Facultad de Estudios Superiores
IZTACALA

REVISTA MEXICANA DE TRASTORNOS ALIMENTARIOS

MEXICAN JOURNAL OF EATING DISORDERS

ORIGINAL

# Effects of a healthy lifestyle program with motivational interviewing in high school adolescents

## *Efectos de un programa de estilo de vida saludable con entrevista motivacional en adolescentes de preparatoria*

**Paola Escobedo Hernández, Christian Oswaldo Acosta Quiroz and Raquel García Flores**

Instituto Tecnológico de Sonora

Recibido: 2024-12-12
Revisado: 2025-02-03
Aceptado: 2025-03-17

**Autora de correspondencia:** raquel.garcia@itson.edu.mx (R. García-Flores)

**Financiamiento:** Esta investigación no recibió ninguna subvención específica de ninguna agencia de financiación del sector público, comercial o sin fines de lucro

**Conflicto de intereses:** Los autores declaran no tener conflicto de intereses.

**Abstract.** This study evaluated the effect of a healthy lifestyle program in adolescents, comparing two experimental conditions: one with psychoeducation sessions and another with psychoeducation sessions plus motivational interviewing on mindful eating, self-efficacy for physical exercise, beliefs towards healthy behaviors, emotional regulation and symptoms of depression, anxiety and stress. Through a quasi-experimental design, three groups participated (one with psychoeducation, two with motivational interviewing), participating 142 high school students. The intervention consisted of six weekly sessions. In the psychoeducation condition, an introduction to the topic and a pre-evaluation were carried out, while in the motivational interviewing condition, motivational interview questionnaires were applied followed by psychoeducational sessions. The results showed that the motivational interviewing group had better averages in self-efficacy for physical exercise and mindful eating, with a large effect size. However, the low statistical power suggests that the results are not generalizable. Limitations such as interruption of sessions and dropout of participants could have influenced the results. It is suggested that future studies consider the influence of other variables on the results.

**Keywords:** Healthy lifestyle; Mindful eating; Emotional regulation; Teenagers; Mental health

**Resumen.** Este estudio evaluó el efecto de un programa de estilo de vida saludable en adolescentes, comparando dos condiciones experimentales: una con sesiones de psicoeducación (PS) y otra con sesiones de psicoeducación más entrevista motivacional (EM) sobre variables realcionadas al estilo de vida saludable. Con un estudio cuasi-experimental participaron tres grupos de alumnos (uno con PS y dos con EM), 142 estudiantes en total. La intervención consistió en 6 sesiones semanales. En la condición de PS, se realizaron encuadres y pretest. mientras que en la condición EM se aplicaron cuestionarios de entrevista motivacional seguido de las sesiones psicoeducativas. Se utilizaron las escalas de Dificultades para regular emociones (DERS-15), escala de depresión ansiedad y estrés (DASS-21), el cuestionario de autoeficacia para regular el ejercicio físico, Escala de creencias en conducta alimentaria y actividad física y una escala de alimentación consciente. Los resultados mostraron que el grupo con EM tuvo mejores promedios en autoeficacia para el ejercicio físico y alimentación consciente, con un tamaño del efecto grande. Sin embargo, la baja potencia estadística sugiere que los resultados no son generalizables. Limitaciones como la interrupción de sesiones. Se sugiere que futuros estudios consideren la influencia de otras variables en los resultados, métodos más controlados y cuidar el tamaño de la muestra.

**Palabras clave:** Estilo de vida saludable; Alimentación consciente; Regulación emocional; Adolescentes; Salud mental.

## Introduction

One of the problems that affects the adolescent population is obesity. In Mexico, it is estimated that more than 2 million children are obese and in the last 30 years the prevalence of obesity in minors has increased. National reports mention that the consumption of fruits and vegetables in adolescents has decreased, while the consumption of foods with added sugar increased in this population. Among the factors that influence the risk of suffering from obesity in adolescents are family habits and living in urban areas, that is, the environment is associated with the development of risky health behaviors, so it is important to implement interventions on eating behavior in environments where adolescents develop, such as educational institutions (Shamah-Levy et al., 2024).

Behaviors related to body movement are a determining factor for people's health. According to the National Health and Nutrition Survey, in a sample of Mexican adolescents it was found that around 46% were physically inactive, more than half reported sedentary behaviors such as spending a lot of time in front of a screen, and adolescents between 15 and 17 year olds reported not getting their eight or ten hours of sleep. The authors mention the relevance of the programs to promote physical activity, hours of sleep and reduction of sedentary behaviors (Medina García et al., 2024).

Adolescence is a stage of development in which healthy behaviors related to social or emotional aspects are acquired and that can promote well-being. However, it is also a period where disorders such as anxiety, depression or stress may appear, due to environmental adversities, social pressure and the search for an identity. It´s estimated that 4% of adolescents between 15 and 19 years of age suffer from an anxiety-related disorder and 2% suffer from depression. In addition, some problems related to eating behavior, such as concern about intake, weight or body shape, are more common in adolescents and young people (World Health Organization [WHO], 2021).

