



Mobile applications for medication management in the elderly: a systematic review

Aplicaciones móviles para el control de la medicación del adulto mayor: una revisión sistemática

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Abstract

The increasing use of mobile applications has profoundly influenced various facets of human progress, including the medical area. Electronic applications have demonstrated their ability to improve healthcare, monitor disease progression and serve as a constant stimulus for medication compliance in people with poly pathology. Bringing multiple advantages in monitoring medication consumption in older adults who often suffer from cognitive disorders. To determine the importance of the use of mobile applications as a medication aid in the older adult. The search was conducted in Scopus, Pubmed and Ovid, using terms such as "Technology", "mobile applications", "medication system", "medication in older adult", with a maximum age of 5 years. Mobile applications are

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valuable in improving medication adherence, particularly among the older adult population, depending on the method of engagement, whether through personal interaction, email or telephone means, and on the regularity of dispensing and the intended therapeutic target. Mobile applications improve medication adherence for various chronic diseases in older adults, in direct relation to the quality and quantity of medication and the sociodemographic characteristics of the patient, which favors medication recall.

Keywords: mobile apps, medication, elderly, biomedical technology

Resumen

La creciente utilización de aplicaciones móviles ha influido profundamente en diversas facetas del progreso humano, incluida el área médica. Las aplicaciones electrónicas han demostrado su capacidad para mejorar la atención sanitaria, supervisar el avance de las enfermedades y servir de estímulo constante para el cumplimiento de la medicación en personas con polipatología. Aportando múltiples ventajas en la supervisión del consumo de medicamentos en adultos mayores que a menudo padecen trastornos cognitivos. Determinar la importancia del uso de aplicaciones móviles como ayuda de la medicación en el adulto mayor. La búsqueda se realizó en Scopus, Pubmed y Ovid, usando términos como "Tecnología", "aplicaciones móviles", "sistema de medicación", "medicación en adulto mayor", con una antigüedad máxima de 5 años. Las aplicaciones móviles son valiosos para mejorar la adherencia a la medicación, particularmente entre la población adulta mayor, dependiendo del método de contratación, ya sea mediante la interacción personal, el correo electrónico o los medios telefónicos, y de la regularidad de la dispensación y del objetivo terapéutico previsto. Las aplicaciones móviles mejoran la adherencia a la medicación para diversas enfermedades crónicas en adultos mayores, en relación directa con la calidad y cantidad de la medicación y las características

sociodemográficas del paciente, lo que favorece el recuerdo de la medicación.

Palabras clave: Aplicaciones móviles, medicación, ancianos, tecnología biomédica

Introduction

In recent decades, the advancement of technology has led the Internet, social networks and applications to become the focal point of global communication. This phenomenon is evident in all aspects of human life, including the field of healthcare. In light of this, the increasing use of electronic devices is becoming more and more evident. However, this trend is not limited to the millennial population alone. According to The Pew Research Center's Internet & American Life Project, a sizable percentage of older adults worldwide, specifically over 15%, own at least one tablet or smartphone (Leslie et al., 2016). Thus, the democratization of information through the internet and different technological devices in all age ranges is an increasingly visible fact.

Now, a particularity of this technological development is precisely the application it has had in the healthcare field, a situation that according to the World Health Organization (WHO) is known as eHealth, a term used for the practice of healthcare supported by Information and Communication Technologies (ICT). (Sánchez Rodríguez et al., 2018). In such a way, that this tool has shown great acceptance by different types of users; a situation that is evidenced by the creation of more than 400,000 health applications, the same, are available for download in mobile application stores worldwide (van der Storm et al., 2023).. Mobile health (mHealth) represents a modern version of e-health, which focuses on the use of smartphones and technologies in public health.modifying health behaviors, fosters patient skills and accelerates the treatment of diseases, especially chronic ones (Rodríguez Mariblanca and Cano de la Cuerda, 2021)..

That is why, the development of mobile applications can facilitate access to health, by acting cognitively and behaviorally on the patient's habits, providing a unique ability to empower and monitor

their current situation (Sánchez Rodríguez et al., 2018), promoting the opportunity to improve patient-physician communication and above all a role in the control of different diseases (Patel et al., 2013).

