

# Motivational interviewing and self-management among adolescents with type 1 diabetes: an integrative review

*Entrevista motivacional no autogerenciamento de cuidados a adolescentes com diabetes tipo 1: revisão integrativa*

*Entrevista motivacional en la autogestión de los cuidados a adolescentes con diabetes tipo 1: revisión integradora*

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## ABSTRACT

**Objective:** this study examined scientific evidence on motivational interviewing and its influence on self-management among adolescents with type-1 diabetes mellitus (DM1). **Methods:** the survey for this integrative review took place in June 2020 in the LILACS, PubMed, CINAHL, Scopus, and Web of Science databases to answer the question: What scientific evidence is available on motivational interviewing and its influence on self-management among adolescents with DM1? All the articles found were in English and published between 2003 and 2020. **Results:** of the ten studies included, nine were conducted in the United States and one in the United Kingdom. The studies used different methods for applying motivational interviewing in differing circumstances, and their findings revealed positive impacts on self-management among adolescents with type-1 diabetes, especially on blood glucose monitoring and/or on glycosylated hemoglobin levels. **Conclusion:** motivational interviewing is an intervention that favors self-management and autonomy among adolescents with diabetes.

**Descriptors:** Diabetes Mellitus, Type1; Adolescent; Motivational Interviewing; Self Efficacy; Self-Management.

## RESUMO

**Objetivo:** analisar evidências científicas sobre entrevista motivacional e sua influência no autogerenciamento do cuidado do adolescente com diabetes mellitus tipo 1. **Método:** revisão integrativa cuja busca aconteceu em junho de 2020 nas bases de dados LILACS, PubMed, CINAHL, Scopus e Web of Science para atender a pergunta: Quais evidências científicas sobre entrevista motivacional e sua influência no autogerenciamento do cuidado ao adolescente com diabetes mellitus tipo 1? Todos os artigos identificados estavam no idioma inglês e publicados entre 2003 e 2020. **Resultados:** entre os dez estudos incluídos, nove foram realizados nos Estados Unidos e um no Reino Unido. As pesquisas tiveram métodos diversificados na aplicação da entrevista motivacional em circunstâncias diferentes e os resultados mostraram impactos positivos no autogerenciamento dos cuidados de adolescentes com DM1, principalmente em relação ao controle glicêmico e/ou nos níveis de hemoglobina glicada. **Conclusão:** a entrevista motivacional favorece o autogerenciamento do cuidado e autonomia do adolescente com diabetes.

**Descritores:** Diabetes Mellitus Tipo 1; Adolescente; Entrevista Motivacional; Autoeficácia; Autogestão.

## RESUMEN

**Objetivo:** analizar evidencias científicas sobre entrevista motivacional y su influencia en la autogestión del cuidado de adolescentes con diabetes mellitus tipo 1 (DM1). **Métodos:** revisión integradora llevada a cabo en junio de 2020 en las bases de datos LILACS, PubMed, CINAHL, Scopus y WoS para responder a la pregunta: ¿Cuáles son las evidencias científicas sobre entrevista motivacional y su influencia en la autogestión del cuidado de adolescentes con diabetes mellitus tipo 1? Los artículos encontrados estaban en inglés y fueron publicados entre 2003 y 2020. **Resultados:** de los diez estudios incluídos, nueve se realizaron en Estados Unidos y uno en Reino Unido. Las investigaciones utilizaron diferentes métodos de aplicación de la entrevista motivacional en diferentes circunstancias y los resultados señalaron impactos positivos en la autogestión de los cuidados de adolescentes con DM1, especialmente cuanto al control glucémico y/o niveles de hemoglobina glucosilada. **Conclusión:** la entrevista motivacional favorece la autogestión del cuidado y la autonomía de adolescentes con diabetes.

