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RESEARCH ARTICLE (ORIGINAL)

Older adults with type 2 diabetes mellitus: Contributions to understanding medication regimen management

Pessoa idosa com diabetes mellitus tipo 2: Contributos para a compreensão da gestão do regime medicamentoso

Anciano con diabetes mellitus de tipo 2: Contribuciones a la comprensión de la gestión del régimen de medicación

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Abstract
Background: Due to the population's aging, the prevalence of chronic illnesses, including diabetes mellitus, is increasing, and nurses have to face the challenges arising from the complexity of older adults' medication regimens and their optimal management.
Objective: To understand how older adults with diabetes mellitus manage their medication regimens.
Methodology: This is a descriptive qualitative study using an inductive approach. Twelve semi-structured interviews were conducted with older adults diagnosed with diabetes mellitus. The interviews were transcribed and analyzed using content analysis.
Results: Therapeutic success relates to how patients deal with the need to adhere to a medication regimen. Despite patients recognizing the need to take medication, intrinsic factors (such as gender and age) and extrinsic factors (treatment duration, underdeveloped health systems, and others) influence therapeutic success.
Conclusion: The study allowed understanding how patients manage their medication regimens. It confirmed that low adherence rates compromised therapeutic success and identified the urgent need for interventions that address the specific needs of chronically-ill patients.

Keywords: medication adherence; diabetes mellitus; aged; qualitative research; interview

Resumo
Enquadramento: Face ao envelhecimento populacional existe uma crescente prevalência de doenças crónicas entre elas a diabetes *mellitus.* A complexidade dos regimes medicamentosos destas pessoas e a otimização da sua gestão assume-se desafiante para os enfermeiros.
Objetivo: Compreender como a pessoa idosa com diabetes *mellitus* gere o seu regime medicamentoso.
Metodologia: Estudo descritivo, qualitativo e natureza indutiva. Realizadas 12 entrevistas semiestruturadas a pessoas idosas com diagnóstico de diabetes *mellitus*. O verbatim foi transcrito e analisado através de análise de conteúdo.
Resultados: O sucesso terapêutico relaciona-se com o modo como as pessoas lidam com a necessidade de aderir a um regime medicamentoso. Fatores intrínsecos (como sexo e idade) e fatores extrínsecos (como duração do tratamento, sistema de saúde pouco desenvolvido, entre outros) condicionam o sucesso terapêutico, ainda que a toma dos medicamentos seja reconhecida como necessária.
Conclusão: Este estudo permitiu compreender como as pessoas gerem o regime medicamentoso, corrobora que baixas taxas de adesão comprometem o sucesso terapêutico e estabelece como prementes intervenções dirigidas às necessidades concretas das pessoas com doença crónica.

Palavras-chave: adesão à medicação; diabetes mellitus; idoso; pesquisa qualitativa; entrevista

Resumen
Marco contextual: Ante el envejecimiento de la población, aumenta la prevalencia de enfermedades crónicas, entre ellas la diabetes *mellitus*. La complejidad de los regímenes de medicación de estas personas y la optimización de su gestión es un reto para los enfermeros.
Objetivo: Entender cómo el anciano con diabetes *mellitus* gestiona su régimen de medicación.
Metodología: Estudio descriptivo, cualitativo e inductivo. Se realizaron 12 entrevistas semiestructuradas a ancianos diagnosticados de diabetes *mellitus*. El texto se transcribió y analizó mediante un análisis de contenido.
Resultados: El éxito terapéutico está relacionado con la forma en que las personas afrontan la necesidad de cumplir un régimen de medicación. Los factores intrínsecos (como el sexo y la edad) y extrínsecos (como la duración del tratamiento, el sistema sanitario poco desarrollado, entre otros) condicionan el éxito terapéutico, aunque las personas reconozcan como necesario tomar medicamentos.
Conclusión: Este estudio permitió comprender cómo las personas gestionan su régimen de medicación, corrobora que las bajas tasas de adherencia comprometen el éxito terapéutico y establece la urgencia de llevar a cabo intervenciones dirigidas a las necesidades concretas de las personas con enfermedades crónicas.

