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Original Article

Healthcare personnel use and perception of a mobile application for a comprehensive geriatric assessment

Uso y percepción del personal de salud sobre una aplicación móvil para la valoración geriátrica integral

Uso e percepção do pessoal de saúde de um aplicativo móvel para avaliação geriátrica ampla

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ABSTRACT

Introduction. There is little evidence supporting the usefulness of mobile applications in senior care. GeriatriApp is an application created for *Android* devices to assist health professionals in performing the comprehensive geriatric assessment (CGA). It integrates functional, nutritional, cognitive, emotional, pharmacological, frailty, and sarcopenia assessment. The aim of the present study is to evaluate the perceived usefulness of the App by its users when performing the CGA, as well as its effect on decision-making and to evaluate possible differences among healthcare personnel. **Methodology.** This survey-type descriptive cross-sectional study surveys GeriatriApp users, considering aspects like demographics, education, and the App's perceived

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usability. **Results.** A total of 228 surveys were analyzed, of which 29% involved specialist physicians, 18% general practitioners, 17% medical students, and 12% resident physicians. The age group with the highest frequency of App use was between 20 and 30 years old (39%). The main professional practice setting was the hospital (40.1%), followed by primary care (31.6%). Sixty-three percent of the surveyed used the App between 1 and 5 times per week. The statistical analysis showed no significant difference in the frequency of use according to age ($p = 0.631$) or education level ($p = 0.749$). For 98% of the respondents, the App facilitated professional clinical practice and decision making, and, for 99%, it allowed identifying problems in the seniors in less time. **Discussion.** The application studied has an international scope, demonstrating this technology's potential. The largest number of users were under 30, possibly because of their greater interaction and experience with mobile technology. No differences were found in the frequency of use according to age, an unexpected finding regarding other studies. The application's favorable perception seems to rely on the fact that it is free of charge, the tool's usability, and its user-friendly interface. **Conclusions.** GeriatriApp has a favorable perception of usefulness among health personnel, allows a geriatric assessment in a shorter period, and facilitates care and decision-making regarding seniors. The results suggest its usefulness in hospital settings, primary care, rehabilitation centers, and nursing homes.

Keywords:
Telemedicine; Mobile Health; Mobile Applications; Seniors; Geriatric Evaluation

RESUMEN

Introducción. Existe poca evidencia que sustente la utilidad del uso de aplicaciones móviles en la atención del adulto mayor. GeriatriApp es una aplicación creada para dispositivos *Android* que busca facilitar al profesional de salud la realización de la valoración geriátrica integral (VGI) e integra la evaluación funcional, nutricional, cognitivo, emocional, farmacológico, fragilidad y sarcopenia. El objetivo del presente estudio es evaluar la utilidad percibida entre los usuarios de la App al momento de realizar la VGI, así como el efecto en la toma de decisiones y evaluar posibles diferencias entre el personal de salud. **Metodología.** Estudio descriptivo de corte trasversal, tipo encuesta entre usuarios de GeriatriApp, se indaga por aspectos demográficos, educativos y de percepción de utilidad de la App. **Resultados.** Se analizaron 228 encuestas. El 29% fueron médicos especialistas, 18% médicos generales, 17% estudiantes de medicina y 12% médicos residentes. El grupo de edad con mayor frecuencia de uso de la App se encuentra entre 20 y 30 años (39%). El principal escenario de práctica profesional fue el hospitalario (40.1%), seguido de atención primaria (31.6%). El 63% utilizó la App entre 1 y 5 veces por semana. Durante el análisis estadístico no se encontró diferencia significativa en la frecuencia de uso según la edad ($p = 0.631$), ni el nivel de formación ($p = 0.749$). Para el 98% de los encuestados la App facilitó la práctica clínica profesional y la toma de decisiones, y en el 99% permitió identificar problemas en el adulto mayor en menor tiempo. **Discusión.** La aplicación estudiada tuvo un alcance internacional, lo que demuestra el potencial de este tipo de tecnologías. La mayor cantidad de usuarios fueron menores de 30 años, posiblemente explicado por su mayor contacto y experiencia con la tecnología móvil. No se encontraron diferencias en la frecuencia de uso según la edad, un hallazgo inesperado respecto a otros estudios. La percepción favorable de la aplicación parece estar secundada por su gratuidad, la utilidad de sus herramientas y una interfaz de uso sencilla. **Conclusiones.** GeriatriApp tiene una percepción favorable de utilidad entre el personal de la salud, permite realizar una valoración geriátrica en corto periodo de tiempo, facilita atención y toma de decisiones en el adulto mayor. Los resultados sugieren su utilidad en escenarios hospitalarios, atención primaria, centros de rehabilitación y hogares geriátricos.

