



Original

Aplicability of e-health in patients with peripheral artery disease

Aplicabilidad de la e-medicina en pacientes con enfermedad arterial periférica

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Abstract

Introduction and objective: to determine whether e-health is applicable to patients with peripheral artery disease (PAD) in the Burgos area.

Material and methods: patients with peripheral artery disease (PAD) from outpatient clinics between February and August 2022. We conducted a descriptive, cross-sectional, single-center study through telephone surveys, with a total of 70 completed surveys.

Results: mean age was 69.6 years (SD, 8.4); 88.6% ($n = 62$) were men. The mean perceived difficulty in accessing hospital care on a scale from 1 to 10 was 4.1 (SD, 3.1). A total of 97.1% ($n = 68$) reported good telephone coverage, and 54.3% ($n = 38$) had internet access. Mobile phone ownership was reported by 90.0% ($n = 63$), 57.1% ($n = 36$) of whom had smartphones. Overall, 60.0% of respondents expressed willingness to undergo teleconsultations. Among patients with a smart device, 82.9% ($n = 34$) were willing to use telemonitoring applications. A total of 48.6% ($n = 34$), 38.6% ($n = 27$), and 20.0% ($n = 14$) reported knowing what Facebook, Instagram, and a blog are, respectively. Regarding scientific dissemination, 22.8% ($n = 16$) would use Facebook, 12.8% ($n = 9$) Instagram, and 5.7% ($n = 4$) blogs.

Conclusions: in our setting, patients with PAD showed interest in teleconsultations and telemonitoring when the necessary technology is available. There is currently no interest in scientific dissemination through online platforms.

Keywords:

Vascular surgery.
e-health.
Telemedicine.
Peripheral artery disease.

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Resumen

Introducción y objetivo: determinar si la e-medicina es aplicable a pacientes con enfermedad arterial periférica (EAP) del área de Burgos.

Material y métodos: pacientes con enfermedad arterial periférica (EAP) procedentes de consultas externas realizadas entre febrero y agosto de 2022. Se realizó un estudio descriptivo, transversal y unicéntrico realizado mediante encuestas telefónicas, con un total de 70 encuestas obtenidas.

Resultados: la edad media fue de 69,6 años (DS = 8,4); el 88,6 % ($n = 62$), varones. La puntuación media de sensación de dificultad al acceso hospitalario en una escala del 1 al 10 fue de 4,1 (DS = 3,1). El 97,1 % ($n = 68$) de los encuestados refería tener buena cobertura telefónica y un 54,3 % ($n = 38$) disponía de conexión a internet. El 90,0 % ($n = 63$) tenía teléfono móvil, de los que un 57,1 % tenían teléfonos inteligentes ($n = 36$). El 60,0 % de los encuestados indicaron querer realizar teleconsultas. De aquellos pacientes con algún dispositivo inteligente, el 82,9 % ($n = 34$) estaría dispuesto a utilizar aplicaciones de telemonitorización. El 48,6 % ($n = 34$), el 38,6 % ($n = 27$) y el 20,0 % ($n = 14$) afirmaron saber qué era Facebook, Instagram y un blog, respectivamente. El 22,8 % ($n = 16$) usaría Facebook como plataforma de divulgación científica, y el 12,8 % ($n = 9$) y el 5,7 % ($n = 4$) para Instagram y blogs, respectivamente.

Conclusiones: en nuestro medio, los pacientes con EAP mostraron interés en realizar teleconsultas y telemonitorización en caso de disponer de la tecnología necesaria. No existe interés en la divulgación científica a través de plataformas *online* en el momento actual.

Palabras clave:

Cirugía vascular.
e-medicina.
Telemedicina.
Enfermedad arterial
periférica.

