



THE RE-AIM MODEL FROM THE PERSPECTIVE OF TELEPHONE-BASED EDUCATIONAL PROGRAMS ON DIABETES

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ABSTRACT

Objective: to analyze the dimensions of the RE-AIM model from the perspective of telephone-based educational programs on diabetes, considering the experience of researchers from a public university in the state of São Paulo, Brazil.

Method: this reflexive study presents an analysis of the dimensions of the RE-AIM model and the validity of its Brazilian version concerning the dimensions: reach, efficacy, adoption, implementation, and maintenance of results obtained by the study Telephone Support for the Follow-up of Diabetes *Mellitus*.

Results: the analysis shows that the five dimensions provide information concerning factors that may affect the success of a program in clinical practice; that reaching the population remains a challenge; and that efforts should be made to advance on the efficacy and maintenance of educational interventions.

Conclusion: this reflection, based on the experience of telephone-based educational interventions for diabetes, can contribute to advance Nursing science in terms of methodological guidance to support the development of interventions and programs at the various levels of health care.

DESCRIPTORS: Health Programs. Health Education. Diabetes. Telephone. Nursing.

HOW CITED: Teixeira CRS, Zanetti ML, Almeida FB, Almeida FA. The RE-AIM model from the perspective of telephone-based educational programs on diabetes. *Texto Contexto Enferm* [Internet]. 2019 [cited YEAR MONTH DAY]; 28: e2017264. Available from: <http://dx.doi.org/10.1590/1980-265X-TCE-2017-0264>

MODELO RE-AIM NA PERSPECTIVA DAS INTERVENÇÕES TELEFÔNICAS EDUCATIVAS EM DIABETES

RESUMO

Objetivo: analisar as dimensões do modelo RE-AIM na perspectiva das intervenções educativas por telefone em diabetes, considerando a experiência dos pesquisadores de uma universidade pública paulista, Brasil.

Método: estudo de reflexão que analisou as dimensões do modelo RE-MAIN, validade para o português do Brasil, nas dimensões: alcance eficácia, adoção, implementação e manutenção nos resultados obtidos do estudo denominado Apoio Telefônico no Monitoramento do Diabetes *Mellitus*.

Resultados: os resultados da análise mostraram que as cinco dimensões fornecem informações sobre os fatores que podem afetar o sucesso do programa na prática clínica, sendo que o alcance da população ainda constitui um desafio, e esforços devem ser envidados para avançar na eficácia e manutenção das intervenções educativas.

Conclusão: espera-se, com essa reflexão à luz da experiência em intervenções telefônicas educativas em diabetes, pode contribuir para o avanço da ciência Enfermagem, no que tange a orientações metodológicas, que podem auxiliar na construção e desenvolvimento de intervenções e programas nos diversos níveis de atenção à saúde.

DESCRITORES: Programas de saúde. Educação em saúde. Diabetes. Telefone. Enfermagem.

MODELO RE-AIM EN LA PERSPECTIVA DE LAS INTERVENCIONES TELEFÓNICAS EDUCATIVAS EN DIABETES

RESUMEN

Objetivo: analizar las dimensiones del modelo RE-AIM en la perspectiva de las intervenciones educativas por teléfono en diabetes, considerando la experiencia de los investigadores de una universidad pública paulista, Brasil.

Método: reflexión de estudio que examinó las dimensiones del modelo RE-MAIN, válidos para el portugués de Brasil, en las dimensiones: alcance eficacia, adopción, implementación y mantenimiento de los resultados del estudio denominado soporte telefónico de Monitoreo de la Diabetes *Mellitus*.

Resultados: los resultados del análisis mostraron que las cinco dimensiones proporcionan información sobre los factores que pueden afectar el éxito del programa en la práctica clínica y que el alcance de la población sigue siendo un desafío y se deben realizar esfuerzos para avanzar en la eficacia y el mantenimiento intervenciones educativas.

Conclusión: se espera, con esa reflexión a la luz de la experiencia en intervenciones telefónicas educativas en diabetes, puede contribuir al avance de la ciencia Enfermería, en lo que se refiere a orientaciones metodológicas, que pueden auxiliar en la construcción y desarrollo de intervenciones y programas en los diversos niveles de atención a la salud.

DESCRIPTORES: Programas de salud. Educación en salud. Diabetes. Teléfono. Enfermería.