**Descriptores:** Diabetes Mellitus Tipo 1; Adolescente; Entrevista Motivacional; Autoeficacia; Automanejo.

## INTRODUCTION

The global prevalence of Type 1 Diabetes Mellitus (DM1) in children, adolescents and young people is 1,110,100 cases, with an estimated global annual incidence of around 128,900 in this age group below 20 years old. The countries with the highest number of prevalent cases in children and adolescents under the age of 15 are India (95,600), United States (94,200) and, in third place, Brazil (51,500)<sup>1</sup>.

As a result of the changes inherent to the development stage, adolescents experience conformation of their identity, and their relationships with peers become more important than those with family members and professionals,

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sometimes permeated with conflicts<sup>2</sup>. Therefore, it is suggested that the health interventions include active involvement of the patient, in order to improve self-care<sup>3</sup>.

In this perspective, professionals who take care of adolescents with DM1 should use strategies aimed at improving adolescents' self-management in relation to the disease. Diabetes self-management requires the patients to be able to reconcile their resources and preferences with the treatment so that their engagement in care is more positive<sup>4</sup>.

Consequently, an increasing interest in studying quality of life, emotional behavior and self-care among DM1 patients is observed<sup>3</sup>. It is noteworthy that motivating communication that helps to build a relationship of trust between the adolescents, their family and the health professionals is fundamental to achieve proper management of the disease. In this way, the Motivational Interview (MI) is an intervention modality, a patient-centered counseling style, in order to provoke changes in behavior, helping people to identify their own attitudes related to their health status. The MI follows the fundamental principles referring to expression of empathy, incorporation of changes and, consequently, evocation of intrinsic motivation<sup>5</sup>.

In their consultation, counseling and educational activities with adolescents with DM1, nurses should use strategies that provide care self-management, resulting in an improvement in these patients' well-being and health promotion, a fundamental characteristic of their work<sup>6</sup>. To such end, specific skills in the conduction of strategies are necessary to attain healthy attitudes from their own motivations. Given the above, the MI is a useful strategy to work with ambivalence about change<sup>7</sup>.

In this context, this study presents a synthesis of the available knowledge about MI and its influence on care self-management for adolescents with Type 1 diabetes. The aim is to contribute with decisions in the clinical practice, essentially, in the counseling of adolescents with DM1, by using the Motivational Interview. Thus, the objective of this review was to analyze the scientific evidence on motivational interviewing and its influence on care self-management for adolescents with Type 1 diabetes mellitus.

## METHOD

An integrative literature review outlined in six stages: identifying the theme and selecting the research hypothesis or question; establishing criteria for inclusion and exclusion of studies/sampling or literature search; defining diverse information to be extracted from the studies selected and categorizing them; evaluating the studies included for the review; interpreting the results; and presenting the knowledge synthesis<sup>8,9</sup>.

The search in the literature and selection of the studies were performed independently by two researchers in July 2020, resorting to the following databases: Scopus (*Sci Verse Scopus*), PubMed (*PubMed Central: PMC*), LILACS (*Literatura Latino-Americana e do Caribe em Ciências da Saúde*), CINAHL (*Current Nursing and Allied Health Literature*) and Web of Science (*Main Collection*).

While elaborating the research question, the PICO strategy was used, acronym for *Patient, Intervention, Comparison, Outcomes*<sup>10</sup>. Letter "P" stands for adolescents and Diabetes Mellitus; "I" for motivational interview; "C" does not apply and "O" corresponds to self-management. Thus, the guiding question was as follows: Which is the scientific evidence on motivational interviewing and its influence on care self-management for adolescents with Type 1 diabetes mellitus?

The studies were identified with search equations using the Descriptors in Health Sciences (DeCS/MeSH) and Boolean operators ("AND" and "OR"), as shown in Figure 1. The "diabetes mellitus" descriptor was chosen to allow expanding the number of articles.

