

Implementation intention in adherence to oral antidiabetic medications: intervention strategy validity

Implementation intention na adesão aos antidiabéticos orais: validação de estratégia de intervenção
Implementation intention en la adhesión a los antidiabéticos orales: validación de estrategia de intervención

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Abstract

Objective: To develop and validate a brief intervention strategy based on the concept of implementation intention to promote adherence to oral antidiabetics in people with type 2 diabetes mellitus being monitored in primary care.

Method: This is a methodological study carried out in a primary health unit in Carmo do Cajuru, Minas Gerais, Brazil, from May 2022 to April 2023. The stages taken involved intervention construction based on the concept of implementation intention, with validity of its content by seven experts and assessment of its comprehensibility by 11 people with type 2 diabetes mellitus. An expert committee assessed the intervention's relevance, comprehensibility and comprehensiveness, and the target audience exclusively assessed their comprehensibility through a cognitive interview. Agreement among experts was assessed by the item and total Content Validity Index (CVI), with item and total CVI being considered satisfactory ≥ 0.85 .

Results: The intervention strategy was called "Plan for coping with difficulties in taking oral antidiabetics", and its final validated version was composed of a set of initial instructions, a topic on intended behavior, a column with 13 possible difficulties and a column with 16 possible solutions to the difficulties listed. A total CVI of 0.99 was obtained, and the intervention strategy was understood by the target audience.

Conclusion: The brief intervention strategy obtained evidence of content validity. This technology can support and motivate healthcare professionals' practice, especially nurses, to improve their approach to users with type 2 diabetes mellitus in relation to adherence to oral antidiabetic medications.

Resumo

Objetivo: Desenvolver e validar uma estratégia de intervenção breve baseada no conceito de *implementation intention* para promover adesão aos antidiabéticos orais em pessoas com diabetes mellitus tipo 2 em acompanhamento na atenção primária.

Método: Estudo metodológico realizado em uma unidade de saúde primária de Carmo do Cajuru, Minas Gerais, Brasil, no período de Mai/2022-Abri/2023. As etapas percorridas envolveram a construção da intervenção baseada no conceito de *implementation intention*, com a validação de seu conteúdo por sete especialistas e avaliação da sua compreensibilidade por 11 pessoas com diabetes mellitus tipo 2. O comitê de especialistas avaliou a relevância, compreensibilidade e abrangência da intervenção e o público-alvo avaliou exclusivamente sua compreensibilidade por meio de uma entrevista cognitiva. A concordância entre os especialistas foi avaliada pelo índice de validade de conteúdo (IVC) do item e total, sendo considerado satisfatório, IVC do item e total $\geq 0,85$.

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Conflicts of interest: extracted from the master's thesis "Desenvolvimento de estratégia de intervenção breve para promoção da adesão aos antidiabéticos orais", presented to the Graduate Program in Nursing, Universidade Federal de São João del Rei, in 2023.

Resultados: A estratégia de intervenção foi denominada “Plano de enfrentamento de dificuldades para tomar os antidiabéticos orais” e sua versão final validada foi composta por um conjunto de instruções iniciais, um tópico sobre o comportamento pretendido, uma coluna com 13 possíveis dificuldades e uma coluna com 16 possíveis soluções para as dificuldades listadas. Foi obtido um IVC-total de 0,99; a estratégia de intervenção foi compreendida pelo público-alvo.

Conclusão: A estratégia de intervenção breve obteve evidência de validade de conteúdo. Esta tecnologia poderá fundamentar e motivar a prática de profissionais da saúde, principalmente do(a)s enfermeiro(a)s, para melhorar sua abordagem junto aos usuários com diabetes *mellitus* tipo 2 em relação à adesão aos antidiabéticos orais.

Resumen

Objetivo: Elaborar y validar una estrategia de intervención breve basada en el concepto de *implementation intention* para promover la adhesión a los antidiabéticos orales en personas con diabetes *mellitus* tipo 2 que realizan seguimiento en la atención primaria.