INTRODUCTION

Inconsistency has been acknowledged between demands for evidence-based clinical practice and recommendations provided by behavioral intervention studies originating in highly controlled clinical trials.¹⁻³ In this sense, there is a growing demand on the part of health and nursing workers for models and proposals that meet the demands imposed by healthcare settings, especially diabetes education, which has undergone a profound transformation.

One of the World Health Organization's recommendations is for health workers to adopt communication technologies to follow-up with people who have chronic conditions.⁴ Due to the complexity of diabetes education, information and communication technologies have great potential to educate and support adherence to self-care.⁵

A large variety of communication means is used, such as text message systems, e-mails, interactive sites, electronic transmission of glycemic data, and apps. In some cases, hybrid models that incorporate more than one media are used, while telephone is the most versatile, accessible and cheapest method. Telephones can be used to remind patients of their medical appointments, laboratory or complementary exams. Telephone support is used to reinforce behavior and occasionally adjust therapy without the need to personally attend a health service.⁶

The international and Brazilian literature report the potential of telephone-based educational interventions for diabetes care.⁵⁻¹² There is, however, little information on other key factors to determine whether interventions can be effectively carried over to clinical practice.⁷

In this direction, the RE-AIM (Reach, Efficacy, Adoption, Implementation, Maintenance) model can aid filling in this gap. This model was translated and validated for Portuguese.¹³ Its name remained RE-AIM in its translated version, with its five dimensions: reach, efficacy, adoption, implementation, maintenance. The model and facilitates the assessment of interventions intended to promote behavioral change based on individual and organizational factors when applied in clinical practice.¹⁴

Nonetheless, there is a lack of Brazilian studies addressing the dimensions of the RE-AIM model to plan and assess health programs. Therefore, this study's objective is to analyze this model's dimensions from the perspective of telephone-based educational interventions for diabetes, taking into account the experience of researchers from a public university in the state of São Paulo. This study is expected to support the model in the planning and assessment of health educational programs promoted by nursing professionals in the Brazilian context.

DIMENSIONS OF THE RE-AIM MODEL FROM THE PERSPECTIVE OF TELEPHONE-BASED DIABETES EDUCATIONAL INTERVENTIONS

The five dimensions of the RE-AIM model are explored in this reflective study in light of telephone-based diabetes educational interventions. Note that each of the five dimensions, Reach, Efficacy, Adoption, Implementation, and Maintenance, provides information that can be used in the assessment of health programs, interventions, and public policies or research.

The first dimension of the RE-AIM model is Reach, which is defined as the absolute number, proportion and representativeness of individuals willing to participate in a given program, compared to potentially eligible individuals or those who withdraw. Proportion is considered the rate of participation, that is, the number of individuals who take part in a given intervention program divided by the total number of eligible individuals. The formula to calculate reach is presented in Figure 1.¹³

Number of people who participate = $n \times 100 = \text{Reach} (\%)$

Number of eligible people

Figure 1 - Formula to calculate Reach

The results obtained in the study called ATEM DIMEL (Telephone Support in the Follow-up of Diabetes *Mellitus*) are used to exemplify the calculation of reach.¹¹ The objective of the previously mentioned study, a pragmatic clinical trial, was to verify the effectiveness of telephone-based interventions in encouraging metabolic control among people with diabetes *mellitus* who received care in a health district from a city in the interior of São Paulo, Brazil, in 2014.¹¹ A total of 1,298 eligible people were invited via telephone, but only 98 agreed to participate. The following result was obtained for Reach: $98 \div 1,298 = 0.0755 \times 100 = 7.55\%$, which is considered low when compared to other studies.⁵⁻⁸

The study, however, shows that, even though the sample size was calculated for the project, eligible patients were not accustomed to telephone interventions. This may have interfered in reach because 232 (17.9%) people consented to participate in the study but did not attend the activities scheduled for the beginning of the study. Another aspect to take into account is that 425 (32.7%) individuals were not reached by telephone due to incorrect, disconnected or changed telephone numbers. Additionally, there was no response from 265 (20.4%) completed calls after three attempts, made in alternating hours.