Groups	Search equations
Population	adolescent OR teen* OR youth* OR juvenile OR "young people" OR young
Population	diabetes OR "diabetes mellitus"
Intervention	"motivational interviewing" OR "health communication"
Results	"self efficacy" OR "self-efficacy" OR "self care" OR "self-care" OR "self-management" OR "self management"

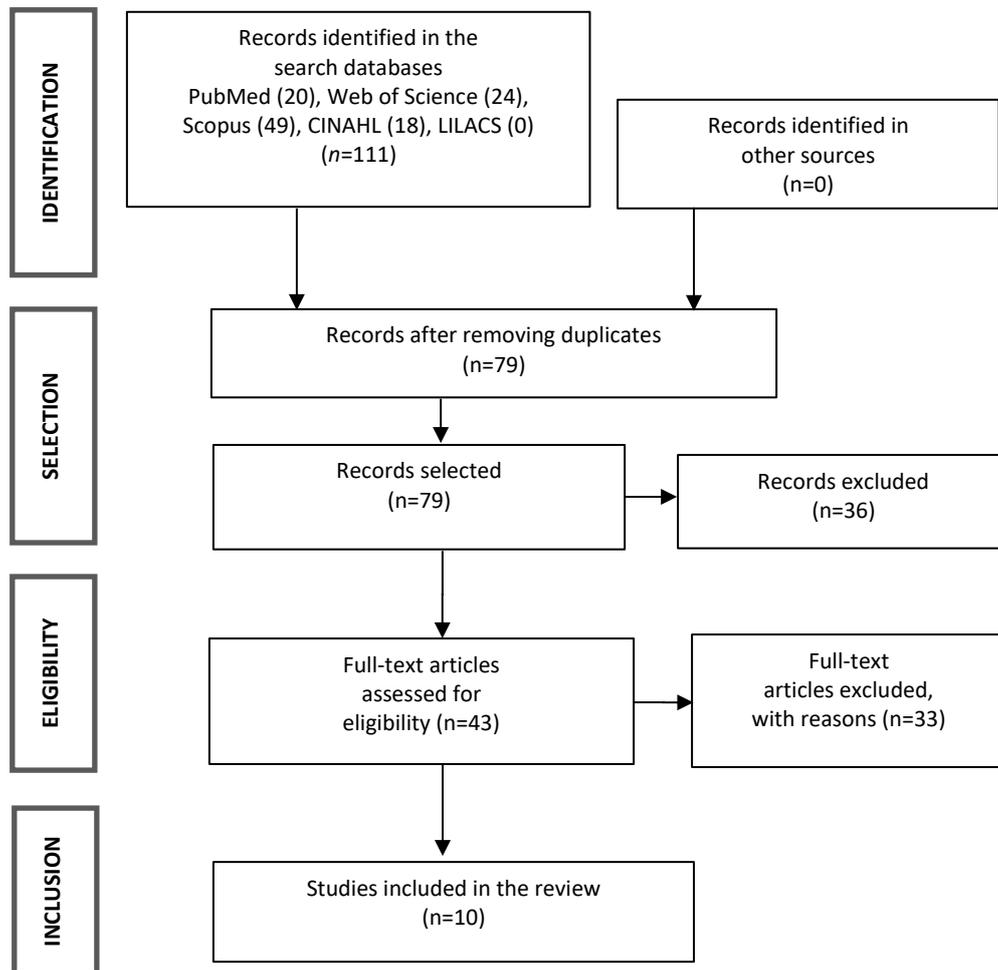
**FIGURE 1:** PICO Strategy – "What scientific evidence is available on motivational interviewing and care self-management for adolescents with Type 1 diabetes mellitus?". Fortaleza, CE, Brazil, 2020.

Source: Prepared by the authors.

The inclusion criteria were as follows: articles written in Portuguese, Spanish and English published and available electronically or with access allowed on the Journals Portal of the Coordination for the Improvement of Higher Level Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, CAPES*), via the Federated Academic Community (*Comunidade Acadêmica Federada, CAFe*). No time frame was established for inclusion of the articles. Duplicate papers were excluded, as well as editorials, opinion articles and those materials that did not answer the guiding question.

Initially, the search yielded 111 potentially eligible publications. Subsequently, duplicate studies were removed and 43 publications remained after reading their titles and abstracts. A total of 33 publications were excluded after applying the selection criteria, obtaining a sample comprised by 10 primary studies.