Métodos: Estudio metodológico realizado en una unidad de salud primaria de Carmo do Cajuru, Minas Gerais, Brasil, entre mayo de 2022 y abril de 2023. Las etapas llevadas a cabo fueron la elaboración de la intervención basada en el concepto de *implementation intention*, la validación del contenido por siete especialistas y la evaluación de la comprensibilidad por 11 personas con diabetes *mellitus* tipo 2. El comité de especialistas evaluó la relevancia, la comprensibilidad y el alcance de la intervención, y el público destinatario evaluó solo la comprensibilidad mediante una entrevista cognitiva. La concordancia entre los especialistas se evaluó mediante el índice de validez de contenido (IVC) de los ítems y total, donde se consideró satisfactorio IVC de los ítems y total $\geq 0,85$.

Resultados: La estrategia de la intervención fue denominada “Plan para enfrentar las dificultades de tomar antidiabéticos orales” y su versión final validada estuvo compuesta por un conjunto de instrucciones iniciales, un tópico sobre el comportamiento esperado, una columna con 13 dificultades posibles y una columna con 16 soluciones posibles para las dificultades enumeradas. Se obtuvo un IVC total de 0,99, y la estrategia de intervención fue comprendida por el público destinatario.

Conclusión: La estrategia de intervención breve obtuvo evidencia de validez de contenido. Esta tecnología podrá justificar y motivar la práctica de profesionales de la salud, principalmente de enfermeros(as), para mejorar su forma de abordar a los pacientes con diabetes *mellitus* tipo 2 respecto a la adhesión a los antidiabéticos orales.

Introduction

Randomized controlled trials and systematic reviews have shown that adherence to oral antidiabetic (OADs) is a complex behavior. The main barriers identified for non-adherence to OADs in people with type 2 diabetes mellitus (T2DM) are related to the following factors: personal (age, socioeconomic conditions, educational level, etc.); complexity of therapeutic regimen (duration of treatment, number of comorbidities, presence of complications, polypharmacy, class of OADs prescribed, etc.); and healthcare services (treatment costs, access to healthcare services, frequency of consultations, etc.). Furthermore, there is a lack of consensus on what constitutes adequate adherence to T2DM treatment.⁽¹⁻⁴⁾

On the other hand, it has been recommended that developing interventions be supported by an individual assessment of beliefs, potential barriers, experiences with the use of medications, available resources and the context of clinical practice where treatment will be carried out.^(1,3,5) It is also argued that interventions based on theoretical models may be more effective in producing beneficial results regarding health-related behaviors, including medication adherence.^(3,5-7)

Theoretical models have been used to elucidate and optimize the adoption of health-related behaviors, including the behavior of adhering to medication use. In some of them, intention or motivation is the main determinant of behavior.⁽⁷⁻⁹⁾ However, despite positive intentions, gaps can prevent people from translating their intention into behavior.⁽⁸⁾ The concept of implementation intention recommends that people with positive intentions develop plans to overcome barriers to promote the achievement of the desired behavior, reducing the gap between behavior intention and implementation.⁽⁸⁾

Implementation intention are plans in the “if... then” format that aim to identify barriers that make it difficult to carry out the behavior, relating them to overcoming plans (“if situation “A” occurs, then I will perform action “B” to effect behavior “C”). This theoretical model allows people to mentally automate the execution of planned behaviors, deal more quickly with critical situations and become the center of the care process, as their preferences and values were considered, contributing to personal satisfaction and greater flexibility to carry out intended behavior.^(8,10)

In general, primary care nurses are the largest workforce, being fundamental to strengthening

this health level.^(11,12) Therefore, the development by these professionals of interventions based on the concept of implementation intention to promote the adherence of people with T2DM to OADs is promising. A randomized clinical study was conducted in Brazil to verify the effect of “if...then” plans in people with T2DM using OADs followed in primary care. It was observed that the intervention program significantly improved adherence behavior, glycated hemoglobin levels and stress related to T2DM. However, the time to develop plans and intervention was extended.^(3,13)

According to our hypothesis, compiling these “if...then” plans can facilitate the application of this technology in clinical practice and contribute to greater adherence and satisfaction for people with T2DM. Therefore, the present study aimed to develop and validate a brief intervention strategy based on the concept of implementation intention to promote adherence to the use of OADs in people with T2DM being monitored in primary care.