Palabras clave: cumplimiento de la medicación; diabetes mellitus; anciano; investigación cualitativa; entrevista

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Introduction

Aging is a noticeable and topical phenomenon, with Portugal following the same trend as other countries in the world (Fundação Francisco Manuel dos Santos, 2019). Due to advancing age, older adults are more prone to chronic illnesses. Diabetes mellitus is the older population's most common illness, associated with high mortality rates, reduced functional capacity, and increased hospitalizations and institutionalizations. Combined with a chronic illness diagnosis, the need to adhere to a medication regimen is often complex. For instance, the medication adherence rate in developed countries is less than 60% (World Health Organization [WHO], 2003). There is a consensus that non-adherence to medication leads to serious individual and global consequences. Therefore, this study aims to understand how older adults with type 2 diabetes mellitus manage their medication regimens.

Background

The phenomenon of population aging is particularly noticeable in 21st-century societies. Its multifactorial, universal, and individual nature is transversal to most countries and cultures. Therefore, it is essential to design health policies focused on older adults' needs that allow them to remain socially participatory and active (Littlejohns & Wilson, 2019). Older people frequently face the diagnosis of at least one chronic illness associated with advancing age and followed by the need to adhere to a medication regimen, which is often complex (WHO, 2019). Hence, the increase in chronic illnesses demands the readjustment of policies, particularly in the areas of health, safety, and social assistance (Littlejohns & Wilson, 2019).

The diagnoses of type 2 diabetes mellitus are increasing. In 2013, they reached approximately 382 million people worldwide, and, in 2014, about 422 million people. The World Health Organization ([WHO] 2020) estimates that, by 2035, 592 million people will be diagnosed with type 2 diabetes mellitus. The *Sociedade Portuguesa de Diabetologia* (SPD - Portuguese Society of Diabetology) highlights that the considerable increase in the incidence and prevalence of diabetes mellitus may lead to severe problems in public health worldwide (SPD, 2019). A Portuguese study observed that more than 25% of people aged between 60 and 79 years had diabetes (SPD, 2019). Apart from documenting the prevalence of diabetes, a closer look at its associated mortality is essential. Each year, 41 million people die from chronic illnesses, and diabetes ranks fourth on the table with 1.6 million deaths (WHO, 2020). In 2012, episodes of hyperglycemia caused the death of 2.2 million people, and in 2016 it directly caused 1.6 million deaths (WHO, 2020).

Nevertheless, the evidence shows that if patients comply with the medication regimen and adopt a healthy lifestyle, the probability of dying from this condition decreases significantly (Atinga et al., 2018; Brown et al., 2016; Gast & Mathes, 2019; Leelakanok et al., 2017). Thus, chronically-ill older persons should adopt and maintain health-promoting behaviors to minimize and control possible adverse events that may compromise their quality of life (Al-Musawe et al., 2019; Brown et al., 2016). Considering adherence to a medication regimen as the compliance and agreement with the proposed regimen, which translates into the person's action and behavior regarding it (WHO, 2003), adherence to a medication regimen should be understood as the patient's active and voluntary acceptance and intervention, sharing with the health professional team the responsibility for therapeutic success. Thus, medication adherence goes beyond the daily intake of medication and includes taking the right medication at the right time, in the right dose, and with the recommended frequency (Atinga et al., 2018; Gast & Mathes, 2019).

Multiple factors cause non-adherence to medication and ineffective medication management. Identifying the factors conditioning non-adherence to medication is vital for implementing interventions aimed at patients' real needs (González-Bueno et al., 2019). Understanding the reality of non-adherence is challenging because it has many factors that differ from person to person, making it a sensitive and difficult issue to solve. Promoting medication adherence is a sensitive area for nursing care. Nurses are in a privileged position to guide, as a dyad, older adults towards therapeutic success and health promotion, encouraging the acquisition of new behaviors for the adoption of healthy lifestyles. An issue that policymakers should consider (Atinga et al., 2018; Gast & Mathes, 2019). Nursing faces the major challenge of identifying each person's needs and helping them respond positively to the transitions that occur throughout the life cycle, such as when a chronic illness is diagnosed. Hence, it is crucial to understand how older adults with type 2 diabetes mellitus manage their medication regimens.

Research question

How do older adults with type 2 diabetes mellitus manage their medication regimens?

