.

METHOD

This is a cross-sectional study carried out within the scope of the 15th Health Region (*Regional de Saúde, RS*) of Paraná, which comprises 30 municipalities and is headquartered in the city of Maringá. In order to write the report of the current study, the criteria established in *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE)⁽¹¹⁾ were used.

The sample under study was established for convenience upon invitation to all nurses (289) working in the Basic Health Units (BHUs) from all 30 municipalities belonging to the 15th RS. The data were collected in May and June 2021 through an electronic form made available in Google Forms.

To this end, the Permanent Education sector of the 15th RS sent a letter to the Primary Care coordinators in all municipalities, informing them about the research and requesting that the link to access the electronic form be sent to all PHC nurses. In that letter, 15 days were informed to fill in the form. Thirty days after the first submission, a new letter was sent to the coordinators asking them to remind the Primary Care nurses about the importance of collaborating with the research by filling out the form.

Although the Permanent Education sector sent the letter, the return rate was low. Nurses who worked at the BHUs from the 15th RS and answered the questionnaire were included in the study. No exclusion criteria were adopted, even when a nurse left some questions unanswered. Thus, the sample under study included 65 nurses who worked in 40 BHUs belonging to 24 municipalities and who filled out the electronic form.

The authors prepared the data collection form based on the study objective and improved it after a discussion with the matrix research coordinator's group members. It consists of four parts, but only three of them are considered in the current study, as the questions related to the perception and evaluation of how assistance to people with AH and/or DM was provided before the pandemic was not used.

a) Sociodemographic characterization: it included questions about gender, age, marital status, time since graduation, time working in PHC, specialty in the area of family health or public health;

b) Willingness to use Telemonitoring: it consisted of questions addressing individual willingness and perceptions about the viability and existence of human and structural resources. They had dichotomous answers (yes and no);

c) Knowledge and preconceptions about Telemonitoring use: comprised of answers arranged on a four-point Likert-type scale. In the analysis, the "I agree" and "I totally agree" options were dichotomized into "Yes" and "I disagree" and "I totally disagree" into "No"). The "Indifferent" option ("No opinion") was not considered.

The data collected from all 65 interviewees were transcribed into a Microsoft Excel spreadsheet and converted to the IBM Statistical Package for Social Sciences (SPSS) statistical program, version 25. Initially, the data were submitted to Exploratory Analysis (EA), where the absolute and relative frequencies of the categorical variables predicting the outcome of "willingness to use Telemonitoring in Primary Health Care" were verified, namely: a) Specialization in Family/Community Health; b) Using ICTs before the pandemic; c) Perceptions regarding ICT use: - It favors communication with other RAS points; - It enables monitoring of patients; - It streamlines/supports work; - It makes communication with the patient faster and easier; - It is unfeasible in the BHU; and d) Attitude: - I would like to receive training on Telemonitoring; - I would

like to participate in a group with researchers to discuss the study experience and outcome. In the exploratory analysis, the hypothesis of normal distribution of the variables was also evaluated, which was rejected using the Kolmogorov-Smirnov test, as $n > 30$.

In data analysis, the answers to the variables related to the perceptions about ICT use were dichotomized into "Yes" ("I totally agree" and "I partially agree") and "No" ("I totally disagree" and "I partially disagree"), excluding the "I don't have an opinion" answers. Chi-square and Fisher's Exact tests were used to analyze the factors possibly associated with nurses' willingness to use Telemonitoring, the perception that this is insufficient if carried out without in-person assistance, and the perception that ICT use streamlines the work performed by the team. Finally, the unadjusted Prevalence Ratio (PR) was used as an association measure, accompanied by the respective confidence interval (95%). The variables that presented $p < 0.05$ and the absence of the number 1 within the bivariate analysis's PR confidence interval were considered possibly associated factors.

Development of the study respected all ethical precepts outlined in National Health Council resolutions 466/2012 and 510/2016 and the Guidelines for procedures in research studies with any stage in a virtual environment - CONEP/2021. The project was approved with Opinion number 4,505,345 by the signatory institution's Committee of Ethics in Research with Human Beings. It is noted that access to filling out the data collection form was only available after reading the Free and Informed Consent Form and expressing consent to participate in the study.

RESULTS

All 65 nurses included in the study worked in 24 of the 30 municipalities belonging to the 15th RS, were aged between 24 and 56 years old, with a median of 36.0 (Interquartile Range = 35.14 -38.71), and were mostly female (86.2%) and married and/or in a stable union (68.8%). The time since graduation varied from 1 to 34 years, with a median of 9.0 (Interquartile Range = 7.81-11.48). More than half of the participants (52.3%) had worked in PHC for at least ten years, and 51.8% had no specialization in Family or Public Health (Table 1).