INTRODUCTION

The term e-health emerged in the early 21st century and encompasses different forms of remote medical practice or “telemedicine” (1), such as scientific dissemination through social media or websites, telemonitoring, teleconsultation, and telerehabilitation (2,3). Peripheral artery disease (PAD) is a chronic condition resulting from atherosclerotic involvement of the body’s arteries, generally excluding the aorta and coronary arteries (4), and in this study focuses on the arteries of the lower limbs. Patients with PAD represent a high-risk population for multiple comorbidities and may benefit from monitoring cardiovascular risk factors and other health parameters, particularly if this leads to a reduction in hospital visits (5).

The objective of this study was to assess the applicability of telemedicine in patients with PAD in our setting.

MATERIALS AND METHODS

We designed a descriptive, cross-sectional, single-center study using a survey developed by the Department of Angiology, Vascular and Endovascular Surgery of Hospital Universitario de Burgos (Burgos, Spain) as the data collection method.

The survey was administered to patients with PAD from outpatient clinics via telephone calls between January and February 2023, including those who had attended at least one in-person consultation between June and December 2022. Each patient was contacted up to three times if the initial call was unsuccessful. Patients unable to respond independently, those residing in nursing homes, or those who did not provide explicit verbal consent were excluded. A total of 119 patients were contacted, and 70 completed surveys were obtained. Verbal informed consent and data collection were obtained prior to survey administration.

The survey included 6 variables (age, sex, Ruth-erford classification, distance, and estimated travel time to the hospital), obtained from the electronic medical record (Table I), and 13 questionnaire-based variables administered sequentially (Tables II and III), defined as follows:

1. *Origin:* Patients were classified as living in a rural area (< 10,000 inhabitants) or an urban area ($\geq 10,000$ inhabitants).
2. *Distance to hospital:* The distance between the hospital and the patient’s residence was measured using Google Maps.
3. *Estimated travel time:* Travel time by car from the patient’s residence to the hospital was estimated using Google Maps.

4. *Difficulty of hospital access*: Patients were asked to rate their perceived difficulty in accessing the hospital on a scale from 1 to 10, where 1 represented minimal difficulty and 10 the maximum imaginable difficulty.
 5. *Telephone coverage*: Patients were asked whether they believed they had good telephone coverage at their usual residence.
 6. *Mobile phone*: Patients were asked whether they owned a mobile phone.
 7. *Smartphone*: Patients with a mobile phone were asked whether it was a smartphone and whether it allowed application installation.
 8. *Internet*: Availability of internet connection at the patient's usual residence.
 9. *Other devices*: Ownership of other smart devices, such as an iPad, tablet, or smartwatch.
 10. *Social media*: Patients were asked whether they knew what Facebook, Instagram, or a blog is, regardless of whether they were users.
 11. *Telemonitoring*: Patients with a smartphone or other smart device were asked whether they would be willing to use an application connected to the hospital for monitoring purposes.
 12. *Teleconsultation*: Patients with a smartphone or other smart device were asked whether they would be willing to attend consultations remotely.
 13. *Scientific dissemination*: Patients previously classified as familiar with at least one social media platform were asked whether they would be willing to learn about their peripheral artery disease through these platforms.
- Responses were analyzed using conventional statistical methods with Stata®.

Table I.

Demographic data		
<i>Categorical variables</i>		
Origin	Urban (85.7%)	
Sex	Male (88.6)	
Rutherford	≤ 3 (63.0%)	
<i>Numerical variables</i>		
Age	69.6 years	SD 8.4
Distance to hospital	5.3 km	IQR 2.8-80.9
Estimated travel time	10.5 minutes	IQR 7.0-65.0
Difficulty of hospital access	4.1	SD 3.1
n = 70; SD, standard deviation; IQR, interquartile range.		

Table II.