Methodology

This is a descriptive qualitative study that uses an inductive approach. Data were collected through face-to-face semi-structured interviews, respecting all the principles of this data collection strategy. The interviews were audio-recorded and transcribed word by word. The transcripts were analyzed using content analysis. The Consolidated Criteria for Reporting Qualitative Research (COREQ) were used to guide research procedures, thus attesting to the rigor of the study's development.

Twelve patients from Family Health Units (FHUs) were selected as participants for the study. They had i) a medical diagnosis of non-insulin-treated type 2 diabetes mellitus, were ii) 65 years or more, and iii) were followed by a physician and nurse of the selected FHUs for diabetes control and monitoring. The inclusion criteria were: i)

people living in their homes, responsible for managing their medication regimen, ii) Portuguese speakers, iii) medicated with oral antidiabetic medication, and iv) with a medical consultation in the last six months. The inclusion criteria were verified through a retrospective review of the patients' clinical records. The exclusion criteria were i) people on insulin medication, ii) with decompensated cognitive or sensory impairment, iii) in need of palliative care, and iv) living in nursing homes or on a waiting list. All the participants selected for the interviews agreed to participate in the study and signed the informed consent form drawn up through the website of the Directorate-General for Health. The participants also agreed to speak freely about their experience in managing their medication regimens. The interviews were conducted for three months until data saturation was reached at the ninth interview. At that moment, it was decided to carry out three more interviews to confirm the absence of new findings.

All interviews were conducted in an available office, guaranteeing the privacy, secrecy, and confidentiality of all information shared. The principal investigator conducted the 12 semi-structured face-to-face interviews and took field notes, primarily of nonverbal language and paralanguage. Before the recording began, sociodemographic and clinical data were collected to characterize each participant. The interviews were structured and based on three questions: 1) How do you feel about having diabetes and having to take medication every day? 2) How do you manage your medication regimen? 3) What type of interventions implemented by health professionals (physician, nurse) do you consider relevant to help you comply with your medication regimen?

The duration of the interviews ranged from 26 to 44 minutes, with a mean of 30 minutes.

Data were analyzed using inductive content analysis, including data coding, organization, and classification into main themes, concepts, and categories and data abstraction, following the steps recommended by Kyngäs et al. (2020). Thus, the first step included the preparation, organization, and free-floating reading of the transcripts. The second step allowed listing parts of the text and selecting categories. The last step was the elaboration of inferences from the information obtained (Kyngäs et al., 2020). The categories translate topics/ aspects that, due to their similarity, the researcher groups, attributing a name to that group, which constitutes the category or subcategory The categories or subcategories translated the topics/ aspects that the investigator grouped due to their similarity and assigned a name (Gonçalves et al., 2021). Thus, the interviews were first transcribed from the audio recordings, read and reread until all meanings were comprehensively understood. Using the inductive approach, the transcripts, including overt content, non-verbal communication, and paralanguage, were analyzed, organized according to similarity, and classified into categories and subcategories. Then, the data were independently analyzed, coded, and organized by another investigator. The NVIVO 10 computer software was also used to assist coding.

Four categories and 12 subcategories emerged from this process, describing how older persons diagnosed with type 2 diabetes mellitus manage their medication regimens. Thus, the central axis of the analysis was the medication management of older adults with diabetes, considering the factors that may interfere with medication management and adherence. The conceptual model known as The Five Dimensions of Adherence (WHO, 2003) was adopted as a reference.

A final telephone contact was made to ensure and legitimize the credibility of the results and their interpretation. These were also validated by an investigator experienced in qualitative research, which confirmed that the interpretations corresponded to the participants' reality and that the coding process was carried out rigorously. To guarantee the study's reliability, data collection was based on the audio-recorded interviews, which took place in a quiet environment without interruptions. Each interview was fully transcribed on the day it took place, which made it possible to consider, among others, body expressions, pauses, and silences. Thus, the participants' discourses exemplify their perspectives and confirm the interpretations made.

This study was approved by the Ethics Committee of the Regional Health Administration of Algarve (Opinion no. 8208/16) and the National Data Protection Commission (Authorization no. 5488/16). Participants understood that their participation was voluntary and were asked to sign the informed consent form only if they agreed to collaborate. This research is one of the study phases conducted within the scope of a Ph.D. in Nursing.