Table 1 - Sociodemographic characteristics of the nurses from the 15th Health region of Paraná (n=65). Maringá, PR, Brazil, 2023

Variables	n (%)
Gender	
Female	56 (86.2)
Male	9 (13.8)
Age	
24-29	10 (15.5)
30-39	35 (53.8)
≥ 40	20 (30.7)
Marital status	
Single	16 (24.6)
Married/Stable union	45 (68.8)
Divorced	4 (6.2)
Time since graduation	
1-5 years	2 (3.1)
6-10 years	18 (27.7)
11-15 years	25 (38.5)
16 -20 years	17 (26.1)
≥ 21 years	3 (4.6)
Specialization in Family and/or Public Health	
Yes	30 (46.2)
No	35 (51.8)
Time working in PHC	
1-5 years	25 (38.4)
6-10 years	16 (24.6)
11-15 years	7 (10.8)
16 -20 years	14 (21.5)
≥ 21 years	3 (4.6)

n: Absolute frequency; %: Relative Frequency

Table 2 shows that, about professional training, most nurses had a specialization in Public or Family Health, did not participate in any training for ICT use, but had already used them in some way before the pandemic. Regarding the structure for Telemonitoring, most nurses reported that the units had Internet access, a computer, and a landline, but they needed a mobile phone or sufficient human resources.

As for the variables related to the perception of ICT use, most nurses considered that it was not feasible in their health unit; however, the majority also had a positive attitude towards them, as they believe that technology collaborates in the communication with other RAS points, that it streamlines and supports teamwork, makes communication with the patient faster and easier, and that it is possible to monitor patients using Telemonitoring.

Table 2 also shows that, in the analysis of the association with predictive variables, a higher prevalence of willingness to use Telemonitoring was verified among the professionals that had already undergone some training on ICTs and lo-

wer prevalence among those who reported that the Health Unit where they work has Internet, a computer and a landline. Although the prevalence of willingness to use Telemonitoring was higher among the professionals who believe that ICTs can collaborate with the dialogue between the RAS points and make communication with the patient faster and easier, the CI values do not support the conclusion that they would be factors associated with the event of interest.

Table 3 shows that age (less than 30 years old) and time since graduation (less than 10 years) were factors with a suggestive association with the perception that Telemonitoring without in-person assistance is insufficient to follow-up users with AH and/or DM. Regarding the perception that ICT use streamlines the work performed by the team, there was an association between a reference to the possibility of follow-up using ICTs and the perception that communication with the patient becomes faster and easier. Although significance was observed for the time since graduation, the PR CI value does not reinforce the result.

DISCUSSION

The advancement of ICTs has accelerated the implementation of policies to expand and improve their incorporation into care, management, and educational practices. An example of this was the rapid inclusion and adaptation of technologies in the work process during the social isolation period caused by the COVID-19 pandemic, especially within the PHC scope, which had to rethink how to provide care to people prevented from attending health units⁽¹¹⁾.

The contribution of ICTs to management has impacted on healthcare efficiency, effectiveness, and safety, as they are considered technical means that help process information and ease communication. The incorporation of these resources has been recorded in countries such as China, the United States, and Brazil, and there is diverse evidence of the association between using these technologies and improvements in the quality of the care provided in health services. However, this relationship is not observed in all realities, given the many difficulties faced by health services. In addition, the attitudes toward using these work resources are still poorly

Table 2 - Association between the existence of material resources in the BHU, professional training and perceptions about ICTs and nurses' willingness to use Telemonitoring in the follow-up of users with SAH and/or DM (n=65). Maringá, PR, Brazil, 2023