In the case of older adults, new technology platforms aimed at improving healthcare are used after education and technological support to make the experience simple and easy to use, but represent a potential for medical support, which, while not replacing the experience with a healthcare provider, represents a widely useful clinical tool, especially for following up on medical treatments (Pergolotti et al., 2019).. Mobile applications in older adults may have effectiveness due to the very high percentage in the elderly population who have multiple comorbidities that are associated with the need for pathology control, where their treatment is daily and long-term, so it is important to maintain good medication adherence and strict control for disease management (Leslie et al., 2016).

In this regard, the Center for Disease Control and Prevention (CDC) estimates that the prevalence of elderly people suffering from chronic diseases related to diabetes, hyperlipidemia and arterial hypertension is very high, reaching percentages of up to 70% and it is believed that it will continue to increase over the years (Nurakysh et al., 2022).. Additionally, the WHO estimates that overall adherence to medication intake in patients with chronic diseases is only 50%, which means that only 5 out of 10 patients adhere correctly to treatment (Ping et al., 2022).

In relation to the above, the chronicity in pathologies and the lack of adherence is an aspect of care due to the fact that a treatment must have an adherence of at least 80% to be considered effective and thus avoid the consequences of poor adherence such as high costs of medical care and worse clinical outcomes (Lee et al., 2022). For this reason, patient participation is essential since the success of the treatment will depend on their collaboration, especially in the follow-up and taking of medication (Al-Arkee et al., 2021)..

Previous studies have investigated the usability attributes of mobile applications, but so far, few have focused on older users, whose needs differ from those of the younger generation who grew up with cell phones and touchscreen technology (Nurakysh et al., 2022).. Technological progress has recently resulted in the implementation

of mobile applications in healthcare to improve clinical outcomes for patients. Studies have confirmed that one of the best options for patients who miss medication due to forgetfulness is a medication reminder by a short message (Ping et al., 2022).

In this context, it is important to know that medication adherence is a complex behavior that is influenced by multiple factors that are associated with the patient, the physician, the pharmacist, and the specific treatment (Haramiova et al., 2017).. The development of interventions to address medication nonadherence is important to improve health outcomes (Al-Arkee et al., 2021).. For this reason, it is important to investigate medication nonadherence, which can be intentional when the decision is premeditated by the patient and unintentional when there are physiological factors such as memory loss, loss of senses such as vision and hearing in order to develop tools that are adapted to the needs of patients by increasing treatment adherence and improving a health problem in the geriatric population (Lee et al., 2022; Ping et al., 2022)..

From the above, the need for systematic research on mobile applications for medication management in older adults is revealed, by identifying it as crucial, because it allows a comprehensive evaluation of its effectiveness in improving medication adherence in a population susceptible to complex medical treatments, enabling the comparison of mobile applications with traditional methods, in such a way, that the systematic literature review (SLR) contributes to scientific knowledge by identifying areas that require further research and development in health technology for older adults. Consequently, despite the increasing adoption of mobile applications in healthcare, few studies have investigated how they work and are useful for older adults, whose needs and challenges differ from those of younger generations. Hence, the aim of the manuscript aims to determine the importance of the use of mobile applications as medication aids in the older adult.

Methodology

For the following research, the systematic review type was used, which was carried out using the PRISMA statement model. The systematic literature search was performed in high impact scientific

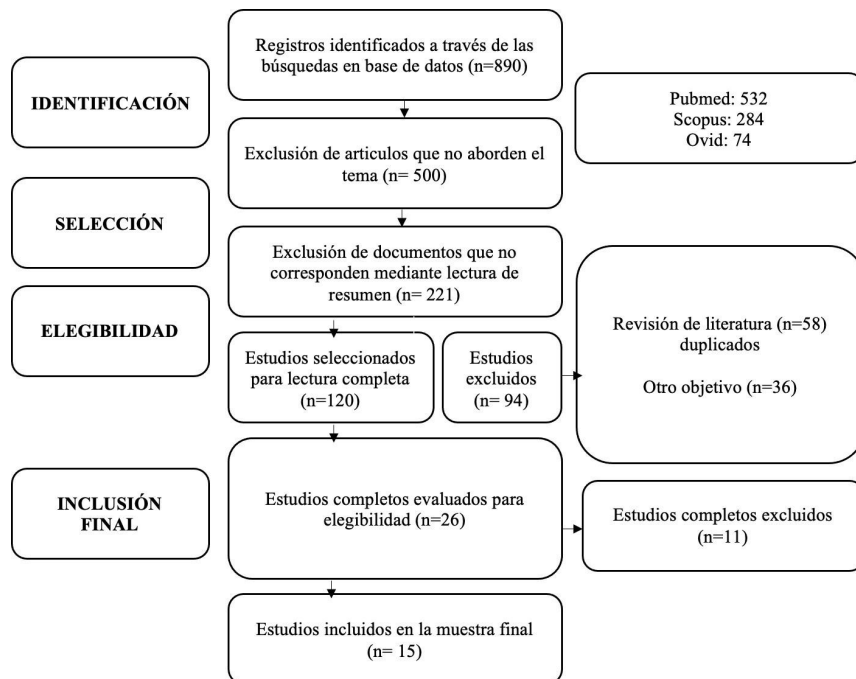
sources, such as: Pubmed, Ovid and Scopus, The MeSH/DeCS terms used for the search were: "technology", "medication system", "medication in older adult".