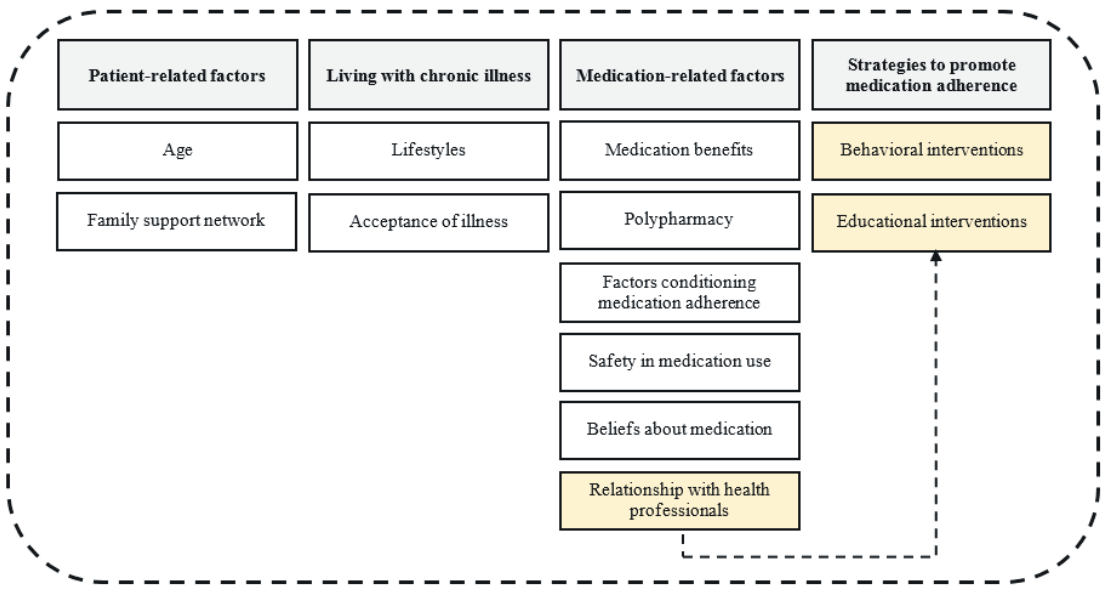
Results

The participants, six men and six women, were 67 or older, with a mean of 75 years. Their level of education varied greatly as 8.33% of the participants had no level of education, 25% could read and write, 25% had completed the 1st cycle of basic education, 33.34% had the 3rd cycle of basic education, and 8.33% had completed secondary education. Seven lived with their spouses, and five lived alone. Regarding polypharmacy, participants had a mean of 4.83 prescribed medications (median = 5, mode = 5 and *SD* = 1.740) and took a mean of 7.67 medications per day (median = 8 and mode = 10).

The participants' experiences regarding medication management were organized into four categories (patient-related factors, living with chronic illness, medication-related factors, and strategies to promote medication adherence) and 12 subcategories (Figure 1). Significantly, the results highlighted the importance of health professionals' role as promoters of medication adherence and recognized them as facilitators of medication adherence promotion strategies. Therefore, the relationship between health professionals and patients is vital since the lack of trust compromises therapeutic success.

Figure 1

Categories and subcategories emerged from the interviews



Patient-related factors

The participants associated the need to adhere to a medication regimen with advancing age: "before I was old, I did not need to take any medication, I did not have any health problems ... age is unforgiving" (P1). The lack of a family support network is also seen as a predictor of non-adherence to medication: "I am the one who takes care of my medication, my husband cannot help me, and my son does not understand any of this either" (P3); "I do not ask my son for help because he does not understand any of this and because he also has his own problems" (P11).

Living with chronic illness

Living with one or more chronic illnesses and the need to adopt a healthy lifestyle is not well accepted. It is considered as restrictive: "I was used to eating whatever I felt like and having to follow a diet did not please me at all, so I sometimes misbehave" (P1); "when people reach the end of their lives, they cannot eat whatever they feel like. ... I secretly eat sweets" (P2); "I do not think it is fair with the few years of life I have left that I have to be careful about what I eat" (P12).

Having to adopt a healthy lifestyle in old age is not well accepted. The medical diagnosis is even omitted from the family to maintain their usual lifestyle: "I hid from my family and friends that I was diabetic, so I could continue to do everything I did before" (P8).