Palabras clave:
Telemedicina; Salud Móvil; Aplicaciones Móviles; Adulto Mayor; Evaluación Geriátrica.

RESUMO

Introdução. Existem poucas evidências para apoiar a utilidade do uso de aplicativos móveis no atendimento dos idosos. GeriatriApp é um aplicativo criado para dispositivos *Android* que visa facilitar ao profissional de saúde a realização da avaliação geriátrica ampla (AGA) e integra a

avaliação funcional, nutricional, cognitiva, emocional, farmacológica, fragilidade e sarcopenia. O objetivo deste estudo é avaliar a utilidade percebida pelos usuários do App no momento da realização da AGA, bem como o efeito na tomada de decisão, também avaliar possíveis diferenças entre os profissionais de saúde. **Metodologia.** Estudo transversal descritivo, tipo enquete entre usuários do GeriatriApp, consultando aspectos demográficos, educacionais e de percepção de utilidade do App. **Resultados.** Foi analisado um total de 228 enquetes. 29% eram médicos especialistas, 18% clínicos gerais, 17% estudantes de medicina, e 12% residentes. O grupo etário com maior frequência de utilização do App tem entre 20 e 30 anos (39%). O principal cenário de prática profissional foi o hospital (40.1%), seguido da atenção básica (31.6%). De outro lado, 63% usaram o aplicativo entre 1 e 5 vezes por semana. Durante a análise estatística, não foi encontrada diferença significativa na frequência de uso em função da idade ($p = 0.631$), nem do nível de educação ($p = 0.749$). Para 98% dos entrevistados, o App facilitou a prática clínica profissional e a tomada de decisões, e para 99% permitiu identificar problemas nos idosos em menos tempo. **Discussão.** O aplicativo estudado teve um alcance internacional, o que mostra o potencial desse tipo de tecnologia. O maior número de usuários tinha menos de 30 anos, possivelmente explicado pelo maior contato e experiência com a tecnologia móvel. Não foram encontradas diferenças na frequência de uso de acordo com a idade, uma descoberta inesperada em comparação com outros estudos. A percepção favorável do aplicativo parece apoiar-se na sua gratuidade, na utilidade das suas ferramentas e numa interface amigável. **Conclusões.** O GeriatriApp tem uma percepção favorável de utilidade entre os profissionais de saúde, permite uma avaliação geriátrica em um curto período de tempo, facilita a tomada de decisão e o atendimento ao idoso. Os resultados sugerem sua utilidade em ambientes hospitalares, atenção básica, centros de reabilitação e lares geriátricos.

Palavras-chave:
Telemedicina; Saúde Móvel; Aplicativos móveis; Idoso; Avaliação Geriátrica

Introduction

Mobile Health (mHealth) is a concept that proposes the use of information and communication technologies in mobile devices to prevent, diagnose, and treat disease or promote health (1). Its use by health professionals facilitates access to information, improves care and decision-making, and reduces the risk of medical error (2,3). Every year, the available evidence of the positive effects of mHealth on health care and its cost-effectiveness is bolstered (4,5).

In geriatrics, mobile applications (*Apps*) are used in the management of chronic conditions, cognitive stimulation, rehabilitation, and physical activity (6,7). However, few are focused on comprehensive geriatric assessment (CGA), despite its benefit in reducing hospitalizations, institutionalization, disability, and mortality (8,9). Silva and contributors identified this weakness and developed the GeriatricHelper (10). Aislan Lander developed geriatric scales (11); however, they are available in Portuguese. Other Apps such as Indicators of dependence (12), Frailty Assessment (13), although available in Spanish, are limited because they fail to assess the different CGA domains.

GeriatriApp is an application for tablets and smartphones developed by the Universidad Nacional de Colombia's geriatrics unit. It is available free of charge for the Android operating system, distributed through the "Google Play" App store, and available for download worldwide. GeriatriApp is for healthcare workers who care for the senior adult population; it aims to facilitate CGA by providing information of interest. Its main usefulness is the presentation of validated scales for functional, nutritional, cognitive, emotional, pharmacological, medical, and frailty assessment (14,15).

This study's objective is to describe the demographic and educational profile of GeriatriApp users, establishing their patterns of use of the App and perceptions on its usefulness when performing the CGA, including the App's possible effect on decision-making in different clinical practice scenarios. Moreover, it explores the possible differences in the profiles of use according to age, level of education, the field of practice, and country of use.