Variable	Willingness to use Telemonitoring		PR*	CI (95%)	p-value**
	Yes (%)	No (%)			
Already undergone some training in ICTs?					
Yes	7 (100.00)	0 (0.00)	1.208	[1.074; 1.359]	0.584
No	48 (82.76)	10 (17.24)	1	-	
Does your BHU have Internet?					
Yes	52 (83.87)	10 (16.13)	0.839	[0.752; 0.935]	1.000
No	3 (100.00)	0 (0.00)	1	-	
Does your BHU have a computer?					
Yes	52 (83.87)	10 (16.13)	0.839	[0.752; 0.935]	1.000
No	3 (100.00)	0 (0.00)	1	-	
Does your BHU have a landline?					
Yes	49 (83.05)	10 (16.95)	0.831	[0.740; 0.932]	0.579
No	6 (100.00)	0 (0.00)	1	-	
Does your BHU have a mobile phone?					
Yes	18 (81.82)	4 (18.18)	0.951	[0.755; 1.198]	0.723
No	37 (86.00)	6 (14.0)	1	-	
Does your BHU have enough HRs?					
Yes	26 (86.67)	4 (13.33)	1.050	[0.851; 1.285]	0.471
No	29 (82.90)	6 (17.10)	1	-	
Do you have any specialization in Public and/or Family Health?					
Yes	25 (83.33)	5 (16.67)	0.972	[0.788; 1.199]	0.529
No	30 (85.71)	5 (14.29)	1	-	
Were ICTs already used in your BHU before the pandemic?					
Yes	29 (85.29)	5 (14.71)	1.017	[0.826; 1.252]	1.000
No	26 (83.87)	5 (16.13)	1	-	
Does ICT use favor communication with other RAS points?					
Yes	46 (90.20)	5 (9.80)	1.403	[0.940; 2.095]	0.031
No	9 (64.29)	5 (35.71)	1	-	
Is it possible to monitor a patient by using the phone?					
Yes	45 (86.54)	7 (13.46)	1.125	[0.820; 1.544]	0.405
No	10 (76.92)	3 (23.08)	1	-	
Does Telemonitoring streamline/support work?					
Yes	50 (87.72)	7 (12.28)	1.535	[0.802; 2.937]	0.070
No	4 (66.67)	2 (33.33)	1	-	
Does ICT use favor communication with the patient (turning it faster and easier)?					
Yes	48 (87.50)	7 (12.50)	1.750	[0.781; 3.919]	0.048
No	3 (50.00)	3 (50.00)	1	-	
Is ICT use feasible in your BHU (n=64)?					
Yes	16 (76.19)	5 (23.81)	0.862	[0.663; 1.121]	0.275
No	38 (88.37)	5 (11.63)	1	-	

Note: * = Prevalence Ratio; ** = Fisher's Exact test.

Table 3 – Prevalence Ratio (PR) between the predictive variables of interest and the “Telemonitoring without in-person assistance is insufficient” and “Telemonitoring streamlines the work performed by the team” outcomes, according to nurses from the 15th Health Region (n=65). Maringá, PR, Brazil, 2023

Predictive variables	Outcomes							
	Telemonitoring without in-person assistance is possible				It streamlines the work performed by the team			
	Yes	No	PR [95% CI]*	p-value	Yes	No	PR [95% CI]*	p-value
Age								
Less than 30 years old	7 (70.0)	3 (30.0)	2.022 [1.165;3.510]	0.037**	7 (70.0)	3 (30.0)	0.756 [0.500;1.142]	0.070**
30+ years old	18 (34.6)	34 (65.4)	1		50 (92.6)	4 (7.4)	1	
Time working in PHC								
Less than 10 years	13 (54.2)	11 (45.8)	1.715 [0.946;3.111]	0.077#	23 (92.0)	2 (8.0)	1.055 [0.893;1.247]	0.695**
10+ years	12 (31.6)	26 (68.4)	1			34 (87.2)	5 (12.8)	
Time since graduation								
Less than 10 years	9 (64.3)	5 (35.7)	1.929 [1.103;3.373]	0.038#	10 (71.4)	4 (28.6)	0.760 [0.542;1.066]	0.036**
10+ years	16 (33.3)	32 (66.7)	1			47 (94.0)	3 (6.0)	
Monitoring is possible								
Yes	19 (38.8)	30 (61.2)	0.840 [0.424;1.666]	0.630#	51 (98.1)	1 (1.9)	1.962 [1.113;3.458]	<0.001**
No/Insufficient	6 (46.2)	7 (53.8)	1			6 (50.0)	6 (50.0)	
It favors communication with the patient								
Yes	20 (37.7)	33 (62.3)	0.566 [0.292;1.099]	0.212**	56 (100.0)	0 (0.00)	-	<0.001**
No	4 (66.7)	2 (33.3)	1			0 (0.00)	6 (100.0)	

* PR – Prevalence Ratio; 95% CI - 95% Confidence Interval;

** Fisher's Exact test

Chi-square test.

understood and evaluated⁽¹²⁾.

Regarding these aspects, it is important to consider that almost half of the nurses studied did not receive any training related to ICT use. A research study that analyzed ICT use by nurses from 2013 to 2016 based on secondary data obtained from the *TIC Saúde* database observed that nearly 75% of them had not attended training sessions or courses on the subject matter in the last 12 months⁽¹⁰⁾.