Regarding the chronic illness diagnosis, participants see it as a negative life experience: "It is bad" (P6); "it is a real nuisance" (P7); "it is embarrassing, on top of that I forbade my wife to tell my children that I had diabetes" (P10).

Medication-related factors

This category includes the following subcategories: i) medication benefits; ii) polypharmacy; iii) factors conditioning medication adherence; iv) safety in medication use; v) beliefs about medication; vi) and relationship with health professionals, in which older adults expressed that living with the need for daily medication arouses feelings of dependence ("for me, I see it as a dependence" [P4]).

Regarding the benefits of medication, older persons believe that physicians prescribe the medications because they are necessary and beneficial for maintaining autonomy and disease control: "I believe that the doctor prescribes the medications because they are good for me" (P5). However, related to this feeling, older adults also reported that taking oral antidiabetic medications did not contribute to their well-being: "I do not feel anything special in terms of benefits, the only advantage is the fact that my blood tests are better when I take the medication" (P6).

Polypharmacy emerges as a real and transversal problem for the participants, who mentioned: "I take a lot of medication every day" (P9); "I have pills at home that I do not know what they are for" (P3); "I have to divide the pills into boxes because I take a lot of them" (P12); "the doctor should prescribe less" (P12).

Regarding the factors conditioning adherence, the way people face the need to adhere to a medication regimen significantly interferes with their behavior: "I just do not like taking pills" (P8). The fact it is a chronic illness also appears as an obstacle to therapeutic success: "if this was like an antibiotic, I could tolerate it, but having to take all those pills every day until the end of my life is bad" (P2); as well as forgetting to take the medication: "Sometimes I forget the medication" (P1); "sometimes I forget, especially when I go out to dinner" (P8); and its economic cost: "the pills are very expensive, and I do not have money to buy all the medication" (P3); "the doctor should take into consideration the medication cost when prescribing, not everyone can afford it" (P12).

In terms of safety in medication use, older adults have difficulties in daily management: "I do not see very well anymore, the packages have small letters, and the pills are not very big ... the greatest difficulty is to distinguish the pills" (P2); "I distinguish the pills by colors and shapes, I can no longer read the names" (P3); "the pharmacist shows me the pills, and I memorize the ones I have to take by color and size" (P11). Older adults also mention that beliefs about medications interfere in their management: "fear that the medication will hurt my stomach" (P5); "I am afraid to take so many pills" (P7); "I saw a news report on TV where they said that medications kill" (P8). A distant relationship with the health professional also contributes to non-adherence: "there are some pills that I stopped taking . . . but I did not tell them because I am afraid they will get angry with me" (P3); "the doctor and the nurse should work together" (P8); "there should be a closer monitoring . . . maybe my attitude toward pills comes from the lack of interest of the health professionals" (P10).

Strategies to promote medication adherence

The older persons interviewed recognized nurses' ability to promote adherent behavior: "I believe that nurses could help me always take my medication" (P1); "if nurses had more time to help me with my pills, I would feel safer" (P9).

Two subcategories emerged in this category: behavioral interventions and educational interventions.

Behavioral interventions include activities aimed at increasing communication and counseling, simplifying medication regimens, and involving users in the treatment: "boxes already prepared with the medication for the week" (P1); "nurses should be able to go to people's homes" (P3); "the nurse should talk to us in the consultation and then make a phone call" (P12).

Regarding educational interventions, older people recognized that educational programs are a valuable tool to increase people's knowledge: "they could clarify our doubts and fears and give us a paper at the end so that I could show it to my children" (P7); "more support, more information because maybe I am irresponsible due to the lack of knowledge" (P10); "they could even hold joint sessions to share ideas" (P4).

The statements described above allow understanding the importance of information transmission and the predisposing factors for non-adherence.