Only original articles, published in English and Spanish between 2018 and 2022 and open access, will be included in the research.

All documents that are not relevant to the subject matter will be excluded, and the research must have been conducted in the older adult age group. This review was guided by the following research question: Is there a benefit with the use of mobile applications for the control of medication in the elderly?

Figure 1 shows the systematic search process. The initial search resulted in 890 manuscripts (PubMed=532, SCOPUS=284, OVID=74), after eliminating duplicate articles and applying the inclusion and exclusion criteria, 120 manuscripts were obtained. Finally, 15 documents were selected to be analyzed in the study.

Figure 1. Flow chart of the search under the prism methodology.



Results

Over the past few decades, the accelerated development and advancement of technology has brought about very marked changes in virtually every aspect of human endeavor with major implications for health (Abernethy et al., 2022).. Thanks to the rise of information and communication technologies (ICT) applied to health, it is possible to open new windows of opportunity for population health coverage and their respective monitoring of the different pathologies and their evolution and management (Sánchez Rodríguez et al., 2018).

In relation, in the field of medicine, pharmacotherapy remains one of the main strategies in the intervention of medicine; however, there are still large gaps that fail to be solved, for example, one of the biggest problems in taking medication is to do it routinely (Tabi et al., 2019). Thus, adherence to prescribed pharmacotherapeutic regimens is crucial to maintain the clinical efficacy of prescriptions, especially in chronic diseases (Ping et al., 2022). (Ping et al., 2022).

Reason why, the increase in the number of chronic diseases results in the growth of financial expenditures in the health care system worldwide (Leslie et al., 2016). Non-communicable diseases are the cause of 41,000,000 deaths in a year, which is equivalent to 70% of all deaths in the world (Ping et al., 2022).

Thus, chronic diseases in older adult patients are one of the main Public Health challenges in the world (Gong et al., 2020). Among many of the pathologies that entail higher daily medication use in older adults is arterial hypertension, which has been described as one of the reasons for the development of cardiovascular diseases that have ended in high mortality, implying that these diseases should be more meticulously assessed and that they need more measures to be effectively controlled (Gong et al., 2020; Nurakysh et al., 2022)..

Despite the above, the rate of compliance with preventive medication in chronic cardiovascular diseases is found to be 55% and 9% of cardiovascular disease complication events, a situation attributed to poor medication compliance (Al-Arkee et al., 2021).. In relation, the effective control of chronic diseases is closely linked to the patient's adherence to treatment; thus, good adherence to medications

contributes to improve health outcomes, reduce hospitalization and medication costs, and reduce the cost of treatment (Ping et al., 2022). (Ping et al., 2022).

Normally, adherence to treatment should have a compliance of more than 80% for it to work effectively, despite this, in chronic diseases this value can be as low as 50% (Ping et al., 2022). (Ping et al., 2022). In addition, there are different factors that cause pharmacological adherence to be affected, for example, polypharmacy (Tan et al., 2022). In addition, inadequate adherence to treatment among adults is also attributed to a higher prevalence of comorbidities and cognitive impairment in the patient who is unable to remember medication dosage taking (Ping et al., 2022).

Now, as mentioned, polypharmacy is considered one of the most important reasons that create the need to seek an adequate control of drug administration, where a correct use of drugs is essential and where it is required to follow up and improve adherence to treatment (Tan et al., 2022).

In response to this issue, in recent years, emerging technological innovations have transformed the health care landscape by providing new opportunities for chronic disease management of the elderly (Tan et al., 2022). However, it should be considered that, in the current context, medication adherence in older adults is still considered relatively poor (Ping et al., 2022). From this perspective, cell phones are useful tools for their control, however, their effectiveness is still under investigation (Gong et al., 2020). (Gong et al., 2020).