Methods

This is a methodological study. These studies describe the logic, decision-making processes, methods and findings from the beginning of the intervention until its version is available for feasibility, pilot or efficacy testing before a randomized clinical trial.⁽¹⁴⁾

The stages taken involved intervention strategy construction, content validity by a committee of experts and comprehensibility assessment among the target audience. Data collection took place in households assisted by a primary health unit located in Carmo do Cajuru (MG, Brazil) between May 2022 and April 2023.

The first stage was based on results from previous studies^(3,13) that identified barriers and solutions to implement the behavior of taking OADs in people with T2DM being followed up in primary care using the concept of implementation intention.⁽⁸⁾ These studies identified different situations (forgetfulness, presence of adverse events and misunderstanding of the reason for using OADs, among

others.) that can occur in the daily life (work or leisure) of people with T2DM and can be considered difficult for taking OADs. Furthermore, they listed plans to overcome these challenges (such as plans to enable better visualization of medication boxes and establish a feeding routine), according to the theoretical concepts of implementation intention.⁽⁸⁾

In the present study, an exhaustive reading of the plans and solutions proposed in previous studies^(3,13) was carried out to construct an intervention strategy based on categorization by similarity of plans for adherence to OADs. Title, description of expected behavior, lists of obstacles to taking OADs and their respective solutions and a space to relate the difficulties with the solutions listed were considered essential.

Content validity was carried out by an expert committee. Nurses, holding a master's or doctoral degree, specialist in the area (diabetes mellitus, medication adherence or health behavior), with knowledge and/or skills acquired through professional experience of at least one year (assistance, teaching or research), experience in the development of health technologies and validity studies, were included. Professionals who responded to the data collection instrument incompletely and/or did not return it within 30 days were excluded.

The search for experts was carried out on the *Lattes* Platform (Brazilian National Council for Scientific and Technological Development (CNPq - *Conselho Nacional de Desenvolvimento Científico e Tecnológico*)) by entering the terms “T2DM”, “medication adherence”, “safe use of medications” and “validity studies”. A total of 19 professionals were invited through a network of contacts: 12 of them did not return, and the sample resulted in seven experts. The minimum number of six experts was considered in accordance with previous recommendations involving the development of psychometric scales.⁽¹⁵⁾

For data collection, participants received an invitation letter containing study objective, Informed Consent Form (ICF), brief intervention strategy and sociodemographic characterization instrument (initials, sex, age (complete years), training time, city where they work, degree, current occupation,

place of work, care and teaching experience with publications in the area).

Experts were then asked to assess the intervention using a form consisting of a four-point Likert scale. According to the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN)⁽¹⁶⁾, three properties were assessed: Relevance (if an item is considered relevant to the construct according to the population and context of use: 1. definitely not relevant; 2. not relevant; 3. Relevant; and 4. definitely relevant); Comprehensibility (whether an item is considered comprehensible by the population of interest as intended: 1. definitely not comprehensible; 2. not comprehensible; 3. Comprehensible; and 4. definitely comprehensible); and Comprehensiveness (whether all key concepts and necessary dimensions were included: 1. not comprehensive; 2. slightly comprehensive; 3. Comprehensive; and 4. strongly comprehensive).

