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Dia-D Program: propositional essay of an educational intervention for self-management in type 2 diabetes

Programa Dia-D: ensaio propositivo de intervenção educativa para autogerenciamento em diabetes tipo 2

Programa Dia-D: ensayo propositivo de una intervención educativa para el autocuidado en diabetes tipo 2

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Abstract

Objective: to present the *Diabetes em Dia* (*Dia-D*) Program: an educational intervention for self-management in type 2 diabetes, focused on promoting healthy eating, being active, and taking medication, among adults with type 2 diabetes. **Method:** a propositional essay of complex intervention based on two behavioral models: The ADCES7 Self-Care Behaviors™ (Association of Diabetes Care and Education Specialists); and the Behavior Change Wheel (BCW). **Results**: BCW's conceptual framework "Capability, Opportunity, Motivation-Behaviour (COM-B)" made it possible to define the determinants of target behaviors. Based on these, interventions were proposed, such as training, enablement, education, environmental restructuring, persuasion, service provision, guidelines, and communication. Behavior change techniques (demonstration and self-monitoring of behavior, information on health consequences, among others) underpinned the intervention content. **Final considerations and implications for practice**: the theoretical models enabled the structuring of an educational intervention with an emphasis on proposing strategies for behavior modification, a central component in caring for people with diabetes. The relevance of adopting behavioral models in health education planning and the complex nature of the intervention design stand out.

Keywords: Self-Management; Type 2 Diabetes; Chronic Disease; Patient Education as Topic; Health Education.

Resumo

Objetivo: apresentar o Programa Diabetes em Dia (Dia-D): uma intervenção educativa para autogerenciamento do diabetes tipo 2 focada em promover alimentação saudável, prática regular de atividade física e uso correto de medicamentos entre adultos com diabetes tipo 2. **Método**: ensaio propositivo de intervenção complexa, fundamentado em dois modelos comportamentais: *The ADCES7 Self-Care Behaviors™* (Associação de Especialistas em Cuidados e Educação em Diabetes); e *Behaviour Change Wheel* (BCW). **Resultados**: a estrutura conceitual "*Capability, Opportunity, Motivation-Behaviour* (COM-B)" do BCW possibilitou a definição dos determinantes dos comportamentos-alvo. A partir desses, foram propostas as intervenções de treinamento, capacitação, educação, reestruturação ambiental, persuasão, provisão de serviços, diretrizes e comunicação. Técnicas de mudança de comportamento (demonstração e automonitorização do comportamento, informações sobre consequências de saúde, entre outras) alicercearam o conteúdo da intervenção. **Considerações finais e implicações para prática**: os modelos teóricos possibilitaram a estruturação de intervenção educativa com ênfase na proposição de estratégias para modificação de comportamentos, componente central no cuidado a pessoa com diabetes. Destaca-se a relevância de adoção de modelos comportamentais no planejamento da educação em saúde e o caráter complexo no delineamento da intervenção.

Palavras-chave: Autogestão; Diabetes Tipo 2; Doença Crônica; Educação de Pacientes como Assunto; Educação em Saúde.

Resumen

Objetivo: presentar el Programa *Diabetes em Dia* (Dia-D): una intervención educativa para el automanejo de la diabetes tipo 2 enfocada en promover la alimentación saludable, la actividad física regular y el uso correcto de medicamentos, entre adultos con diabetes tipo 2. **Método**: ensayo de propósito de intervención complejo basado en dos modelos conductuales: *The ADCES7 Self-Care Behaviors*™ (Association of Diabetes Care and Education Specialists); y *Behavior Change Wheel* (BCW). **Resultados**: el marco conceptual de la BCW "*Capacidad, Oportunidad, Motivación-Comportamiento* (COM-B)" permitió definir los determinantes de las conductas objetivo. A partir de estos, se propusieron intervenciones de entrenamiento, empoderamiento, educación, reestructuración ambiental, persuasión, prestación de servicios, directrices y comunicación. Las técnicas de cambio de comportamiento (demostración y autocontrol del comportamiento, información sobre las consecuencias para la salud, entre otras) sustentaron el contenido de la intervención. **Consideraciones finales e implicaciones para la práctica**: los modelos teóricos posibilitaron la estructuración de una intervención educativa con énfasis en la propuesta de estrategias para la modificación de la conducta, componente central en el cuidado de las personas con diabetes. Destaca la relevancia de adoptar modelos conductuales en la planificación de la educación para la salud y la complejidad del diseño de la intervención.