Such is the case of medication reminder applications, which, despite their effectiveness, still have a somewhat limited use but provide users with multiple benefits (Ping et al., 2022). Thus, at present, the mobile health digital market or mHealth offers a variety of mobile applications in the health field, for example, applications to support the administration of medications, monitor blood pressure, schedule medical appointments, among others; being considered a public health tool supported by mobile devices (Paiva et al., 2020).

In the case of polypharmacy, a mobile application provides users with multiple functions such as, for example, having all the medications that the patient uses stored with images of these so that the frequency

and correct doses of the medications can be shown, resulting in a simpler and more accessible control mechanism for the person taking the medication. (Tan et al., 2022).

Thus, different statistical studies indicate that in terms of health in older adults the most popular software are those that are oriented to direct patients in the timely application of medications, help to record vital parameters such as blood pressure and glucose levels, or educate about possible lifestyle modifications (Skrzypecki et al., 2019)..

Similarly, certain apps allow users to understand pharmacological effects, and monitor outcomes; hence, the use of an app is a reliable method for medication management before the patient's condition may become critical (Tabi et al., 2019).

In the case of the elderly, the most optimal target in the can be altered by medication noncompliance (Zhang et al., 2020).. Thus, through the use of mobile health technologies, especially mobile applications, medication adherence and, in general, improved clinical outcomes can be enhanced (Al-Arkee et al., 2021). (Al-Arkee et al., 2021).. However, despite the practicality of the use of mobile applications for the general population, when it comes to elderly users, some factors must be considered, such as accessibility (Paiva et al., 2020).

Thus, according to statistics, the most downloaded health applications for geriatric care are Medscape, MIMS, and Epocrates; apps that have multiple options in terms of disease management, medical dictionaries, and pharmacological reminders (Berauk et al., 2018)..

Another benefit is the possibility of scheduling remote reminders, which have been shown to be effective in improving medication adherence (Tan et al., 2022). The use of the smartphone application according to studies resulted in being a small improvement in self-reported medication adherence, covering patients who have presented non-adherence (Morawski et al., 2018)..

The above mentioned so far leads to the reflection that technological innovations provide a viable solution to perform multicomponent

interventions alleviating the burden on hospital resources (Tan et al., 2022). Where the use of e-health and mobile health technology as primary prevention in older adults is evidenced in studies where the scope of the use of these tools for disease prevention has been demonstrated (Kampmeijer et al., 2016).. In this way, it is how digital interventions such as smartphone apps become over time an agile way to support medicine and patients, even more so with medication adherence and chronic disease management (Márquez Contreras et al., 2019)..

However, it is necessary to mention that, despite their multiple functions, benefits and accessibility, the use of mobile applications for medication management in the elderly is still low, since figures indicate usage percentages of 2.6%, a situation that could be related to multiple factors such as age, ethnicity, participation in computer courses, comorbidities, medication adherence, and polypharmacy per se (Zhang et al., 2020).

In relation to the aforementioned, one should consider characteristics of the geriatric public that cause rejection of mobile health applications, for example, cognitive barriers such as the need for more time to learn, lack of motivation, physical capacity - poor visual acuity, and perception; categories that justify the lack of adoption of mHealth in older adults despite the benefits that these applications can provide (Paiva et al., 2020).

Finally, one aspect that should be carefully considered is the fact that healthcare apps that are used to monitor, guide, diagnose, or treat patients should be considered medical devices and, therefore, comply with medical device regulations that allow for the assessment of their efficacy and veracity, not to mention that if apps that collect and/or process medical data must comply with data privacy regulations (Al-Arkee et al., 2021).. From this view, healthcare personnel should review apps themselves before issuing recommendations to patients (Skrzypecki et al., 2019).. Additionally, it should be considered that, the large number of mobile health (mHealth) apps available in commercial app stores makes it difficult for lay users and healthcare professionals to choose the right one for their individual needs, even more so the geriatric population (Berauk et al., 2018)..

Technology adoption as a strategy to improve medication adherence in older adults.