Therefore, reach is an important dimension when planning an intervention, considering that 53.1% of the eligible people were not effectively contacted, even though they had an accessible telephone number. A systematic review addressing regular exercise programs directed to elderly individuals using the RE-AIM model reports that an average of 47.2% of the studies analyzed presented a description of the reach dimension.¹⁵ Therefore, there is a need to seek effective strategies in the information systems of health facilities to update the patients' telephone numbers and achieve a higher rate of participation in telephone-based programs. This need is also reported by a recent study analyzing hospitalizations and their correlation with the estimate of the number of people with systemic high blood pressure registered and monitored by Family Health Strategy (*Estratégia Saúde da Família* – ESF, in Portuguese) services from 2009 to 2012 in the cities in Mato Grosso do Sul, Brazil. The study shows weaknesses in the identification and selection of patients with cardiovascular diseases from the perspective of system management.¹⁶

The second dimension of the RE-AIM model is Efficacy. Efficacy measures changes in the variable of interest of an intervention regarding clinical outcomes including quality of life, potential negative effects and costs. The impact desired can be obtained in the medium and long term, and is generally measured at an individual level.

Efficacy in the scope of diabetes education can be assessed through data that concern clinical care, health promotion, counseling, and disease management, among others. Healthy eating habits, treatment adherence, self-monitoring of capillary blood glucose at home, decreasing the risk of acute and chronic complications, good psychosocial adaptation, and the regular practice of exercises are indicators that diabetes programs are being efficacious.¹⁷ The self-monitoring of capillary glucose at home has increased in Brazil,¹⁸ though glycemic control outcome most frequently used in clinical practice and in research assessing the efficacy of diabetes educational interventions directed is glycated hemoglobin.

In this sense, an integrative literature review conducted in 2011 analyzed the efficacy of interventions that adopted telephone support as a strategy to promote glycemic control among adults

with type 2 diabetes *mellitus* (DM2) and four out of the eight studies it addressed presented statistically significant improved glycemic control.¹⁹

Apps for mobile phones have been recently used to support educational interventions. One systematic review addressing controlled trials reports a decrease of 0.48% in the glycated hemoglobin of adult outpatients with DM2 when apps in mobile phones were used in an educational intervention.⁸

Nonetheless, one meta-analysis study that investigated the efficacy of telephone interventions without the transmission of electronic data concerning glycemic control shows no difference when interventions were performed via telephone, compared to traditional clinical care. Telephone-based interventions, however, may present other benefits, especially if we consider scarce resources in the health field.²⁰

Note that the efficacy of interventions for glycemic control is affected by various factors related to the patient, such as age, educational level, income, type of diabetes, complexity of the disease, and pharmacological treatment.²⁰ Another point to consider is duration of the disease. Patients with long-duration diabetes are less interested and motivated to maintain self-care actions, to adhere to pharmacological treatment, or to implement changes in their lifestyles compared to recently diagnosed patients.²¹

Other outcomes, such as quality of life and patient satisfaction, also show the efficacy of telephone-based educational interventions. One study conducted in the United States in 2013 adopted the RE-AIM model to assess the efficacy of a health information service provided via mobile phone. Of the 161 patients investigated, 108 reported high levels of satisfaction with the information service. The study shows that health information provided via mobile phone was positive and promoted positive behavioral changes, especially in terms of eating habits and exercises.²¹

One observational study conducted in the interior of São Paulo, Brazil, assessed the expectations and satisfaction of patients who received telephone-based diabetes follow-up and showed that 77.8% of the patients were satisfied with the information provided.¹²

Assessing the efficacy of telephone-based educational interventions may represent advancement for health services. This strategy may decrease waiting time for consultations and the cost of commuting for patients, in addition to facilitating return visits to health services, though such interventions require health workers to receive training to provide orientation via telephone.

The third and fourth dimensions of the RE-AIM model, that is, adoption and implementation, are assessed at an organizational level. Adoption refers to the absolute number, proportion and representatives of organizations and intervention agents who are willing to initiate a given program. As such, adoption is the way organizations or communities are organized to operationalize and implement a given intervention. Therefore, level of adoption can be measured according to a study population, for instance, patients, health staff, and employees, among others. The calculation of adoption is performed according to the formula presented in Figure 2:¹³

$$\frac{\text{Number of organizations that participate}}{\text{Number of eligible organizations}} = n \times 100 = \text{Adoption (\%)}$$

Figure 2 - Formula to calculate adoption

Our experience is centered on the individual approach, while there is a lack of Brazilian studies addressing the organizational perspective of telephone-based educational interventions. Nonetheless, the use of the telephone in population inquiries in Brazil has grown. In 2006, the Ministry of Health (MH), through the Department of Health Surveillance and Department of Strategic and Participatory