Palabras clave: Automanejo; Diabetes Mellitus tipo 2; Enfermedad Crónica; Educación del Paciente como Asunto; Educación en Salud.

INTRODUCTION

Diabetes management continues to be a global challenge, as there is evidence of a lack of effectiveness in the health care of people with diabetes.[1] Epidemiological data on diabetes in Latin America have indicated that the region has the lowest rates of achieving treatment goals related to glycemic and metabolic control. Among these data, a study in Brazil stands out in which only 48.5% of people with type 2 diabetes had glycated hemoglobin values below 8%.[1]

An extensive review of more than 280 publications on the prevalence, awareness, treatment and control of diabetes mellitus in Latin America indicated that glycemic control (HbA1C less than 7%) was only achieved by 3% to 54% of people with diabetes; blood pressure control, by 25% to 67%; and lipid control, by 12% to about 53%. Achieving all of these goals together peaked at nearly 10% of findings.[2]

Education for diabetes self-management, usually referred to as education for self-management, is recognized as an essential approach to controlling the disease and, therefore, should be part of the health care of people with diabetes, aiming at effective care.[3,4] This theoretical-methodological approach to health education is based on the integration of knowledge and skills necessary to promote self-care in diabetes.[5,6]

Educational programs centered on diabetes self-management have demonstrated the effectiveness of this education model, expressed in positive health outcomes. Associated benefits include achieving clinical goals, reducing hospital admissions and readmissions, as well as health costs, due to the reduced risk of complications associated with diabetes.[5-7]

In addition to indicated clinical benefits, other studies have revealed the effectiveness of this approach in improving quality of life, personal self-efficacy and positive coping with the disease, as well as the individual ability to manage the demands imposed by chronicity.[8-14]

A systematic review, carried out in large databases, identified the significant impact on glycemic control associated with the use of education for self-management in diabetes, especially when individual and group approaches were associated and when educational activities involved ten or more hours of duration.[15]

The Association of Diabetes Care & Education Specialists (ADCES) advocates that education for self-management is an essential part of caring for people with diabetes. Thus, educational planning should facilitate acquiring knowledge and develop the necessary skills to handle demands that are invariably multidimensional, involving clinical, psychosocial, educational and behavioral aspects.[16,17]

ADCES proposes a theoretical model of health education for self-management in diabetes based on the adoption of seven self-care behaviors (Association of Diabetes Care and Education Specialists 7 Self-Care Behaviors™ (ADCES7)): healthy coping, healthy eating, being active, taking medication, monitoring, problem solving and reducing risk.[16] Despite adopting solid and coherent assumptions, this model does not explain how educational interventions can be structured and configured to promote self-management in diabetes and the necessary behavioral changes.

The search for a theoretical framework that would provide a clear link between concepts and methods capable of generating behavioral changes led to the recognition of the Behavior Change Wheel (BCW) model. It is a systematic method that makes it possible to outline behavioral interventions based on the analysis and understanding of the behavioral system that needs to be activated. This initial diagnosis enables the choice of specific behavior change strategies based on the delimitation of functional interventions and support policies.[18]

The BCW model has been used to deal with the challenges of changes in different health behaviors, in different contexts, with its scientific rigor attested in numerous studies.[18-21] As an example of its use in the context of self-management in diabetes, we mentioned the design of Healthy Eating and Active Lifestyles for Diabetes (HEAL-D), culturally personalized, to promote healthy lifestyles among people with type 2 diabetes from black British communitiess.[22]

Thus, starting from the premise that interventions aimed at promoting changes in behavior need to be based on solid theoretical and methodological references, this essay aims to present the *Diabetes em Dia* (*Dia-D*) Program: a proposal for an educational intervention for self-management in type 2 diabetes focused on promoting healthy eating, being active and taking medication among adults with type 2 diabetes.

METHOD

This is a propositional essay of a complex intervention. The complex denomination is inferred to an intervention, either by its own characteristics (e.g., involving several components or change mechanisms), or by the context in which it will be implemented or by the interaction between these two elements.[23] This complexity increases with the number of components involved; range of targeted behaviors; knowledge and skills required to administer or receive the intervention; or the level of flexibility possible between intervention components.[24] This proposal addresses several of these aspects, as can be seen in the next sections.