Technological data	
	Yes
Telephone	97.2%
Mobile	90.0%
Smartphone	57.1%
Internet	54.3%
Other devices	20.0%
Social media knowledge:	
- Facebook:	48.6%
- Instagram:	38.6%
- Blog:	20.0%

Table III.

e-health data	
	Yes
Teleconsultation (70)	60.0%
Telemonitoring (41)	82.9%
Scientific dissemination (34):	
- Facebook:	47.1%
- Instagram:	26.5%
- Blog:	11.2%
Number in parentheses indicates number of observations.	

RESULTS

Due to the different nature of the questions, responses were grouped into 3 categories: demographic, technological, and e-health. Mean age was 69.6 years (SD, 8.4); 88.6% ($n = 62$) were men. A total of 85.7% ($n = 60$) lived in urban areas. The median distance to the hospital was 5.3 km (IQR, 2.8-80.9), with a median travel time of 10.6 minutes (IQR, 7.0-56.0), and a mean perceived difficulty score of 4.1 (SD, 3.1).

In the technological category, most patients reported good telephone coverage (97.1%) and mobile phone ownership (90.0%). However, just over half had smartphones (57.1%) or internet access at home (54.3%). Only 1 in 5 patients owned another smart device. Facebook was the most recognized social media platform, known by nearly 50% of respondents.

Regarding e-health, 60% of respondents ($n = 70$) expressed interest in teleconsultations. Among patients with at least one smart device ($n = 41$), 82.9% were willing to use telemonitoring. Among those familiar with at least one social media platform ($n = 34$), 47.1% expressed interest in scientific dissemination through Facebook, 26.5% through Instagram, and 11.2% through blogs.

DISCUSSION

Access to vascular surgery specialists, as in other specialties, is concentrated in urban areas, making access more difficult for patients from rural regions (6). In our study, perceived difficulty in accessing hospital care was low, even though approximately 15% of patients lived in rural areas. Moreover, perceived difficulty was lower among rural patients compared with urban patients when analyzed separately.

Implementation of telemedicine requires the use of technological tools, which implies that patients must have sufficient prior knowledge or receive appropriate, specific, and understandable training. Studies by Gunther et al. (7) and Mousa et al. (8) excluded up to 32.5% of patients due to lack of interest in technology, absence of a smartphone, or inability to use applications. One of the main requirements for telemedicine implementation is internet access.

In Spain, internet penetration is 91.7%, ranking 14th worldwide (9); however, in our study, internet access barely exceeded 50%, likely reflecting the advanced age of the sample.

In patients with chronic heart disease, telemedicine has been associated with reduced hospitalization time, fewer readmissions, lower mortality rates, and improved clinical outcomes, as well as cost-effectiveness (10). Although telemedicine in vascular surgery is less developed, publications on this topic have increased notably since the mid-2020s, as shown by 2 recent systematic reviews (5,11). Additionally, Isabela Herrero et al. (11) highlighted the lack of studies in Spain and proposed this as an opportunity for further research. So far, telemedicine in this field appears to be associated with fewer unnecessary hospital visits, improved surgical wound outcomes, enhanced patient functional capacity (12,13), and potential environmental benefits due to reduced pollutant emissions (6).

In the abovementioned systematic reviews, at least 65% of published articles focus on teleconsultation or postoperative telemonitoring. Specifically, in PAD, most studies use telemonitoring for wound surveillance or for exercise programs aimed at improving intermittent claudication symptoms (5). In our study, teleconsultation and telemonitoring showed the highest acceptance rates, whereas scientific dissemination showed the lowest level of interest. None of the reviewed articles focused specifically on scientific dissemination in vascular surgery. Currently, few studies provide data on the cost-effectiveness of telemonitoring systems. As noted by Gunther et al. (7), the sustainability of these systems depends on their integration into healthcare systems and incorporation into routine clinical practice (13).

CONCLUSIONS

Although patients in our cohort did not perceive significant barriers to accessing hospital care, they showed willingness to engage in teleconsultation and telemonitoring if appropriate technological tools are available. Scientific dissemination through online platforms does not currently appear to be a relevant clinical target.

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