Management, implemented the Surveillance System of Risk Factors and Protection Against Chronic Diseases by Telephone Inquiry (*Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* – VIGITEL, in Portuguese) in all capitals of the 26 Brazilian states and in the Federal District. This System shows the annual progress of health indicators. Thus, the Ministry of Health makes available the main determinants of non-transmissible chronic diseases in Brazil, contributing to the formulation of public policies and improved quality of life for the Brazilian population.²²

The fourth dimension of the RE-AIM model is implementation, which assesses the extent to which a program or a policy is implemented, including permanence in the program, according to the predicted duration and cost of intervention. The results obtained on the ATEM DIMEL enable researchers to present important indicators when developing telephone-based educational programs, such as: duration of intervention, number of planned calls, mean duration of calls, number of calls/month.

The benefits related to the use of telephone as a strategy of intervention are the speed with which patients and health workers are accessed, decreased waiting time for consultations, decreased commuting time and costs, in addition to enabling increased frequency of contacts with family members, and facilitating return visits to the health service.²³ Still, the characteristics of telephone-based educational interventions should be taken into account.

One systematic review of studies addressing telephone-based follow-up interventions highlights some factors that should be considered when implementing telephone-based educational programs, such as the direction of calls (whether only workers call patients or patients are allowed to call health workers), whether automated telephone calls are used; whether a telephone script developed by an educator in diabetes is used; and whether physicians participate in the program, adjusting pharmacological therapy. The way programs are implemented influences the results of telephone-based diabetes interventions.⁶

Other issues, however, need to be clarified, such as the conceptual model used to ground interventions. The same conceptual elements used in a study's conception are expected to be compared to those that are grounding telephone-based educational interventions or face-to-face approaches.

The literature concerning studies addressing telephone-based follow-up interventions reveals that no studies clearly describe the conceptual model used to ground educational interventions, while it also shows that adding a psychological component in a telephone-based intervention increases the complexity of its implementation. Therefore, there are methodological challenges to face in order to implement telephone-based educational interventions in clinical practice.⁶

Another component that should be explained in the studies involves the costs of telephone-based interventions implemented in Brazil, both landlines and mobile phones. There is also a need to deepen the approach via telephone on issues that can put patients at risk, such as hypoglycemia and other events that normally occur in the context of diabetes.

Finally, the fifth dimension is maintenance, which can be defined as the degree to which an effect is maintained at the individual level for at least six months after the implementation of a program. It is also defined as the degree to which an intervention can be maintained after the formal financing of a study ceases.¹³ Maintenance at an organizational level is the measure in which a program, or policy, becomes institutionalized or part of organizational practices and policies. Factors that affect maintenance at an organizational level include human resources, partnerships, financing and the organization itself. Maintenance at an individual level is the ultimate goal of an intervention and is translated as beneficial effects on health behaviors in the long term.

A systematic review focusing on the RE-AIM model analyzed 26 scientific papers that implemented regular exercise programs directed to the elderly. The study reports that only one paper assessed how the effect of an intervention was maintained at the organizational level.¹⁵

One pragmatic clinical trial conducted in Canada in 2012 assessed an intervention using the RE-AIM model in an individualized patient-centered care plan. The study shows that the assessment using the RE-AIM model generated evidence for reliability, efficacy and sustainability for the collaborative care plans for patients with chronic diseases and depression.²⁴

In summary, the RE-AIM model is different from other approaches, because it is specifically designed to facilitate transition from investigation to practice. This model equally emphasizes internal and external validity of the planning and assessment of health programs and also emphasizes representativeness. It also offers specific ways and measurement patterns involved in the assessment of the potential impact on public health and its application on a large scale, for instance, at the organizational level.¹⁴ The RE-AIM model is a unique tool to be used in the Nursing field, as professionals in this field have become involved with the development, implementation, and assessment of health programs and policies.²⁵

CONCLUSION

The results of this reflection show that the five dimensions of the RE-AIM model provide information on the factors that may influence the success of a program in clinical practice, while the reach of population remains a challenge and effort should be put forth to advance the efficacy and maintenance of educational interventions.

This reflection, based on the experience of researchers with telephone-based diabetes educational interventions, is expected to contribute to the advancement of the Nursing science in terms of methodological guidance to support the development of interventions and programs at the various healthcare levels.

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NOTES

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CONFLICT OF INTEREST

No any conflict of interest.

HISTORICAL

Received: April 27, 2017.

Approved: November 08, 2017.

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