RESULTS AND DISCUSSION

Theoretical-conceptual bases of the intervention proposal: ADCES7™ and BCW models

In the last two decades, studies have revealed the essential role of behavioral science in explaining and predicting the health behavior of people with diabetes, helping to build solid foundations for complex educational interventions.[25]

The ADCES7™ model, for instance, assumes that self-management is a fundamental condition for achieving desired clinical results and quality of life. The principles of this model

are informed decision-making and patient-centered care, with the purpose of creating conditions for the person with diabetes to share decisions about their care, ensuring respect for individual preferences and values.[5,6]

The fundamental premise of this model suggests that self-management is obtained through a person's engagement in self-care behaviors.[6,16] The engagement process is not linear, but circular and interactive, with healthy coping in the central position. Surrounding this center are healthy eating behaviors, being active, and the taking medication. These three behaviors are essential for achieving glycemic control and therefore are key elements of diabetes self-management education.[16,26]

Monitoring, which encompasses the three main behaviors, is not restricted to controlling blood glucose levels. Self-monitoring of blood pressure levels, physical activity, food consumption, weight, medication, skin care and sleep quality is encouraged. Monitoring these activities is considered the motivational force for changes in behavior and compliance with treatment.[6,16]

Surrounding monitoring are risk reduction and problem solving behaviors. Preventive and proactive action to minimize the occurrence of unwanted outcomes and complications associated with diabetes is the main articulator of risk reduction, examples being regular clinical follow-up, updating the vaccination schedule, smoking cessation, stress management, among others.[6,16] Foot care is an important preventive practice for complications in the lower limbs that deserves to be highlighted, since simple actions can prevent complex problems, such as foot ulcers in people with diabetes.[27]

The ability to solve problems can be developed, translating into effective solutions based on relevant information. It also involves selecting a resolving action, taking action and evaluating the results of that action. The way a person with diabetes deals with other self-care behaviors depends on their ability to solve problems.[6,16]

At the same time, BCW was designed from the synthesis of existing behavioral theories. It has a conceptual structure that makes it possible to outline behavioral interventions based on the analysis and understanding of the behavioral system that needs to be activated to favor changes. This behavioral system is composed of the interaction of three essential elements: capability, opportunity, and motivation. This system, known by the acronym COM-B (Capability, Opportunity, Motivation – Behaviour) allows identifying and understanding the elements that interact in the formation of human behaviors.[18]

In this sense, capability is defined as an individual's physical (physical capability) and psychological (psychological capability) capability to engage in an activity. Physical capability includes the necessary physical aptitudes, while psychological capability comprises the thought processes to understand, rationalize, memorize and make decisions.[28]

Opportunity is defined as every factor, outside the individual, that creates conditions for behavioral change to occur. This component encompasses the physical (environmental context, physical and material resources) and social (culture and social influences) dimensions.[28]

Motivation is understood as any cognitive process that drives and directs action, and was subdivided into reflexive and automatic motivation. Reflective motivation is composed of role and social identity, beliefs in one's ability to make changes, and beliefs about risks/benefits associated with a behavior. Automatic motivation is formed by the emotions and impulses that arise from associative learning and/or innate dispositions.[29]

The COM-B system diagnosis allows the questions to be answered: what internal conditions of individuals and their physical and social environment need to be present for a certain behavior to be achieved? What aspects of the motivational system need to be encouraged?[29]

After this diagnosis, the necessary interventions can be determined, which, in the model, were identified through a systematic review.[28] These interventions were differentiated into two categories:

- Functional interventions, i.e., with specific purposes, such as education, persuasion, incentive, training, among others;
- Support policies, i.e., actions undertaken by authorities that enable or support functional interventions, such as communication/marketing, guidelines, social/environmental planning, provision of services, among others.