After validity by an expert committee, the intervention strategy was applied to the target population to assess its comprehensibility. Through a registry of people with T2DM carried out by community health workers at the unit, the interventionist invited participants to the study via telephone. On the scheduled day, she went to participants' homes to collect data. People aged ≥ 18 years with T2DM, who used OADs for at least six months, followed up at the health unit related to the study and who demonstrated the ability to establish effective communication, were included.⁽¹⁷⁾ People to whom OADs were administered by a caregiver, who had been hospitalized in the last 30 days or who had serious complications from T2DM were excluded. A total of 11 participants were included; this number was defined by saturation criterion.⁽¹⁸⁾ An interview was carried out to collect sociodemographic and clinical characteristics (I. User identification; II. Sociodemographic profile: sex, marital status, education, family arrangement and family income; III. Clinical characterization: time since T2DM diagnosis, prescribed drug treatment current status, time of use of OADs and mode of access to medications) and to apply the intervention strategy.

When making the printed tool available to participants, the interventionist read the instructions

and explained that they should read and identify the difficulties they faced in taking OADs and then list the most appropriate solutions. Finally, participants should relate each difficulty with the solution chosen to overcome it.

When completing the intervention strategy, the cognitive interview technique⁽¹⁹⁾ was used to investigate understanding, the presence of ambiguities, misinterpretations of items as well as assess acceptance of layout and instructions for completion. The interventionist addressed participants showing interest in listening to them, then she asked some questions to check whether the intervention strategy was actually understood. Participants' suggestions and comments were noted and used to change the strategy items. Chart 1 presents assessed items.

Chart 1. Items to assess comprehensibility and related questions

Items	Related questions
a) Question comprehensibility	What do you think of this strategy to improve your medication-taking behavior?
b) Memory retrieval of pertinent information	What is your opinion on each item in the strategy?
c) Decision process	Did you find it easy or difficult to fill in the gaps?
d) Response process	Which points were the easiest and which were the most difficult?

The data were analyzed using the Statistical Package for the Social Sciences (SPSS; v. 21.0). To analyze experts' agreement on the intervention strategy items, the Content Validity Index (CVI) was calculated using the Item-Level Content Validity Index (I-CVI) calculation (which corresponds to experts' agreement with each item assessed) and the total CVI. The I-CVI value was calculated by dividing the number of experts who scored 3 or 4 in this item by the total number of experts; the CVI-total corresponds to the average of all I-CVI. The item that obtained a mean ≥ 0.85 was considered as desired in validity.⁽²⁰⁾ A binomial test was performed to measure the proportion of agreement for each item among experts, and a proportion of agreement $\geq 85\%$ was considered satisfactory. For the remaining analyzes, a 5% significance level was considered.

The study was approved by the Research Ethics Committee of the proposing institution (Opinion

5,394,132) (Certificate of Presentation for Ethical Consideration: 56885422.5.0000.5545) and met the requirements of Resolution 466/2012 (National Health Council (CNS – *Conselho Nacional de Saúde*)). All participants signed the ICF.

Results

The brief intervention strategy was called “Plan for coping with difficulties in taking oral antidiabetic medications”. The content was validated by seven experts. All participants were nurses, with a mean age of 37.4 (± 6.7) years and training time of 14.1 (± 7.3) years. Most ($n=5$; 81.3%) were professors and doctoral degree holders in public higher institutions; others ($n=2$; 18.8%) were specialist care nurses in primary or secondary care. All experts had studies published on topics related to diabetes mellitus or health behaviors. In the content validity stage, the total CVI was 0.99, and a binomial test showed statistical significance ($p<0.001$) for agreement ≥ 0.85 among experts in all items assessed (Table 1).