The search and screening of articles were guided by the PRISMA structure<sup>11</sup>, summarized in Figure 2.



**FIGURE 2:** Flowchart corresponding to the selection process of the primary studies, adapted from the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA). Fortaleza, CE, Brazil, 2020.

A chart was prepared with the studies included in the review, containing the following data: title, author, year of publication, country of origin, level of evidence, objective and main results, presented in the Results section, in descending order regarding year of publication. The studies were identified with the letter "E" ("Estudo" in Portuguese): E1- article 1, E2-article 2, and so on.

For the analysis of the studies, the hierarchical classification of evidence was adopted in order to classify the strength of the evidence regarding the object under study. In this context, the quality of the evidence based on the categorization of the United States of America's Agency for Healthcare Research and Quality (AHRQ) is classified into six levels, namely: level 1, meta-analysis of multiple controlled studies; level 2, individual study with an experimental

design; level 3, quasi-experimental study such as those without randomization with a single pre- and post-test group, time series or case-control; level 4, non-experimental study such as descriptive correlational and qualitative research or case studies; level 5, case report or data obtained systematically, of verifiable quality or program evaluation data; and level 6, opinion of reputable authorities based on clinical competence or opinion of expert committees, including interpretations of information not based on research studies<sup>12</sup>.

## RESULTS

Of the ten studies included (E1 to E10), all originally written in English, nine were conducted in the United States and only one in the United Kingdom, one was published in 2003 and the others between 2010 and 2020, as shown in Figure 3.

The following description highlights a brief presentation of the methodological aspects of each study. In E1, a randomized clinical trial with two interventions was conducted with a population of 301 adolescents aged from 13 to 17 years old. The first intervention, carried out through group work, using motivational interviewing to involve the participant, included problem solving with the objective of improving self-care, such as glycemic monitoring and *bolus* insulin dosage. The other intervention involved text reminders sent to the adolescent's personal cell phone to verify adherence.

The randomized clinical trial conducted with 258 adolescents aged from 13 to 16 years old (E2) tested an adaptive behavioral intervention that integrated motivational interviews and skills training to solve problems and increase adherence to diabetes self-management.

In the non-experimental study (E3) carried out with 55 adolescents aged between 13 and 18 years old and 11 health professionals, the adolescents were subjected to a motivational interview and an assessment of behaviors in care and self-efficacy. The health professionals who did not use language that adhered to the motivational interview, that is, who resorted to coping and persuasion, obtained worse results in terms of glycemic control and less self-efficacy in controlling diabetes in their patients.

Another randomized clinical trial (E4), carried out with DM1 adolescents aged 13-16d, compared the before-and-after of the intervention using motivational interviewing and problem solving; in addition to the use, by all participants, of an educational book for DM1 patients called *Pink Panther Understanding Diabetes*. This study evaluated the main topics for care management, such as blood glucose check, insulin intake, healthy eating and physical activity.

The randomized clinical trial (E5) included the participation of 64 adolescents with DM1 and their parents and/or guardians, who were divided into three groups: in the first group, both the parents and the adolescents received the motivational intervention; in the second, only the parents received the intervention; and, in the third group, neither the adolescents or the parents receive the intervention. The intervention aimed at conveying to the parents a number of reflections about parental monitoring and the advantages in treating this adolescent.

In a pilot study of an intervention carried out via the web with 15 adolescents aged from 13 to 17 years old and their family members from rural areas with poorly controlled Type 1 diabetes (E6), the participants were subjected to interventions that included motivational interviewing and cognitive behavioral principles.

The randomized clinical trial (E7) applied a computerized motivational intervention to 23 adolescents aged from 10 to 13 years old. The pilot study (E8) developed a motivational intervention during 14 weeks with 17 adolescents aged between 12 and 17 years old and their parents.