The choice of interventions or support policies to be implemented is not random, but depends on the previously identified COM-B components to be modified. After obtaining an expert consensus, the BCW model was able to indicate the most effective interventions to activate each component.[18]

A key issue for choosing appropriate interventions is understanding the context in which behavior change is inserted. This will prompt an assessment of what institutional policies are needed to support interventions. To assist in this analysis, BCW directs this evaluation, according to the criteria of accessibility, practicality, effectiveness and cost-effectiveness, acceptability, side effects/safety and equity.[18]

The last step of the model provides for the identification of behavior change techniques and means of communication, according to the model's own taxonomy. According to the authors, behavior change techniques correspond to "active ingredients" of the intervention, i.e., those that favor the change of behavioral components towards the target behavior.[30] Again, this selection must consider the connections foreseen in the model itself and an evaluation of the aforementioned criteria.[18]

Proposal for an educational intervention for self-management in type 2 diabetes: *Diabetes em Dia* Program (*Dia-D* Program)

The present essay proposes the outline of an education program for the self-management of adults with type

2 diabetes (*Dia-D* Program) as a way of operationalizing the theoretical-conceptual framework addressed. To elaborate the proposal, the step-by-step design of behavioral interventions was used, described in the BCW framework, according to three consecutive steps: (1) understanding the behavior; (2) identification of interventions; (3) identification of contents and mode of presentation.[18]

Step 1. Understanding the behavior

Understanding behavior begins by defining the problem in behavioral terms, which implies defining who is involved in the problem and what these people need to do to achieve the necessary change.[18]

In the present trial, to promote self-management in diabetes, three target behaviors were considered: healthy eating, being active and taking medication. These were specified in the following goals, as per the American Diabetes 2022 Association Standards of Clinical Care in Diabetes:[26]

- Healthy eating: balanced carbohydrate consumption by controlling portions; encouraging low-glycemic carbohydrate consumption; replacement of saturated fats with monounsaturated fats.
- Being active: doing 150 minutes a week (e.g., brisk walking), on a regular and progressive basis, or increasing the daily number of steps (up to 10,000/day).
- Taking medication: strictly follow medication treatment (correct medication, route, dose and time).

To map what needs to be changed, the COM-B conceptual framework was used, according to the barriers and facilitators for successful management of type 2 diabetes, described in a recent systematic literature review. In this review, 60 studies carried out in Latin America and the Caribbean were included, among which 46.7% were from Brazil.[31] Chart 1 presents the result of this mapping.

Step 2. Identification of interventions

To identify interventions, both functional and support policies, their relationships with the COM-B components were considered, considering the evaluation criteria proposed by the model. The functional interventions and support policies selected for this study are described below, with their respective objectives:[18]

- Training: build action plan/rules and apply it when necessary.
- Enablement: build persistence, tolerance, endurance; develop the physical and mental strength needed to perform and maintain desired behavior.
- Education: guide how to perform desired behavior.
- Environmental restructuring: facilitating access to resources; reduce time demands that compete with desired behavior.
- Persuasion: build positive beliefs about desired behavior and negative beliefs about unwanted behavior.
- Service provision: provide a certain service.
- Guidelines: create action protocols.
- Communication: create educational material.

Step 3. Identification of content and modes of implementation

Then, behavior change techniques were considered, according to the taxonomy described in BCW itself. It is important to emphasize that the selection of the set of techniques adopted in the present study was based on the evaluation of the technique's capability to generate desired change in the COM-B system components, previously identified in step 1. Chart 2 presents the description of behavior change techniques selected for the *Dia-D* Program in relation to the COM-B components to be activated.

The current moment of social distancing as a result of the new coronavirus pandemic was considered to define the use of a digital platform to implement the program, as well as the Canada Diabetes Clinical Practice Guidelines,[7] who highlighted the relevance of digital devices for implementing education programs for diabetes self-management. Thus, to implement the *Dia-D* Program, the following elements were considered:

- Use of digital communication platform to interact with participants;
- Availability of intervention in consecutive sessions, configured to shape knowledge (education), build skills (training), promote self-efficacy (training/persuasion) and create a favorable environment for target behaviors (environmental restructuring);
- The education and training modules will be carried out in small groups (5 to 10 people). The modules aimed at training/persuasion will be carried out partly in groups and partly individually;
- Development of educational material to support the intervention: *Diário Diabetes em Dia* (behavior monitoring), booklet *Diabetes Dia a Dia*: *Descobrindo Soluções* (exercises simulating everyday situations that involve solving problems related to living with diabetes); informative videos on the target behaviors (diet and physical activity);
- Development of a healthcare staff service script, to conduct the intervention modules, as planned.

The intervention content was planned to support desired behavior changes, based on the proposed behavior change techniques. Chart 3 presents the details of the content proposed for the *Dia-D* Program.

Chart 1. Mapping of COM-B components that need to be present to promote self-management in type 2 diabetes, *Dia-D* Program, 2022.