In the validity stage with experts, only one round was necessary; however, some made suggestions to improve the intervention strategy (Chart 2). In the application stage with the target audience to verify comprehensibility (cognitive interview), 11 people with T2DM participated who had been using OADs for 4 (± 1.1) years and with a mean age of 59.5 (± 9.1) years. The mean education level was 6.1 (± 1.9) years. Seven (77.0%) participants lived with a partner and had a mean income of 2.5 (± 0.9) minimum wages (in 2023: R\$1,302.00). All suggestions given by the target audience were accepted regardless of the value obtained by CVI. In the cognitive interviews, participants mentioned that “these are things that really happen that disrupt the routine of taking medication; it was really good” (Participant 1); “I liked the table” (referring to the layout), “it will help a lot to think about how to improve the routine of taking the medication” (Participant 4); “I’m going to use this way of thinking so I don’t forget to take my medication” (Participant 9); “it was easy

Table 1. Expert agreement on brief intervention strategy items

Variables	Relevance		Comprehensibility	
	n (%)*	I-CVI**	n (%)*	I-CVI**
Title	7(100)	1.00	7(100)	1.00
Instructions	7(100)	1.00	6(85.7)	0.86
Expected behaviors	7(100)	1.00	7(100)	1.00
Difficulties				
1: Forgetting to take your medications...	7(100)	1.00	7(100)	1.00
2: Forgetting to remove medications...	7(100)	1.00	7(100)	1.00
3: Forgetting to take your medications...	7(100)	1.00	7(100)	1.00
4: Having hypoglycemia...	7(100)	1.00	6(85.7)	0.86
5: Having a dry mouth or thirst	7(100)	1.00	7(100)	1.00
6: Having diarrhea...	7(100)	1.00	6(85.7)	0.86
7: Not having a meal routine...	7(100)	1.00	7(100)	1.00
8: Not having a meal routine at work...	7(100)	1.00	7(100)	1.00
9: Not understanding the prescription...	7(100)	1.00	7(100)	1.00
10: Using too many medications	7(100)	1.00	7(100)	1.00
11: Not understanding the reason for the medication...	7(100)	1.00	7(100)	1.00
12: Not fully understanding what...	7(100)	1.00	7(100)	1.00
13: Lack of medication in the unit...	7(100)	1.00	7(100)	1.00
Solutions				
1: Leaving medication boxes visible...	7(100)	1.00	7(100)	1.00
2: Asking family members to help...	7(100)	1.00	7(100)	1.00
3: Writing the name and time to take the medication...	7(100)	1.00	7(100)	1.00
4: Attending appointments...	7(100)	1.00	7(100)	1.00
5: Using reminders on your phone	7(100)	1.00	7(100)	1.00
6: Keeping medication in your purse, backpack...	7(100)	1.00	7(100)	1.00
7: Organizing medications in an organizing box...	7(100)	1.00	7(100)	1.00
8: Creating a meal routine...	7(100)	1.00	7(100)	1.00
9: Drinking small sips of water...	7(100)	1.00	7(100)	1.00
10: Eating every 3 hours/3 hours in small...	7(100)	1.00	7(100)	1.00
11: Looking for a reference doctor to replace...	7(100)	1.00	7(100)	1.00
12: Establishing a break from work...	7(100)	1.00	7(100)	1.00
13: Looking for a nurse or doctor to ask questions...	7(100)	1.00	7(100)	1.00
14: Participating in the unit's diabetes group...	7(100)	1.00	7(100)	1.00
15: Organizing work activities to...	7(100)	1.00	7(100)	1.00
16: Looking for another health center...	7(100)	1.00	7(100)	1.00
Coverage				
	n(%)*		I-CVI**	
Total CVI	7(100)		1.00	
			0.99	

* Percentage of agreement on the item; **Item-Level Content Validity Index

to connect difficulties with solutions” (Participant 8) (Chart 2).

Chart 3 shows the final version of the intervention strategy. It was composed of a guide containing instructions, a topic explaining intended behavior and columns with possible difficulties (13) and solutions (16).