The controlled clinical trial (E9) compared education through motivational interviewing and structured education in diabetes for nine months with 44 adolescents with DM1. Finally, the pilot study (E10) evaluated the effect of motivational interviewing sessions on glycated hemoglobin and psychological aspects of 22 adolescents aged between 14 and 18 years old during a six-month period.

All articles highlight motivational interviewing as a favorable strategy for care self-management in adolescents with DM1, mostly relating to other approaches, as the types of study indicate the benefits in improving health, essentially in blood glucose control.

Country of origin / Level of evidence	Objectives	Main results
<b>E1.</b> United States of America <sup>13</sup> Level 2	To assess the impact of glyated hemoglobin on adolescents with DM1 by means of two interventions: problem solving and text messages.	Both interventions addressed the adolescent about solving the problems and, despite not obtaining changes in the glyated hemoglobin parameters, there was better glycemic control. Extended use of cell phones by the target population was shown and the text message intervention was encouraging, concerning the care reminders.
<b>E2.</b> United States of America <sup>14</sup> Level 2	To apply a new statistical method for analysis that derives an individualized treatment rule to identify participants of the Flexible Lifestyles Empowering Change (FLEX) who may benefit from the intervention based on changes in the glyated hemoglobin percentage (primary outcome), quality of life, and Body Mass Index z-score (secondary outcomes) for 18 months.	The adolescents who joined the intervention group with the behavioral counseling strategy (FLEX), along with motivational interviewing and problem-solving skills training, improved their skills and adherence to treatment management.
<b>E3.</b> United States of America <sup>4</sup> Level 4	To explore the use of the Motivational Interview in the adolescents' and health professionals' communication regarding adherence to the DM1 treatment, self-efficacy and glycemic control.	The health professionals who had non-adherence behaviors, that is, who used coping and persuasion, obtained worst glycemic control and less self-efficacy in diabetes control.
<b>E4.</b> United States of America <sup>15</sup> Level 2	To test the effectiveness of the Flexible Lifestyles Empowering Change (FLEX) adaptive behavioral intervention on the primary (glycated hemoglobin) and secondary (psychosocial and metabolic) outcomes during an 18-month period.	The FLEX intervention did not significantly change the glyated hemoglobin results, but it exerted a positive impact on the psychosocial factors.
<b>E5.</b> United States of America <sup>16</sup> Level 2	To test the feasibility and effectiveness of a three-session, computer-based motivational intervention to promote greater monitoring of primary caregiver parents of young African American adolescents with DM1.	The adolescents and their parents presented increased knowledge after the motivational interview and, in addition, the study shows that the intervention assisted the parents in caring for their children.
<b>E6.</b> United States of America <sup>17</sup> Level 4	To examine the feasibility and effectiveness of a web-based intervention aimed at self-regulation and self-monitoring of blood glucose levels and glycemic control in adolescents with Type 1 diabetes living in rural areas of the USA.	After the educational intervention and the motivational interview, they showed improved performance in the treatment, thus contributing to the performance of glycemic self-monitoring and a decrease in glyated hemoglobin.
<b>E7.</b> United States of America <sup>18</sup> Level 4	To verify the feasibility of a 3-session computer intervention, from 3 to 4 months apart, to improve diabetes management among young African Americans with Type 1 diabetes.	Computerized intervention with information – motivation-behavior and the motivational interview allowed for an improvement in the treatment of adolescents with DM1.
<b>E8.</b> United States of America <sup>19</sup> Level 4	Adaptation and pilot test of a multicomponent motivational intervention that included the family in the positive reinforcement to the adolescents with deficient control of Type 1 diabetes.	A pilot study showed an improvement in the frequency of glycemic monitoring in the adolescents with DM1, indicating the effectiveness of the intervention, which is the mechanism for changing behavior and motivation.
<b>E9.</b> United States of America <sup>20</sup> Level 2	To compare education through motivational interviews and structured education in diabetes to improve the psychosocial measures and glyated hemoglobin in adolescents with Type 1 diabetes.	The motivational interview, associated with a structured educational intervention, exerted a positive effect on the adolescents, improving the glycemic parameters, in addition to contributing to treatment motivation.
<b>E10.</b> United Kingdom <sup>21</sup> Level 4	To obtain preliminary data on the impact of the motivational interview, a counseling approach to behavior change, glycemic control, well-being, and self-care in adolescents with diabetes.	After the motivational interview, improvements in the mean values of glyated hemoglobin were obtained, as well as a contribution to reduce the negative feelings generated by the disease.