Methodology

This descriptive cross-sectional study carried out an anonymous survey through a free access form available at the GeriatriApp main interface between 2019 and 2020, using non-probabilistic consecutive sampling. The survey was designed on the Google Forms platform,

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and the information obtained was stored in spreadsheets. The study variables were demographic data such as the country where the professional practice is performed, gender, age of the professional, level of academic training, and the setting in which the care is provided. The query involved whether the application facilitated professional practice, decision making, made geriatric assessment faster, and the number of times per week that the application was used.

The frequency of use of the application was compared with the age and type of user of the App, and the differences between the countries with highest frequency of use and the practice setting were evaluated.

The surveys included were those answered by the healthcare personnel who provide care to seniors, with an App use of two or more times. Surveys with less than 25% of the items completed or not providing data on being a health worker were excluded. The invitation to take the survey was made directly from the App to all users.

The statistical analysis considered the type and nature of the variables, which were all qualitative and described with absolute and relative frequencies. For hypothesis testing, the Yates Chi-square test of independence was used without correction. An alpha error of 0.05 was considered to establish significance. STATA 16.1 software was used for the statistical analysis.

Results

A total of 235 surveys were obtained; seven were excluded due to incomplete data. The five countries with the highest frequency of response were Colombia (38.2%), Mexico (18%), Argentina (13.16%), Spain (6.6%), and Chile (6.14%). The proportion of men was 59.9%. The age group with the highest frequency of App use was between 20 and 30, corresponding to 39% of respondents; an even higher proportion was observed among women (46.9%) (Table 1). A significant difference was found in the age distribution between men and women ($p < 0.001$).

Table 1. Distribution by age and sex of respondents

Age group	Male	Female	Total
	Frec. abs. [Frec. rel. fila] [Frec. rel. columna]	Frec. abs. [Frec. rel. fila] [Frec. rel. columna]	Frec. abs. [Frec. rel. fila] [Frec. rel. columna]
20 to 30 years	44 [49.4%] [33.3%]	45 [50.6%] [46.9%]	89 [100%] [39.0%]
31 to 40 years	32 [62.8%] [24.2%]	19 [37.2%] [19.8%]	51 [100%] [22.4%]
41 to 50 years	18 [40.0%] [13.6%]	27 [60.0%] [28.1%]	45 [100%] [19.7%]
Over 50 years	38 [88.4%] [28.8%]	5 [11.6%] [3.2%]	43 [100%] [18.9%]
Total	132 [57.9%] [100.0%]	96 [42.1%] [100.0%]	228 [100%] [100%]

Abs: Absolute. Freq: frequency. Rel: relative.
Source: prepared by the authors.

The practice settings where GeriatriApp was most frequently used were the hospital (40.1%), primary care (31.6%), rehabilitation centers (9.6%), and nursing homes (6.1%) (Table 2). In this variable, there was no imbalance in the distribution according to sex ($p = 0.646$). Regarding educational level, the most frequent users of the App were medical specialists (28.95%), general practitioners (18%), medical students (17.1%), residents (12.3%), and other occupations related to medicine (11.8%) (Table 3).

Table 2. Frequency of use of the application according to the practice scenario, educational level, etc.

	Absolute frequency	Relative frequency	Cumulative relative frequency
Hospital	92	40.4%	40.4%
Primary Care	72	31.6%	71.9%
Rehabilitation center	22	9.6%	81.6%
Geriatric home	14	6.1%	87.7%
Emergencies	13	5.7%	93.4%
Home care	12	5.3%	98.7%
Others	2	0.9%	99.6%
UCI	1	0.4%	100%
Total	228	100%	--

ICU: Intensive Care Unit.
Source: prepared by the authors

Table 3. Frequency of use of the application according to educational level

	Absolute frequency	Relative frequency	Cumulative relative frequency
Medical Specialty	66	28.9%	28.9%
General Practitioner	41	18.0%	46.9%
Undergraduate in medicine	39	17.1%	64.0%
Medical residency	28	12.3%	76.3%
Sciences related to medicine	27	11.8%	88.1%
Nursing or nursing assistant	13	5.7%%	93.8%
Student of careers related to medicine	10	4.4%	98.2%
Others	4	1.8%	100%
Total	228	100.0%	--

Source: prepared by the authors.

Upon evaluating the number of times per week the application was used, it was documented that 63% of the users use it between 1 and 5 times, 22.5% use it between 5 and 10 times, and 14.5% use it more than 10 times per week. When asked whether the application facilitated clinical practice, 98.7% of respondents indicated that it did. Similarly, 97.8% indicated that it also facilitated decision-making. Likewise, 99.7% indicated that it helped identify problems in seniors, and 99.6% stated that it increased the speed of the geriatric assessment.