Chart 2. Modifications made to the brief intervention strategy based on experts' and target audience's suggestions

Items	Expert committee	
	Participants' suggestions	Modified Items
Difficulty 2	Replace the term "remove" with "take" the medications	Forgetting to pick up medications at the health center
Difficulty 4	Explain what it means to have hypoglycemia	Having hypoglycemia, which can be noticed by the presence of excessive sweating, racing heart and tremors
Difficulty 6	Replace the term "empachamento" with a more popular term used in the region	Having diarrhea or a feeling of bloating in your belly
Difficulty 7	Include the term "make meals"	Not having a routine for eating meals in my work environment
Solution 3	Include the term "or in an easy-to-see place"	Writing the name and time of the medication and place it on the refrigerator door or in another easy-to-see place
Solution 10	Replace the solution "Eat every 3 hours in small quantities" (solution 10)	Always carrying practical and healthy snacks to eat when you are at work or on a walk
Solution 13	Replace the term "clearly" with "comprehensible manner"	Seeing a nurse or doctor to ask questions or ask them to rewrite the prescription in a comprehensible manner
Items	Target audience	
	Participants' suggestions	Modified Items
Title	Replace the term "obstacles" with "difficulties"	Plan for coping with difficulties in taking oral antidiabetic medications
Difficulty 1	Replace the term "prescribed times" with "times prescribed by the doctor"	Forgetting to take medications at the times prescribed by the doctor
Difficulty 7-8	Replace the term "lack of routine for meals" with "not having a set time to eat meals"	Not having a set time to eat meals and Not having a set time to eat meals at work
Solution 11	Replace the term "looking for a reference doctor" with "consulting the doctor who is monitoring you"	Consulting the doctor who is monitoring you for a possible medication replacement or dose adjustment

Discussion

People with T2DM often report difficulties taking prescribed medications due to the complexity of therapeutic regimens, beliefs about medications and access to healthcare services.^(1,2,21)

In this context, nurse-led and person-centered interventions can be highly effective in promoting OADs adherence behavior.^(2,3) These professionals have proposed technologies, such as educational booklets,⁽⁶⁾ measurement instruments⁽²²⁾ and mobile technologies⁽²³⁾ to implement medication adherence behavior. However, a brief intervention, constructed and validated for this purpose focusing on the profile of Brazilian Health System (SUS – *Sistema Único de Saúde*) users, has not yet been released.

This study compiled barriers and solutions to implement OADs based on the concept of implementation intention. From this theoretical model, it is

Chart 3. Final version of the intervention strategy

“Plan for coping with difficulties in taking oral antidiabetic medications”	
Instructions: Below are some difficulties in taking medication to treat diabetes, including possible solutions. Draw a line joining the difficulties that relate to you (left column) to the solutions for them (right column). For each difficulty, choose up to three solutions.	
Behavior: taking medication to treat diabetes daily, at the indicated times and in quantity, as prescribed by your doctor.	
DIFFICULTIES	SOLUTIONS
Forgetting to take medications at the times prescribed by the doctor	Leaving medication boxes in easy-to-see places
Forgetting to pick up medications at the health center	Asking family and/or friends to help me remember to take my medications
Forgetting to take medication to work or when I'm out for a walk	Writing the name and time to take medication and place it on the refrigerator door or in another easy-to-see place
Having hypoglycemia: this can be noticed by the presence of excessive sweating, racing heart and tremors	Going to scheduled appointments and exams
Having dry mouth or thirst	Using reminders on your cell phone
Having diarrhea or a feeling of bloating in your belly	Keeping the medication in your purse, backpack or shirt pocket and carrying a bottle of water
Not having a set time to eat meals	Placing medications in a box organized by time of day
Not having a set time to eat meals at work	Creating a daily meal routine and associating it with medication taking times
Not understanding the doctor's prescription	Drinking small sips of water throughout the day
Using too many medications	Always carrying practical and healthy snacks to eat when you are at work or on a walk
Not understanding the reason for prescribed medication	Consulting the doctor who is monitoring you for a possible medication replacement or dose adjustment
Not understanding how diabetes is treated	Taking breaks from work to eat meals and take medication
Lack of medication at the health center	Seeing a nurse or doctor to ask questions or ask them to rewrite the prescription in a comprehensible manner
Others:	Joining the diabetes group at the healthcare facility to learn more about the care you need
	Organizing breaks during work to be able to eat properly and take medications
	Finding another health unit or a popular pharmacy closer to you
	Others:

possible to form “if...then” plans and then construct individual, realistic, succinct goals that are easy to understand and defined by the person themselves. Thus, an intervention with these characteristics is promising for people assisted in primary care services in Brazil, since low education and health literacy levels prevail in this population and pose challenges to healthcare professionals in changing behavior.