Discussion

The data obtained in this study require a deep reflection and a multifactorial approach. If, on the one hand, there is the chronic illness diagnosis and the prescription of a medication regimen, on the other, there is a person with beliefs and experiences that will condition the course of this transition phase. Living with daily medication intake is a complex, exhausting, and dynamic process (Al-Musawe et al., 2019; Gast & Mathes, 2019), particularly for the older population due to the physiological changes associated with aging (WHO, 2019). Managing a medication regimen requires skills and abilities as well as incorporating a panoply of behaviors into daily life through differentiated help (Gast & Mathes, 2019; WHO, 2019). Similar to other studies, the older adults interviewed recognized that medications are necessary for maintaining health and promoting quality of life. However, their management is compromised due to intrinsic factors (such as gender, age, cognitive changes, forgetfulness, among others) and extrinsic factors (such as medication regimen complexity and underdeveloped national health systems) (Al-Musawe et al., 2019; Brown et al., 2016). Therefore, it is urgent to explore further the issues interfering with adherence, as ineffective management can lead to loss of autonomy, independence, quality of life, increased morbidity, and mortality (Brown et al., 2016; Karam et al., 2020).

This study's findings revealed that living with medication implies a lifestyle readjustment. Thus, nurses should design and implement strategies allowing older people to experience this transitional phase in a healthy, harmonious, and positive way (Karam et al., 2020).

It is possible to infer, considering the transcripts, that the chronic illness diagnosis is not always positively integrated into health experiences, which hinders a healthy transition and, as a consequence, the acceptance of the medication prescribed, which seems to condition future behavior. Moreover, changing a behavior acquired throughout life appears challenging since it is a complex and lengthy process with many setbacks.

Regarding the medication-related factors, the participants gave particular emphasis to polypharmacy. Morin et al. (2018) observed that older persons were exposed to a mean of 4.6 different medications at baseline. They verified the prevalence of 44% of polypharmacy (more than five medications) and 11.7% of excessive polypharmacy (more than ten medications), and the overmedication of 55.7% of the participants in their study. In turn, Midão et al. (2018) reported between 26.3% and 39.9% of polypharmacy in European older adults. This scenario raises serious concerns about the aging population's health as the medication regimen complexity limits daily routines (Al-Musawe et al., 2019; Leelakanok et al., 2017; Midão et al., 2018; WHO, 2019). According to scientific evidence, regular intake of more than five medications is a predictor of adverse drug reactions, directly associated with increased macrovascular complications, hospitalizations, and all-cause mortality (Al-Musawe et al., 2019; Leelakanok et al., 2017; WHO, 2019).

Significantly, medication regimen complexity is not restricted to the number of medications taken. It also relates to the recommended frequency of medication intake and the attitudes required to take the right medication at the right time, in the right dose (WHO, 2019). Thus, and according to previous evidence, the greater the number of medications prescribed and taken daily, the greater the risk of drug interactions and errors, leading to a greater likelihood of loss of quality of life, systemic complications, and death (Al-Musawe et al., 2019; WHO, 2019).

Therefore, medication schedules should be adapted to each individual, considering that the smaller the number

of schedules, the higher the adherence rate (Leelakanok et al., 2017). Furthermore, the literature argues that medication regimens should be simplified (Aminde et al., 2019; Brown et al., 2016).

In addition to complexity, another factor reported as conditioning adherence is having to take the chronic illness-prescribed medication for life. The obligation to maintain a medication regimen leads to a sense of dependence, increases frailty, and evokes feelings of sadness, anxiety, and anger (Al-Musawe et al., 2019; Leelakanok et al., 2017; WHO, 2003). The individual's behavior towards medication therapy affects the success of the care plan to maintain self-care and perceived quality of life. Thus, non-adherence can lead to severe adverse reactions, demanding complex medical and nursing interventions, which in turn will lead to increased health care costs through direct, indirect, and immeasurable expenses.

Unintentional non-adherence is predominantly due to forgetfulness, and participants do not use any reminder to facilitate daily medication intake. Similar findings were obtained in other studies (Aminde et al., 2019).

Reports of intentional non-adherence were also mentioned and are essentially related to beliefs and convictions. In a study developed by Tavares et al. (2013), 5.2% of the sample associated non-adherence with the domain of beliefs, with beliefs about medication contributing to its acceptance or non-acceptance. Thus, older adults must establish a relationship of trust with the health professional so that previously established beliefs about medication can be demystified and they can recognize the need to take medication to live a healthy life.