Considering that age could determine the frequency of use, an evaluation was conducted to determine whether there was an imbalance in the proportions according to age groups. However, none were found ($p = 0.631$). Moreover, no significant differences were found in the frequency of use according to the level of education ($p = 0.749$).

Differences were found between countries and the clinical practice setting (Figure 1). When comparing Colombia and Argentina, the proportion of App use in a hospital setting was significantly higher in Colombia (62.1% to 26.7%, $p = 0.013$). The same phenomenon was observed when comparing Colombia and Mexico (62.1% to 24.4%, $p < 0.001$). When contrasting Mexico and Argentina, no significant usage differences were found according to the area of care ($p = 0.181$).

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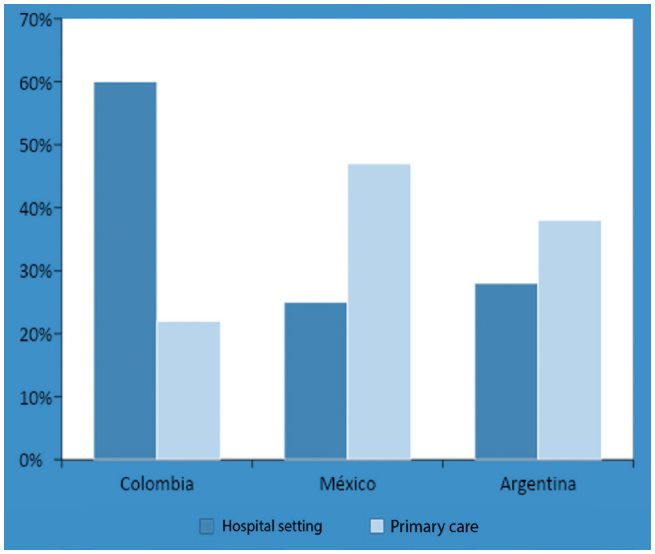

In Colombia, 60% of the respondents carried out their practice in hospitalization and 22% in primary care; in Mexico, 25% in hospitalization and 47% in primary care. In Argentina, 28% in hospitalization and 38% in primary care.

Figure 1. Distribution of the practice scenario among the countries with the highest number of surveys conducted.

Source: prepared by the authors

Discussion

GeriatriApp is one of the few applications in Spanish designed to improve CGA accessibility. The App's reach is throughout Latin America and Spain; its most significant use (38.2%) was observed in the App's country of origin (Colombia), possibly because of the greater dissemination through various media made by the creator group.

The age distribution showed a higher proportion of users under 30, an expected result, given that this generation has been more exposed to and familiar with mobile device technology and applications, a similar phenomenon observed in other studies. However, it is striking that, in the male group –the second group with the highest frequency of use– the most frequent users were those over 50. This finding could be distorted due to a bias on the part of those who conducted the survey, a phenomenon to be explored in future studies.

The survey results showed no statistically significant differences in the frequency of GeriatriApp use among the different age groups or differences according to educational level; this is not consistent with previous studies. Franko and contributors documented the lower use of medical Apps by professionals with more experience (16). Payne and contributors surveyed medical students and junior doctors and found a high level of app use in their practice (17).

Perception of usefulness and efficacy is high among application users. The majority of the respondents indicated that the App facilitated clinical practice and the identification of geriatric patient problems, streamlining CGA. Although limitations to the use of Apps, such as costs and the tools' usefulness and usability, have been described (18), this survey's data suggest that GeriatriApp overcomes these three barriers, possibly because it is free of charge; has a broad range of utilities, proposing the most frequently used scales in most of the CGA domains; and has a minimalistic and simple design.

This study's limitations arise mainly from the sampling methodology (non-probabilistic consecutive sampling). Similarly, the proportion of non-response was not quantified, and the causes of non-response were not examined. A plausible hypothesis is that those less satisfied with the application may have uninstalled it before responding and biased the responses towards more satisfied users. In addition, because this study evaluated the perceived usefulness of the application, a de novo measurement tool was developed without following a standardized process; this may have limited the understanding of the phenomenon, and other relevant aspects of the user's perception and experience may have been overlooked.

Conclusions

Healthcare personnel perceives the GeriatriApp as a very useful tool that allows them to perform a comprehensive geriatric assessment in less time, facilitating care and decision-making in the main scenarios where seniors receive health care and attention. However, a deeper study of mHealth in Latin America is necessary both in descriptive aspects such as use and user experience and the real impact of this type of tool on clinical outcomes.

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