Content validity by an expert committee was one of the stages taken. At this stage, it was found that included items were relevant, comprehensible and comprehensive in terms of the concepts necessary to provide the intervention. Content validity is one of the types of validity of instruments for

measuring subjective variables, being defined as the condition in which the items measured correspond to the construct to be measured. Therefore, this is a fundamental stage in which failures can compromise the proposed measure.^(17,23) This type of validity has also been applied to validate the content of taxonomies,⁽²⁴⁾ motivational interview questionnaires⁽²⁵⁾ and intervention strategies⁽²⁶⁾, such as the present study. During this stage, all items assessed obtained satisfactory I-CVI and total CVI as recommended in the literature.

Assessing comprehensibility by the target audience was another stage taken in this study. Using the cognitive interview technique,⁽¹⁹⁾ participants were able to assess the intervention and report the difficulties identified in its content and appearance. In this study, five items (title, difficulties 1, 7 and 8 and solution 11) were not fully understood by the target audience and were changed after the suggestions received. The results of the cognitive interview showed the positive aspects of this strategy. Its viability was supported by participants in statements aimed at contribution of the intervention to taking OADs, ease of identifying barriers and possibility of understanding the importance not only of self-management of T2DM but also of medication adherence. Furthermore, participants reported satisfaction as they felt welcomed by participation experience.

The development of an intervention strategy based on a robust theoretical framework⁽⁸⁾ and content validity assessment criteria supported by international methodological recommendations⁽¹⁶⁾ are the strengths of this study. As for limitations, the recommended inclusion of a target population member in the expert committee was not carried out. However, the participation and opinion of these people was valued during the cognitive interview as recommended in the literature.⁽²⁷⁾ Social desirability can also be considered a limitation. It refers to cognitive or behavioral bias in which participants respond in a biased or biased manner to present a socially acceptable image of themselves at the expense of the truthfulness or accuracy of the responses. This phenomenon is associated with the search for social approval and minimization of behaviors or traits considered socially undesirable.⁽²⁸⁾

To minimize this bias, participants who had previous contact with the study authors were not included. Finally, memory bias can be considered referring to systematic distortion of participants' memories and recollections, influencing the accuracy and reliability of collected data.

To measure intervention efficacy and effectiveness, future studies are recommended in a representative sample of the target population. Conducting feasibility studies, exploring logistics, resources and practical challenges of implementing the intervention in real healthcare settings will provide valuable insights to ensure its applicability and sustainability in the clinical context. A more in-depth approach to users' acceptance, adherence and satisfaction with the intervention can also enrich the understanding of its effects and limitations, contributing to its continuous refinement and adaptation to clinical and contextual needs.

Conclusion

The brief intervention strategy was supported by satisfactory evidence of content validity. This technology can support and motivate primary care healthcare professionals, especially nurses, to improve their approach to people with T2DM in relation to adherence to OADs. Forgetfulness, lack of a meal routine and adverse events were some of the barriers included in this health technology. The main coping plans involved everyday actions such as leaving pills in an easily accessible place and establishing meal routines.

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Collaborations

Trevisan DD, Rodrigues RCM, Santos G, Andrade SN, Oliveira F, Galindo Neto NM, Lima MHM and São-João T contributed to study design, data

analysis and interpretation, article writing, relevant critical review of intellectual content and approval of the final version to be published.

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