The findings of this study reinforce how essential it is for older adults to feel respected, legitimizing the importance of respect and trust in the patient-health care professional dyad. Nursing consultations should occur in a climate of respect and availability with a non-judgmental attitude to allow sharing people's daily routines and beliefs. This will enable obtaining information relevant to the health--illness process and describing actual behaviors (Brown et al., 2016). Moreover, older people value and attribute meaning to the health professional's words, smile, look, touch, and the time the professional spends with them and how the dialogue occurs. After changing a medication plan, nurses should telephone patients to monitor their adaptation and any adverse effects, doubts, and perceived benefits. Monitoring and surveilling older adults with these needs must not be limited to the physical space of the health unit (Brown et al., 2016). Moreover, nurses must instruct, teach and train patients, empowering independence and autonomy.

Considering the economic costs, it is worth noting that medications are expensive, representing a significant share of the family budget, and conditioning adherence (Tavares et al., 2016). Recognizing poverty can be disturbing for many people due to the social stigma and the sense of lack of control over their lives. Therefore, whenever a medication is prescribed and not purchased, the health professional responsible for managing the medication regimen should be notified of the absence of purchase. A well-designed and user-centered health information system would allow finding out why the medication was not purchased and propose alternative solutions.

Medication management depends on several factors and has different expressions. Given the above, medication adherence should be promoted considering the Five Dimensions of Adherence (WHO, 2003), identifying individual factors of non-adherence as a valuable tool in developing an individualized intervention plan. Patients are interested in acquiring the knowledge and skills to manage their illness and medication and value the physicians' and nurses' advice, guidance, and recommendations. They also mention that medication management depends on several factors (acceptance, beliefs, economic situation, among others) and arouses different feelings (need, dependence, anger, sadness). Implementing complex interventions at a multifactorial level can promote medication adherence.

This study had some limitations. First, the interviews were only conducted in two FHUs, pointing to the need to extend the analysis to other settings. Secondly, the investigator's lack of practice as an interviewer may have facilitated the overlooking of relevant aspects for understanding the phenomenon under study.

Conclusion

Managing a complex medication regimen proves to be exhausting and difficult for patients. Managing a medication regimen requires skills and abilities beyond taking the right medication at the right time. During the research, it was possible to observe that patients feel like passive agents, mere followers of the indications provided by health professionals, which contradicts what the literature advocates as essential to effective medication management. Patients recognize medication complexity as a conditioning factor for non-adherence, but there are other barriers, which is why this study has an added value. This research allowed understanding how people deal with a chronic illness diagnosis and manage the medication regimen. It allowed understating that people have difficulties managing their medication regimen and that the predictors of non-adherence are medication complexity, medication cost, and the relationship between the patient and the health professional. If nurses intervene in this dimension, they will promote medication adherence and, consequently, patients' well-being and quality of life.

Thus, nurses must value the complexity of older adults' medication regimen experiences, rapidly diagnose patients who manage their medication regimen ineffectively, intervene to overcome the factors causing non-adherence, and promote self-care in this area. The change will only be possible with perseverance, a structured family support network, and an effective partnership between patients and health professionals. Finally, this study confirms the difficulties experienced by older adults in managing their medication regimen and related to its complexity and the negative feelings and emotions experienced. It also reaffirms the need to develop research that results in interventions targeted at the specific needs of chron-

ically-ill older adults, followed by the implementation of interventional and personalized models that allow them to age in a healthy, active, and participatory way.

Author contributions

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References

Al-Musawe, L., Martins, A. P., Raposo, J. F., & Torre, C. (2019). The association between polypharmacy and adverse health consequences in elderly type 2 diabetes mellitus patients: A systematic review and meta-analysis. *Diabetes Research and Clinical Practice, 155*, 107804. https://doi.org/10.1016/j.diabres.2019.107804

Aminde, L. N., Tindong, M., Ngwasiri, C. A., Aminde, J. A., Njim, T., Fondong, A. A., & Takah, N. F. (2019). Adherence to antidiabetic medication and factors associated with non-adherence among patients with type-2 diabetes mellitus in two regional hospitals in Cameroon. *BMC Endocrine Disorders, 19*(1), 35. https://doi.org/10.1186/s12902-019-0360-9

Atinga, R. A., Yarney, L., & Gavu, N. M. (2018). Factors influencing long-term medication non-adherence among diabetes and hypertensive patients in Ghana: A qualitative investigation. *PLoS One, 13*(3), e0193995. https://doi.org/10.1371/journal.pone.0193995

Brown, M. T., Bussell, J., Dutta, S., Davis, K., Strong, S., & Mathew, S. (2016). Medication adherence: Truth and consequences. *The American Journal of the Medical Sciences, 351*(4), 387-399. https://doi.org/10.1016/j.amjms.2016.01.010

Fundação Francisco Manuel dos Santos. (2019). *População residente, estimativas a 31 de Dezembro: Total e por grupo etário*. PORDATA.