Healthy eating: balanced carbohydrate consumption by controlling portions; encouraging low-glycemic carbohydrate consumption; replacement of saturated fats with monounsaturated fats	
COM-B components	**What needs to happen for the target behavior to be achieved?**
Physical capability (physical ability)	· Willingness/spirit and ability to follow the proposed dietary pattern · Sufficient health staff and up to date on clinical guidelines
Psychological capability (knowledge, cognitive and interpersonal skills, memory, attention, decision processes, behavioral regulation)	· Knowledge about the proposed dietary pattern · Knowledge about the role of food in glycemic control · Capability to plan meals according to the proposed dietary pattern · Capability to maintain proposed dietary pattern in social events (e.g., meetings, parties, restaurants)
Physical opportunity (environmental context, material resources)	· Access to proposed dietary pattern at home and at work · Patient-centered healthcare staff approach
Social opportunity (culture, social influences)	· Family/friend support to follow the proposed dietary pattern
Reflective motivation (role and social identity, beliefs in one's own capability, beliefs about risks/benefits associated with the behavior)	· Valuing the achievement of goals to control the disease · Personal self-efficacy to follow the proposed dietary pattern · Overcoming unhealthy food preferences ("fat is tasty"; "healthy foods don't satisfy hunger") · Perception of benefits of the proposed dietary pattern · Perception of risks associated with unhealthy eating · Overcoming male gender issues (e.g., "men consume alcohol in excess"; "healthy eating is not compatible with male work") · Overcoming female gender issues ("taking care of others - children, husband, grandchildren - is a priority")
Automatic motivation (emotions/drives arising from associative learning and/or innate dispositions, reinforcers)	· Ability to deal with food cravings or cravings · Feel comfortable trying new flavors/spices · Positive attitude towards diabetes
Physical activity (PA): doing 150 minutes a week (e.g., brisk walking) on a regular and progressive basis or increasing the daily number of steps (up to 10,000/day)	
COM-B components	**What needs to happen for the target behavior to be achieved?**
Physical capability (physical ability)	· Willingness/spirit and ability to include regular PA in the daily routine · Sufficient health staff and up to date on clinical guidelines
Psychological capability (knowledge, cognitive and interpersonal skills, memory, attention, decision-making, and behavioral regulation)	· Knowledge about PA recommendations for people with diabetes · Knowledge about the role of PA in glycemic control · Ability to plan regular PA practice · Ability to perform PA safely (e.g., without hypoglycemia) · Ability to deal with everyday difficulties to perform PA (e.g., low mood, unforeseen events, extreme temperatures)
Physical opportunity (environmental context, resources, and equipment)	· Access to places to perform PA (e.g., streets, parks, gyms) · Time to perform PA · Patient-centered healthcare staff approach
Social opportunity (culture, social influences)	· Family/friend support to perform PA regularly
Reflective motivation (role and social identity, beliefs in one's own capability, beliefs about risks/benefits associated with the behavior)	· Valuing the achievement of glycemic goals · Perception of PA benefits · Perception of risks associated with sedentary lifestyle · Personal self-efficacy for practicing PA regularly · Overcoming male gender issues (e.g., "men should prioritize work") · Overcoming female gender issues ("taking care of others - children, husband, grandchildren - is a priority")
Automatic motivation (emotions/drives arising from associative learning and/or innate dispositions, reinforcers)	· Positive attitude towards diabetes
Medications: strictly follow medication treatment (medication name, correct route, dose, time)	
COM-B components	**What needs to happen for the target behavior to be achieved?**
Physical capability (physical skill)	· Willingness/spirit and ability to plan the taking medications · Sufficient health staff and up to date on clinical guidelines
Psychological capability (knowledge, cognitive and interpersonal skills, memory, attention, decision-making, and behavioral regulation)	· Knowledge about medications in use (name, dose, indication, action, conservation and side effects) · Knowledge about the relationship between compliance with treatment and glycemic control · Planning the daily routine according to the medications · Planning the taking medications in non-routine events (e.g., trips, outings, parties)
Physical opportunity (environmental context, resources, and equipment)	· Access to prescription drugs · Patient-centered healthcare staff approach
Social opportunity (culture, social influences)	· Family/friend support
Reflective motivation (role and social identity, beliefs in one's own capability, beliefs about consequences - risks/benefits - associated with behavior)	· Valuing the achievement of glycemic goals · Perception of benefits of drug treatment · Perception of risks associated with failures in compliance with drug treatment · Personal self-efficacy to comply with drug treatment · Overcoming concerns about drug treatment · Overcoming fear of medication or injection side effects · Overcoming male gender issues (e.g., "men should be strong")

Source: authors themselves.