**FIGURE 3:** Characterization of studies regarding identification and country of origin, level of evidence, objectives and main results. Fortaleza, CE, Brazil, 2020. Source: Prepared by the authors.

## DISCUSSION

The studies identified show the benefits of MI as professional interventions with adolescents with DM1. However, the intervening aspects were highlighted, since the way of application, duration and the approach to this audience must be adapted to their understanding and motivation.

In this sense, some of the studies (E6, E8, E10) confirmed positive results in glycemic control and in the reduction of glycosylated hemoglobin, both during and after the intervention.

A similar result was found in study E8, which showed a positive effect of the intervention, with responses in care, and the adolescents significantly increased glycemic monitoring with responses regarding improvement in glycosylated hemoglobin after the intervention. A similar result occurred in another study (E6), in which blood glucose self-monitoring significantly increased at the end of the active treatment and, during the treatment, the level of glycosylated hemoglobin was reduced.

The pilot study carried out in the United Kingdom (E10) indicated the effect of the intervention on the glycosylated hemoglobin mean value, which was reduced from 10.8% to 9.7% during the study and remained lower after the intervention period. Nevertheless, it was observed that there was no reduction in the glycosylated hemoglobin values in the group that did not receive the Motivational Interviewing intervention.

On the other hand, in study E1, there were different findings, as there was no significant difference in glycosylated hemoglobin over time, by study group, considering the primary outcome of 12 months. The same happened in the randomized clinical trial (E4), in which glycosylated hemoglobin did not present a statistically significant difference between the intervention group and the control group.

In another randomized clinical trial (E1), it was also observed that the intervention group subjected to motivational interviewing did not improve glycemic control. This same study asserted that, although there was no difference in HbA1c by study group, there was a greater response to text message reminders to check blood glucose, resulting in better glycemic control with no deterioration in HbA1c.

Positive responses were obtained in study E9 when comparing motivational interviewing and structured education in diabetes to improve the psychosocial measures and glycosylated hemoglobin in adolescents with Type 1 diabetes. At six months of monitoring, the structured education group obtained better responses than the group subjected to MI. In the methodological procedures, it was stated that the three professionals who applied Motivational Interviewing were trained only for two days in workshops.

In the structured education group, a comprehensive list of recommendations from the American Diabetes Association (ADA) was used, basic content adopted in their routines. Such results consider that the motivational interviewing procedures were not well assimilated by the professionals, as they had brief contact, indicating a potential inconsistency in application of the intervention. Given the above, it is supposed that there is a need for extended training of the professionals to apply MI.

Whereas in study E10, the researchers who applied motivational interviewing participated in a three-month training with workshops and video training, in addition to weekly supervision during the intervention application period. The result of the research study that used MI presented a positive response in the reduction of glycosylated hemoglobin, both during and after the intervention.

A meta-analysis<sup>22</sup> suggested that motivational interviewing has a small but significant effect on various health behaviors among young people, indicating that, overall, MI achieves the goals. In addition to that, the authors analyzed that the MI effects seem to be long-lasting, as there was no evidence of a statistically significant decrease in effect size over the follow-up time.

This study<sup>22</sup> highlights that, when health professionals do not have experience in the application of MI, they do not achieve positive results regarding adherence and self-efficacy in the treatment of diabetes in their patients and, consequently, in glycosylated hemoglobin control. Therefore, to guarantee the quality of MI application, training and the presence of continuous supervision are necessary, enabling greater empowerment with the intervention method and greater effect on the results.