According to Lesli et al, in the relevant results of their research interprets that strategies to improve medication adherence will vary according to the mode of medication entry, this means that it varies according to the person, mail, phone, etc., as well as the frequency of administration and the target audience of the treatment, these trials conducted on mobile applications describe the positive effectiveness of these interventions as reminder methods in selected populations such as the elderly population (Leslie et al., 2016).

Tan et al, in their trial with 16 older adults with the use of technology as a frailty prevention tool had a significant improvement, overall, this means that there is a good acceptance of technology in the medical resources of older adults (Kampmeijer et al., 2016)..

Ying Jong in the results on her research on the use of apps as medication reminders was a by 2.6% where the factors most associated to differentiate their use were age, ethnicity, educational level, health literacy, comorbidities, medication adherence, and polypharmacy (Zhang et al., 2020).

Saule et al, in their research concluded that adherence to treatment in patients with arterial hypertension increased with the use of mobile applications on the patients' cell phones, thus demonstrating a positive effect on their use. (Nurakys et al., 2022)..

Shahd et al. in their research included 16 different articles from the last 6 years old, where in a total of 12 reported medication adherence as the primary outcome, being that medication adherence rates showed statistically significant improvements (Al-Arkee et al., 2021)..

Manuscript synthesis

Table 1 describes the articles that were selected for the study, in order to present their metadata and main results.

Table 1. Articles analyzed

Base	Magazine	Title	Year and author	Target	Main results
PubMed	Journal of Managed Care & Specialty Pharmacy	A multichannel intervention for medication adherence influences patient and prescriber behavior	Scott, et al. 2016	To evaluate the impact of a quasi-experimental multichannel adherence intervention on beneficiary medication adherence and health plan quality performance measures for 2 MA-PD plans.	During the first year of the intervention, the response rate of the prescribers was 53.7%. Positive influence of the intervention on adherence to HTA and CHOL was shown. The odds of achieving adherence (PDC \geq 80%) were higher in the intervention group compared with the control for HTA.
PubMed	Neurology (English Edition Journal)	Neurorehabilitation and apps: a systematic review of mobile apps.	Sanchez et al. 2018	To carry out a systematic review of the published information on applications aimed at the field of neurorehabilitation, in order to classify them and describe their main characteristics.	There are numerous applications with potential for use in the field of neurorehabilitation, so it is important that developers and designers understand the needs of people with neurological disorders so that their products are valid and effective in light of those needs.
PubMed	Surgical endoscopy.	Mobile applications in gastrointestinal surgery: a systematic review.	L van der Storm et al. 2023	To provide an overview of available gastrointestinal surgical applications and evaluate their prospects for the delivery of surgical care.	Thirty-eight articles describing twenty-nine applications were included. The applications were classified into seven categories: follow-up, weight loss, postoperative recovery, education, communication, prognosis, and clinical decision making.
PubMed	Acta Informatica Medica Journal	Evaluation of the effectiveness of mobile application on adherence in patients with arterial hypertension.	Nurakysh et al. 2022	The aim of the study was to evaluate the effect of the use of a mobile application on adherence to treatment in patients with diagnosed hypertension.	In the T1 period in both the GC and GI groups, moderate adherence to treatment was recorded with equal indices. After 12 months on the adherence scale in patients who used the mobile application "My Therapy" (IG), despite a slight decrease in scores, the results were relatively superior.
Elsevier	Exploratory Research in Clinical and Social Pharmacy	Prevalence and correlates of 'use and intention to use' medication reminder app among older adults.	Ping et al. 2022	To examine the prevalence and sociodemographic and health correlates of medication reminder app use and intention to use among older adults in Singapore.	The prevalence of use and intention to use the medication reminder application was low, at 2.6%. Age, ethnicity, educational level, previous participation in IT or computer-related courses, comorbidity, health literacy, medication adherence, and polypharmacy were correlated with app use and intention to use in multivariable analyses.