Chart 2. Description of behavior change techniques selected for the *Dia-D* Program according to the COM-B components to be activated, 2022.

Behavior change techniques	Description
Encouraging willingness and skills (physical and psychological capability)	
Behavior demonstration	Provide an observable sample of how to perform the behavior directly or indirectly, via video or pictures, so that people can be inspired or imitated.
Behavior self-monitoring	Establish a method for the person to monitor or record performance of the behavior.
Shaping knowledge/educating (psychological capability)	
Instructions on how to perform the behavior	Advise or agree on how to perform the behavior; includes skills training.
Information about health consequences	Provide information about the health consequences associated with carrying out the behavior, not only for oneself, but also for others.
Information about emotional consequences	Provide information about emotional consequences of performing the behavior.
Prompts/cues	Introduce an environmental or social stimulus for the purpose of promoting or warning the behavior.
Promoting training (automatic and reflective motivation; social opportunity)	
Goal setting	Establish or agree to defined goals in terms of desired behavior.
Action planning	Develop a detailed plan for how to perform the behavior, including context, frequency, duration, and intensity. Context can be environmental (physical or social) or internal (physical, emotional or cognitive).
Commitment	Ask a person to affirm and reaffirm their commitment to behavior change.
Graded tasks	Determine tasks that are easy to perform, gradually increasing the difficulty.
Problem solving	Encourage the analysis of the factors that influence the achievement of desired behavior and generate/propose strategies to overcome barriers and/or make it feasible.
Feedback on behavior	Monitor information and provide feedback on performance of behavior.
Feedback on outcome(s) of behavior	Monitor and provide feedback on the outcome associated with performing the behavior.
Pros and cons	Advise the person to identify and compare advantages and disadvantages in performing the behavior.
Comparative imagining of future outcomes	Promote comparison of future results between performing or not changing behavior
Social support (practical and emotional)	Advise/provide practical and emotional help from family/friends/health care staff to perform the behavior.
Reduction of negative emotions	Advise on ways to lessen demands on mental resources to facilitate behavior change.
Persuading (automatic and reflexive motivation)	
Salience of consequences	Use specific methods to emphasize consequences of carrying out the behavior, with the purpose of making them unforgettable, going beyond informing (e.g., using shocking images about harmful consequences associated with smoking).
Framing/Reframing	Suggest adopting a new perspective on the behavior and its purpose, with the intention of changing associated reasoning or emotions.
Verbal persuasion about capability	Assertively communicate that the person has the capability to perform desired behavior, dispelling their doubts and emphasizing the potential for success.
Environmental restructuring (physical opportunity)	
Restructuring the physical environment	Change or advise to change the physical environment in order to facilitate the performance of desired behavior or to create difficulties for the unwanted behavior.
Behavior substitution	Promote unwanted behavior replacement with desired one.

Source: elaborated by the authors based on the description of the BCW model.[18]

Chart 3. Intervention content to support changes in target patient behaviors of *Dia-D* Program, 2022.