It is added that two of the studies (E4 and E10) presented positive psychosocial outcomes from using MI. Study E10, carried out with 22 adolescents, noticed a reduction in fear of hypoglycemia and better coexistence with the disease. In another study (E4), although glycosylated hemoglobin did not present a statistically significant difference between the intervention group and the control group, the intervention was associated with better scores for motivation and overall quality of life, problem solving, diabetes self-management, reduction of adherence barriers to self-management and improvement in family relationships.

It was noticed that MI was mainly conducted through in-person meetings, also with adoption of digital media. Study E10 combined face-to-face meetings and phone calls. Three studies (E5, E6 and E7) resorted to computers and to the web for the intervention. The interventions were carried out within a period of one to 18 months, four of them within a six-month period (E5, E6, E9 and E10); another four studies, in a period of nine to 18 months (E1, E2, E4 and E7); and two studies (E3 and E8) in a period between one and three months. The number of sessions varied from three to 25, when indicated in the study, as some studies (E2 and E3) did not specify the total number of sessions. The mean value was from three to five sessions (E1, E4, E5 and E7).

As for the influence of MI on care self-management for adolescents with DM1, various studies showed positive results (E2, E4, E6, E7 and E10), such as reduced fear of hypoglycemia, better co-existence with the disease, better motivation and problem-solving scores and improved BMI. Another significant effect was found in research E6, which obtained an improvement in the performance of memory and inhibitory control tasks (ability to inhibit or control impulsive or automatic responses). Thus, the parents reported fewer problems with management of the cognitive processes.

The research study (E7) that applied MI based on the information, motivation and health behavior change skill model of young people with DM1 verified feasibility of the intervention to improve care management. The participants considered that the strategy was useful to motivate diabetes control and empower them with support from the family.

The meta-analysis<sup>22</sup> confirms the effectiveness of MI in the young population, indicating that it is an effective and appropriate intervention to direct changes in the health behavior of these individuals, improving diabetes care self-management. It is understandable that, when the professionals support the patient's autonomy in a collaborative way, they allow patients to be the drivers of change and become prone to change, assuming their care<sup>23</sup>.

Consequently, one study (E7) reinforces that interventions involving motivation have the potential to improve the adolescents' health. Furthermore, a study (E5) that included interventions with parents and adolescents noticed that the adolescents did not obtain such significant results as their parents. However, that same study highlights that parental supervision increased as family conflict diminished, and parents encountered significant resistance in the adolescents, possibly because they stopped monitoring. It is understandable that family conflicts can trigger adverse effects, such as reduction in the adolescents' self-esteem.

In the evaluation of primary studies, only five studies (E1, E2, E4, E5 and E9) with strong evidence were observed, which indicates the need to conduct research with higher levels of evidence in order to indicate the effectiveness of motivational interviewing in care self-management for adolescents with Type 1 diabetes mellitus.

Some limitations are pointed out in this review, such as the fact that half of the studies were descriptive, which in itself has uncontrolled factors that could affect the results of Motivational Interviewing in comparison with other educational strategies. In addition to that, analyzing data from primary studies conducted by means of different approaches and varied procedures in interventions is challenging, with a possible bias in elaboration of the results.

## CONCLUSION

The studies on MI that were identified and analyzed, as well as its influence on care self-management for adolescents with DM1, show variations in behavioral responses with impacts on the control of glycemic levels and improvement in BMI. However, for being behavioral and cognitive interventions, many intervening and subjective aspects can influence the results.

Nonetheless, research suggests that the use of motivational interviewing has increased as a promising intervention with a lasting effect to promote self-management in adolescents with diabetes, which may contribute to self-efficacy. Therefore, for greater effect of the intervention, several aspects should be considered, including training of the professional who applies the motivational interview technique and the application time.

It is concluded that studies failed to show statistical significance of MI on the improvement of glycated hemoglobin, although they did show some impact, either physiological or psychosocial, such as care self-management for educational purposes. However, the professionals must be trained on how to use MI to obtain better therapeutic responses, thus contributing direct benefits in treatment and care management, favoring the autonomy of adolescents with diabetes.

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