Concerning Nursing care management in PHC, the incorporation of ICTs emerges as an ancillary resource, as it contributes to improving management, expanding professional-patient

intercommunication and favoring knowledge production⁽¹³⁾. Among the possibilities offered by ICTs, the following stand out: ease in recording information; more integrated workflows, connecting the various activities carried out in management; information storage and easy access to data; use of technological resources for time management; and speed in responses and decision-making, exerting a direct impact on patient safety⁽¹⁴⁾.

In this context, a study carried out in the United Kingdom, the Netherlands and Germany with patients with chronic heart failure pointed out the cost-effectiveness of Home-based Telemonitoring resulting from telephone Nursing support,

in addition to the more remarkable survival of these patients when compared to those who only received usual care⁽¹⁵⁾.

Despite all this evidence related to the benefits of using ICTs in health management and care, the current study found that a high percentage of nurses considered their use unfeasible in the health unit where they worked and did not perceive their various benefits. These results deserve reflection and raise the need to explore what leads nurses to have unfavorable perceptions, given that these can negatively impact on the use of Telemonitoring to follow-up users with AH and/or DM.

It is noted that the process of incorporating ICTs into the health professionals' routine depends on some factors, such as familiarity and skill with the technologies, the professionals' positive assessment of the potential of this resource for health care qualification, the existence of adequate infrastructure, the institutions' funding to adopt the technology, and credibility and trust in the technology by users and professionals⁽²⁾. Regarding these aspects, in addition to the majority of nurses in the current study not realizing the potential of ICTs in qualifying the care provided to the users, most of them also highlighted the lack of adequate resources for their implementation, such as the unavailability of mobile phone devices. In addition, a significant percentage of nurses mentioned insufficiency of human resources. These data reveal that basic health units must be better supported with structural and human resources and, therefore, financial ones, to effectively enable Nursing Telemonitoring for users with AH and/or DM.

According to the *TIC Saúde* database, the lack of team training and the absence of financial resources to invest in technologies frequently interfered with ICT use, which might be hindering or demotivating factors⁽¹⁰⁾. In the literature, other barriers to ICT use are mentioned as financial challenges, technical complexities, and problems related to communication by health services and users⁽¹⁶⁾. However, a study that analyzed 29,756 health teams (66.2% of the total number of Primary Care teams existing in Brazil in 2013) drew attention to the need for a careful analysis between the influence of service structure and the real difficulty of ICT use, as structural variables (Internet, physical structure of the service and type of health unit) were not significantly associated. In addition, it considered that the results might be under the effect of residual confounding⁽¹⁷⁾.

In the case of the current study, even though less willingness to use Telemonitoring was identified among the nurses who reported that the Health Unit where they worked had Internet, a computer, and a landline, it should be remembered that the data were collected in the first months of the pandemic when the need for access to technology was intensified. This allowed nurses to perceive that if the resources available in the unit (human and technological) needed improvement, it would be very tough to implement this strategy in their care routine.

In the current study, being younger and having less time since graduation was suggestively associated with the perception that Telemonitoring without in-person assistance is insufficient for follow-up users. Telemonitoring should be part of an integrated healthcare system, not to replace but to improve and expand existing care services and access to appropriate use and efficiency of health services⁽¹⁸⁾.

Nurses believe that using this resource can streamline the work performed by the team, in addition to easing communication with the users. Corroborating this, the 19 nurses participating in a study carried out in Rio de Janeiro pointed out that ICTs assisted in a positive way in the organization of activities and agility of the communication process between the team and the assisted users⁽⁵⁾. A study in Canada also found a positive perception of nurses regarding Telemonitoring to follow-up people with CNCs. In addition, the users accepted and adopted Telemonitoring at a moderate to high adherence level in all conditions, envisioning this technology as supporting patient self-care, keeping them connected to the clinical team and improving communication and teamwork⁽¹⁹⁾. In the same direction, a study that investigated the effectiveness of clinical management using of Telemonitoring in southern Brazil with 109 individuals with chronic conditions, all monitored by the supplementary health system, found a significant improvement in the adoption and/or maintenance of healthy habits, in addition to highlighting the low cost for its use⁽¹⁴⁾.