Behavior change techniques	intervention content
Encouraging willingness and skills	
Behavior demonstration	**Food:** composition of a healthy dish through interaction games with participants; demonstration of simple recipes to increase vegetable consumption and reduce carbohydrate and saturated fat consumption (video). **Physical activity:** demonstration of a personalized program of physical activity at no cost (video on how to walk, strength exercises and stretches).
Behavior self-monitoring	Participants will receive a *Diário Diabetes em Dia*, to monitor and record the follow-up of the action plan, and will be guided to use applications for cell phones to count steps, when possible.
Shaping knowledge/educating	
Instructions on how to perform the behavior	Participants will receive detailed guidance on how to: (i) plan meals according to the proposed dietary pattern; (ii) carry out the proposed physical activity program; (iii) taking medications correctly and planning daily activities according to medication schedules.
Information on health/emotional consequences	Participants will be instructed on: (i) the role of diet, physical activity and medications in glycemic control; (ii) health benefits of complying with the proposed behaviors and risks of not complying with.
Prompts/cues	Participants struggling to remember medication times will receive personalized information on how to create reminders and prompts.
Promoting training	
Goal setting/action planning	Participants will be individually encouraged and guided to set lifestyle change goals in relation to target behaviors. Guidelines will be personalized and adjusted to the socioeconomic and clinical profile of the participants and the type of medication being used.
Commitment	Participants will be encouraged to commit to the proposed planning and goals, by completing the *Diário Diabetes em Dia* and the booklet *Diabetes Dia a Dia: Descobrindo Soluções*, which will present situations involving problems and request the search for solutions.
Graded tasks	Composition of food/physical activity goals will be done gradually to facilitate compliance with the plan.
Problem solving	Difficulties to change behavior will be discussed in the group, in order to encourage the exchange of experiences and the search for solutions. Strategies for overcoming barriers will be discussed based on the entries in the booklet *Diabetes Dia a Dia: Descobrindo Soluções*.
Feedback on behavior	Compliance with the action plan will be monitored by the health staff and participants will receive feedback.
Feedback on outcome(s) of behavior	Participants' clinical data will be monitored before and after the intervention and participants will receive feedback.
Pros and cons/ Comparative imagining of future outcomes	During the health staff's interactions with the participants, they will be encouraged to: (i) consider the pros and cons of following the proposed action plan, with the aim of weighing the benefits and risks; (ii) reflect on one's perspective of health in the future, in relation to how it is in the present.
Social support (practical and emotional)	Family members will be invited to participate in the group sessions to discuss how they can engage and help comply with the action plan.
Reduction of negative emotions	Participants will be guided on simple relaxation/meditation techniques to reduce the emotional burden of diabetes.
Persuading	
Salience of consequences	Information about the health risks of not complying with desired behaviors will be emphasized with the use of aversive images about the chronic complications of diabetes.
Framing/Reframing	During interactions with the health staff, participants will be encouraged to reflect on beliefs that make it difficult to comply with desired behaviors (e.g., "fat is tasty"; "healthy food does not satisfy hunger"; "men need to consume alcohol in excess"; " healthy lifestyle is not compatible with male work"; "for women, taking care of children, husband or grandchildren is a priority"; "men must be strong").
Verbal persuasion about capability	During individual interactions, participants will be encouraged to follow through with the action plan, emphasizing successes and new skills acquired.
Environmental restructuring	
Restructuring the physical environment	Participants will be advised to organize the environment to fulfill the plan, through: (i) purchase of food; (ii) resources needed to perform physical activity (appropriate location and clothing); (iii) adequate supply and resources to organize medication doses and schedules.
Behavior substitution	In individual interactions, if participants report a lack of time for physical activity, they will be advised to review their daily life routine in order to learn how to manage time and replace "sedentary" time with "active".

Source: authors themselves.

FINAL CONSIDERATIONS AND IMPLICATIONS FOR PRACTICE

In the current condition of global burden of non-communicable chronic diseases, it is necessary to undertake with greater theoretical-conceptual and methodological sophistication the patient-centered educational processes, including family and social context.

The present essay is unique in that it presents an application of theoretical behavioral models to propose a complex intervention to promote self-management in diabetes, based on strategies for behavior modification, a central component in the improvement of clinical outcomes in the care of people with type 2 diabetes.

The purpose of this essay considered aspects of the social context in the design, such as family/friend support, overcoming gender issues and access to prescribed medication. However, the proposal does not analyze exogenous factors that may interfere with desired results, such as the need for health staff training, availability of resources necessary for implementation, perception of health professionals and people with diabetes about the feasibility and acceptability of the activities present in the intervention. The evaluation of these aspects will be carried out in a future study.

The deliberate choice of models presented is considered a limitation of this essay, despite other theoretical-methodological references available in the scientific literature.

Among the implications for practice, the relevance of adopting behavioral models in health education planning is highlighted. The current premise of education for self-care of chronic illness emphasizes the role of a person in the process of staying healthy. From this perspective, all professionals involved in this process must be able to work together with people to enable them to adopt behaviors with positive health outcomes. Since educating for health implies educating to promote behavior change, mastering this competence is an essential condition in this process.

Another important implication for practice resides in the finding that complex interventions, such as those involving educational approaches, need to consider the context in which they will be implemented, as the results generated depend on the interaction between the intervention and the circumstances that surround it (social, political, economic and geographical).

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