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PubMed	Journal of Medical Internet Research	Mobile applications to improve medication adherence in cardiovascular disease: systematic review and meta-analysis.	Al Arkee et al. 2021	To evaluate the effects of mobile healthcare applications on medication adherence and health-related outcomes in patients with CVD.	Medication adherence was shown as the primary outcome. Medication adherence rates showed statistically significant improvements. In addition, they reported improvement in systolic blood pressure, diastolic blood pressure, total cholesterol, and low-density lipoprotein cholesterol levels in the intervention group. In the 7 trials that evaluated the usability of the application, all were acceptable.
Ovid	Perspectives. Journal of National Academy of Medicine.	The promise of digital health: then, now and the future	Abernethy et al. 2022	Highlight the compelling possibilities and unresolved challenges for advancing reliable digital technology for the benefit of all people at every stage of their lives.	Identify structural, technical, and political preconditions for long-term progress; identify critical priorities for cooperation and collaboration among policymakers, practitioners, and industry leaders to drive the development and application of best-in-class digital health tools.
PubMed	JMIR mHealth and uHealth	Mobile applications for medication management: review and analysis.	Tabi et al. 2019	Provide an overview of available mobile apps, focusing on those that help patients understand and take their medications.	A total of 328 apps were categorized (175 Android and 153 iOS). Most apps were developed by the software industry (73 %, 11/15), a minority of them were co-developed by healthcare professionals (15 %, 3/20) or academia (2.1 %, 7/328). The most prevalent specialty was diabetes (23 applications). The most frequent functions were reminder, symptom tracking and the ability to share data with a family member or physician.
PubMed	Medicine (Baltimore)	Mobile health apps for the treatment of primary hypertension: a multicenter, randomized, controlled trial.	Gong et al. 2020	The purpose was to evaluate the impact of m-Health applications on blood pressure control and medication adherence.	At the end of the study, participants in the 2 groups had lower systolic blood pressure and diastolic blood pressure than at baseline, and the intervention group demonstrated a significantly greater reduction in systolic blood pressure and diastolic blood pressure than the control group (P<0.05). In addition, the percentage of participants with controlled blood pressure was higher in the intervention group (P<0.05). Medication adherence in the intervention group was much higher than in the control group (P<0.05).
Scopus	Frontiers in Medicine	Effectiveness and usability of a frailty assessment and intervention system in pre-frail older adults living in communities: a pilot study.	Tan et al. 2022	To explore the efficacy of SAIF in improving frailty status, physical performance and strength, and its usefulness in pre-fragile older adults.	There was a significant improvement in FFP score (-0.5, p < 0.05, effect size, r = 0.43), but not in CFS (-1.0, p = 0.10, r = 0.29). Five (31.3%) improved in their frailty status for both FFP and CFS. Three themes were identified: "Difficulty in module navigation" (barriers to SAIF interaction); "User engagement by gamification" (facilitators

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					encouraging participation); and "Perceived physical health benefits" (subjective improvements in physical well-being), which were corroborated by SUS (68/100) and interest-enjoyment (3.9/5.0) scores.
PubMed	Prior physical illness Journal	Mobile applications for healthcare of the elderly: a systematic mapping.	Paiva et al. 2020	Identify the state of the art in the literature related to the development of mobile applications for elderly health care, considering the point of view of health and software engineering.	A total of 2533 articles were found and, after applying our eligibility criteria, we obtained 149. We observed aspects related to the type of digital health initiative, using the classification proposed by the World Health Organization (WHO), the profile of older persons prioritized by the application, the spatio-temporal distribution of the studies, the type of empirical validation and the research contribution of each work.
PubMed	Clinical and Experimental Optometry	Patient-oriented mobile applications in ophthalmology	Skrzypecki et al. 2019	To analyze the market for patient-oriented mobile applications in ophthalmology.	Fifty-six applications were found that met the established criteria. The total number of downloads was estimated at 1.5 million, while the weighted average score for all applications was 4.21/5. The number of applications by subspecialty did not correlate with the prevalence of a particular eye disorder.
Scopus	Therapeutic Innovation & Regulatory Science	Mobile health apps for elderly care: review and comparison.	Laput et al. 2018	Evaluate the contents and features of mHealth applications for elderly care.	Twenty-five mHealth apps were evaluated. Medscape and Skyscape Medical Library are the most comprehensive mHealth apps for general drug information, physician referrals, clinical scoring, and medical calculator. The Alzheimer's Disease Pocketcard and Confusion: Delirium & Dementia: A Bedside Guide apps are recommended for clinical assessment, diagnosis, medication information, and treatment of geriatric patients with Alzheimer's disease, delirium, and dementia.
PubMed	JAMA Internal Medicine Journal	Association of a smartphone app with medication adherence and blood pressure control: randomized clinical trial MedISAFE-BP.	Morawski et al. 2018	To determine whether the Medisafe smartphone app improves medication adherence and blood pressure control.	Participants had a mean age of 52.0 years and a mean body mass index, calculated as weight in kilograms divided by height in meters squared, of 35.5; 247 (60%) were female and 103 (25%) were black. After 12 weeks, mean (SD) MMAS score improved by 0.4 (1.5) among intervention participants and remained unchanged among controls (between-group difference: 0.4; 95 % CI, 0.1 to 0.7; P = 0.01). Mean systolic blood pressure (SD) at baseline was 151.4 (9.0) mm Hg and 151.3 (9.4) mm Hg, among intervention and control participants, respectively. After 12 weeks, mean systolic blood