The nurses participating in the current study believed that Telemonitoring could also favor communication between the different points of the Health Care Network (*Rede de Atenção à Saúde*, RAS). In line with this result, a scoping review that included 10 studies, four of which were carried out in Brazil, highlighted the little relevance attributed to ICTs as a means to facilitate the satisfactory performance of the RAS,

although this constitutes an important strategy for coordination and regulation in health⁽²⁰⁾. The lack of mobile phones, and insufficient human resources reported by the nurses in the current study as factors that may compromise the implementation of Telemonitoring confirm the results of a study carried out in Espírito Santo⁽²⁾. At that time, it was found that the use rates of technologies by health professionals were lower than expected, which led the authors to consider that the current PHC setting is marked by structural precariousness, work overload and insufficient computerization, which impairs acceptance and use of technologies⁽²⁾. In this way, they pointed out the need for investments in structuring health services and adapting technologies to the professionals' reality, as well as in actions that promote greater proximity of all with technologies⁽²⁾. Regarding these aspects, a study carried out in the state of Minas Gerais pointed out that health professionals made little use of the structure of the services, opting for their means, such as smartphones and home computers⁽⁷⁾, which was probably related to the non-existence or even precariousness of the equipment available in the work environment. However, even if this occurs in an incipient way and without institutional support, it is still considered a step forward in the attempt to introduce ICTs into the work practice. Higher prevalence was verified in the willingness to use Telemonitoring among the professionals already training in ICTs. In this direction, a study in Scotland pointed out that to implement Telemonitoring in health services, it is important not only the support of institutions and available structural resources but also to implement strategies that train professionals to use them⁽²¹⁾. These results confirm what was found in the study in Rio de Janeiro, which pointed out that resorting to permanent health education contributes to the PHC professionals' sensitization regarding the use of the technology⁽⁵⁾. In other words, for Telemonitoring use to be viable in everyday work, the professionals need to be adequately prepared and, at the same time, have sufficient structural and human resources⁽²⁾.

It is noted that the actions to expand Telemonitoring use in Brazil, mainly within the SUS scope, are still timid despite the benefits already reported⁽¹⁴⁾. Many of these actions have arisen from public notices to promote research, allowing the acquisition of infrastructure, equipment, and the formation of research centers in several academic institutions in the country. Regarding public

policies, the *Brasil Redes* National Telehealth Program was developed in Brazil and launched in 2007, which aimed at improving the quality of the assistance and Basic Care in the SUS, integrating teaching and service through information technology tools, in addition to providing permanent education for health professionals⁽¹⁷⁾.

However, it is important to highlight that although initiatives aimed at encouraging ICT use in the SUS are still scarce, supplementary network clinical management employing Telemonitoring for beneficiaries with chronic conditions is already a reality in some health plan operators⁽¹⁴⁾. This fact allows inferring that Telemonitoring in the follow-up of beneficiaries with chronic conditions is, at least, rewarding in monetary terms. Thus, it is crucial to reinforce the importance of the SUS not measuring efforts to implement and value the use of this care strategy, which also implies working with nurses so that they can reflect on their perceptions and understanding of the theme.

A study on the challenges and opportunities of using Telemonitoring in the SUS highlighted the potential benefit of this technology for a significant reduction in costs with the management of CNCDs, and asserted that the challenge of its incorporation into health services is related to the scarcity of studies specifically focused on Telemonitoring⁽²²⁾.

Planning and evaluation are required to incorporate technologies into health services. Thus, to implement Telemonitoring in the service, it is necessary to recognize the importance of sensitizing and training the professionals through specific training, in addition to providing material and human resources and technical support for using the technology in managing chronic conditions. Possible limitations of the current study are related to the sample researched, established for convenience – nurses who were willing to answer the online questionnaire: therefore, caution should be exercised in generalizing the findings, even within the scope of the 15th Health Region. In any case, the results are valid because they allow identifying the factors that lead nurses to not wanting to incorporate Telemonitoring into their care practice and to know the aspects that, in their opinion, would ease the change in their willingness to use the technology in their work routine.

CONCLUSION

Most of the nurses pointed out the scarcity of structural and human resources in basic health

units for ICT use; they did not consider their implementation feasible, although they believed that their use could favor communication with other RAS points and with the patient, that they streamline and support teamwork, and that it is possible to follow-up patients with AH and/or DM using Telemonitoring. A higher prevalence of willingness to use Telemonitoring was found among the professionals who had already received some training in ICTs and a lower prevalence among those who reported that the Health Unit where they work had Internet, a computer, and a landline. Being less than 30 years old and having graduated less than 10 years ago were associated with the perception that Telemonitoring without in-person assistance is insufficient to follow-up users and that the Telemonitoring variables favor communication with the patient and can streamline the team's work.

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The absence of training sessions and the insufficiency of devices and human resources affect and may preclude Telemonitoring. Thus, it is up to the managers to develop and implement policies that can improve the structure, make human resources available and offer permanent education aimed at training professionals to make nurses aware of the benefits offered by the technology and its incorporation into their everyday work practice.

CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

FUNDING

This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel – Brazil (CAPES). Finance Code 001.

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