Gast, A., & Mathes, T. (2019). Medication adherence influencing factors-an (updated) overview of systematic reviews. *Systematic Reviews, 8*(1), 112. https://doi.org/10.1186/s13643-019-1014-8

Gonçalves, S. P., Gonçalves, J. P., & Marques, C. G. (2019). *Manual de investigação qualitativa: Conceção, análise e aplicações*. Pactor.

González-Bueno, J., Calvo-Cidoncha, E., Nieto-Martín, M. D., Ollero-Baturone, M., & Santos-Ramos, B. (2019). *Selection of interventions aimed at improving medication adherence in patients with multimorbidity. European Journal of Hospital Pharmacy, 26*(1), 39-45. https://doi.org/10.1136/ejhpharm-2017-001240

Karam, S. L., Dendy, J., Polu, S., & Blonde, L. (2020). Overview of therapeutic inertia in diabetes: Prevalence, causes, and consequences. *Diabetes Spectrum, 33*(1), 8-15. https://doi.org/10.2337/ds19-0029

Kyngäs, H., Kääriäinen, M., & Elo, S. (2020). The trustworthiness of content analysis. In H. Kyngäs, K. Mikkonen & M. Kääriäinen (Eds.), *The application of content analysis in nursing science research* (pp. 41-48). Springer.

Leelakanok, N., Holcombe, A. L., Lund, B. C., Gu, X., & Schweizer, M. L. (2017). Association between polypharmacy and death: A systematic review and meta-analysis. *Journal of the American Pharmacists Association, 57*(6), 729-738. https://doi.org/10.1016/j.japh.2017.06.002

Littlejohns, B. L., & Wilson, A. (2019). Strengthening complex systems for chronic disease prevention: A systematic review. *BMC Public Health, 19*(1), 729. https://doi.org/10.1186/s12889-019-7021-9

Midão, L., Giardini, A., Menditto, E., Kardas, P., & Costa, E. (2018). Polypharmacy prevalence among older adults based on the survey of health, ageing and retirement in Europe. *Archives of Gerontology and Geriatrics, 78*, 213-220. https://doi.org/10.1016/j.archger.2018.06.018

Morin, L., Johnell, K., Laroche, M. L., Fastbom, J., & Wastesson, J. W. (2018). The epidemiology of polypharmacy in older adults: Register-based prospective cohort study. *Clinical Epidemiology, 10*, 289-298. https://doi.org/10.2147/CLEP.S153458

Sociedade Portuguesa de Diabetologia, Observatório Nacional da Diabetes. (2019). *Diabetes: Factos e n*úmeros*: O ano de 2016, 2017 e 2018: Relatório anual do Observatório da Diabetes*. https://www.spd.pt/images/uploads/20210304-200808/DF&N-2019_Final.pdf

Tavares, N. U., Bertoldi, A. D., Mengue, S. S., Arrais, P. S., Luiza, V. L., Oliveira, M. A., Ramos, L. R., Farías, M. R., & Pizzol, T. D. (2016). Factors associated with low adherence to medicine treatment for chronic diseases in Brazil. *Revista de Saúde Pública, 50*(Suppl. 2), 10s. https://doi.org/10.1590/S1518-8787.2016050006150

Tavares, N. U., Bertoldi, A. D., Thume, E., Facchini, L. A., França, G. V., & Mengue, S. S. (2013). Factors associated with low adherence to medication in older adults. *Revista de Saúde Pública, 47*(6), 1092-1101. https://scielosp.org/article/rsp/2013.v47n6/1092-1101/pt/

World Health Organization. (2003). *Adherence to long-term therapies: Evidence for action*. https://www.who.int/chp/knowledge/publications/adherence_full_report.pdf

World Health Organization. (2019). *Medication safety in polypharmacy.* https://apps.who.int/iris/handle/10665/325454

World Health Organization. (2020). *World health statistics 2020: Monitoring health for the SDGs sustainable development goals*. https://www.who.int/publications/i/item/9789240005105