				pressure (SD) decreased 10.6 (16.0) mm Hg among intervention participants and 10.1 (15.4) mm Hg among controls (between-group difference: -0.5; 95 % CI, -3.7 to 2.7; P = 0.78.
PubMed	BMC Health Services Research	The use of e-health and m-health tools in health promotion and primary prevention among older adults: a systematic review of the literature.	Kampmeijer, R. et al. 2016.	<p>The initial search yielded 656 publications. After applying the inclusion and exclusion criteria, 45 publications were selected for review. In the reviewed publications, several types of e-health/m-health tools were described, namely applications, websites, devices, video consultations and webinars. The majority of the publications (60%) reported studies in the U.S. In 37% of the publications the study population was older adults in general, while the remaining publications studied a specific group of older adults (e.g., women or overweight individuals). The publications indicated several facilitators and barriers. The most commonly mentioned facilitator was the support for the use of e-health/health tools that older adults received.</p>
Taylor & Francis	Current Medical Research and Opinion	Hypertension-specific smartphone app for improving medication adherence in hypertension: a cluster randomized trial	Contreras E. 2019	<p>To evaluate the effectiveness of the intervention on pharmacological therapeutic adherence in mild to moderate arterial hypertension (AHT), through an application installed on a cell phone, as well as the degree of control achieved by the patient with this tool.</p> <p>A total of 148 patients completed the study. The mean age was 57.5 ± 9.9. Overall adherence was 77.02%. Daily adherence was 93.15% and 86.3% in the IG, and 70.66% and 62.66% in the CG after 6 and 12 months, respectively. The percentage of uncontrolled patients was 28.3% (CI = 21.05-35.55%). Hypertension control at 12 months was 17.8% and 38.6% for IG and CG, respectively.</p>

Source: Authors

Patel et al. in their research targeting 50 older adults evaluated the acceptance and use of mobile apps as a medication reminder for established hypertension where their population was 96% African American, with acquired diabetes in 50% and high BMI 40%, in addition to including in their study people with low health literacy, and low quality of life (Patel et al., 2013).

Zuzana et al, in research notes that short text messages are one of the best tools for short disease management, having a more adequate approach to treatment and treatment adherence (Nurakys et al., 2022)..

Ping et al, this study is the first to give a representative prevalence estimate of 2.6% of the use of medication reminder app devices in the elderly, in which respondents accepted the use of apps, but did not know how to use them, in addition to having predisposing factors such as age, where those older in age were less likely to use the apps (Ping et al., 2022).

Saule et al, conducted the first study on the evaluation of the adherence of patients in hypertension treatment using a mobile application, for the reason that good adherence to treatment gives a significantly higher probability in achieving better blood pressure control, thus helping to lower costs and lower use of health care resources (Márquez Contreras et al., 2019).

It also talks about the situation of the COVID-19 pandemic with the social distancing regime that was maintained that made the health care system transform worldwide, so the use of digital artifacts among people who need constant controls is an advantage as it is associated with low costs for the patient, time savings and in that time to a reduction of the risk of infection (Haramiova et al., 2017).

Conclusions

This study found that improvements in adherence to medications taken for the various chronic pathologies that afflict older adults are directly related to the quality and quantity of the medication, and the sociodemographic characteristics of the patient, which can cause a common compliance barrier, so the use of mobile applications that are used for medication reminders, both dosage and schedule is one of the tools that medicine has used of technology.

However, the prevalence of the use of medication reminder apps and the intention to use them is very low, meaning that there are other factors that influence the use of these apps, the main ones being the lack of knowledge of cell phone use or the use of medical apps.

Concluding that the use of technology as an aid to medicine is very important, since it allows us to perform different activities that will help the health of the patient in question, given that most patients who forget their medication are older adults, it is a population that should be trained more for the correct use of the application notifications, which will make the patient take their medication at the right time and have a good adherence to the treatment of their chronic disease.

Reference

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