One way to treat eating and mental health problems has been the practice of mindfulness (Juarascio et al., 2021; Vohra et al., 2019). Likewise, the practice of mindful eating, which is about experiencing all the sensations involved in the act of eating with an attitude of enjoyment and without judgment or guilt (Olvera-Ruvalcaba et al., 2021). Mindful eating is related

to mindfulness of the eating experience, awareness of internal hunger and satiety cues, and emotional regulation of eating (Framson et al., 2009). According to Kristeller & Wolever (2010), this practice involves a high level of sensory and emotional awareness in eating behavior and differentiates physical from emotional hunger. The measurement of mindful eating has evolved with the development of several instruments that capture its key dimensions. One of the first and most widely used is the Mindful Eating Questionnaire (MEQ; Framson et al., 2009), which assesses factors such as disinhibition, awareness of internal cues, and emotional regulation. Subsequently, more specific scales were developed, such as the Mindful Eating Scale (MES; Hulbert-Williams et al., 2014) and the Mindful Eating Behavior Scale (MEBS; (Winkens et al., 2018), which refine the measurement by including aspects such as the response to external food and interoception. Mindful eating has had an effect on eating behavior problems and obesity (Rodrigues et al., 2020). On the other hand, the practice of emotional regulation with strategies that help the person manage their emotions effectively (Thompson, 1994).

Training in emotional regulation has helped to improve psychological well-being, eating behavior problems and obesity (Boelens et al., 2022), and also improves healthy habits (Debeuf et al., 2023). A study that sought to know if the lack of emotional clarity and awareness, limited access to regulation strategies, and variables related to sleep quality are associated with anxiety disorder, showed that emotional dysregulation, specifically the lack of strategies to regulate and accept negative emotions, has an association with anxiety disorder in adults (Schantz et al., 2024). In addition to emotional regulation, beliefs regarding food or physical exercise can help improve habits.

Beliefs are developed from previous experiences and can be a good predictor for the adoption of healthy behaviors (González & Rodríguez, 2021). As part of the beliefs there is the self-efficacy construct, which according to (Bandura, 2004), is the perception regarding one's own ability to carry out a certain task or healthy behavior. In the case of physical activity, the term physical activity self-efficacy has been used to refer to a person's beliefs regarding their effectiveness when performing physical exercise. These perceptions may vary according to the moment and the environment (Fuentes Vega & González Lomelí, 2020). Self-efficacy to carry out physical activity was associated with the physical activity carried out per week in parents and adolescent children (Burns, 2019), that is, it can be a good predictor for the acquisition of healthy habits, like having a more active life.

The promotion of healthy habits and psychoeducation to regulate emotions can be useful tools to improve the lifestyle of adolescents, and, therefore, their well-being (Dias et al., 2016). A tool that has shown effectiveness for adherence to treatments and permanence in intervention programs has been Motivational Interviewing (MI) (Urfa & Aşçı, 2023), where favorable results have been reported for healthy habits in adolescents (Castrillon et al., 2023). Moreover, MI, a technique designed to enhance self-motivation for behavior change through collaborative conversations (Miller & Rollnick, 2013), has been successfully integrated into socio-educational programs for adolescents, aiming to strengthen motivation and commitment to positive behavioral changes (Orte et al., 2022). In accordance with the above, in this study the research question was: Does the inclusion of motivational interviewing in a psychoeducational program improve mindful eating, self-efficacy for physical exercise, emotional regulation and symptoms of depression, anxiety and stress? The objective was to evaluate the effects of a healthy lifestyle program with psychoeducational sessions and motivational interviewing on mindful eating, self-efficacy for physical exercise, emotional regulation and symptoms of depression, anxiety and stress. And the hypothesis: Participants who receive a psychoeducational program with motivational interviewing will show greater improvements in mindful eating, self-efficacy for physical exercise, emotional regulation, and symptoms of depression, anxiety and stress reduction compared to those who receive only psychoeducational sessions.

## Methods

### *Participants*

A quasi-experimental field design was used with pre-evaluation and post-evaluation, conducted in a

natural school setting, in three groups and two experimental conditions: Group 4C with psychoeducation (PS) and Groups 2B and 4A with psychoeducation plus motivational interviewing (MI). 142 students from a high school in northwest Mexico participated, 48 men and 94 women, between 15 and 17 years old, with a mean age of 15.96 years and SD=.65, where 46 were in second grade and 96 were in fourth grade. One fourth grade group had psychoeducational sessions (54 students) and one fourth grade group and one second grade group had psychoeducational sessions and motivational interviewing (88 students). 66% of the participants mentioned practicing some physical exercise. Ball sports were the most frequent, followed by strength exercises such as lifting weights or boxing. 47.6% of participants mentioned having tried to lose weight through exercise (Table 1).

Inclusion criteria included students enrolled in the participating school and enrolled in the selected groups. Participants who did not attend the psychoeducational sessions were excluded.

## Measures

A demographic questionnaire was applied to determine the age, sex, and school grade of the participants, as well as whether or not they practiced physical exercise or sports, access to places to do them, and whether they had tried to lose weight in the last three months. Food record: Prior to the intervention, a record was applied on the weekly consumption of healthy and unhealthy foods. It measures the frequency of consumption with a Likert-type scale and response options ranging from 1-2 times, 3-4 times, 5-6 times and 7 times a week (Olmedilla & Andreu, 2002).

## Dependent variables

Difficulties in Emotion Regulation Scale (DERS-15): To measure emotional regulation, the version for the Mexican population of the DERS scale was used, which evaluates an individual's difficulties in regulating their emotions with strategies and whether they are attentive to them. It has 15 items and a Likert-type scale with response options ranging from "Never" to "Always", with a Cronbach's alpha of .89 (De La Rosa-Gómez et al., 2021; Gratz & Gunderson, 2006).

Depression, Anxiety and Stress Scale (DASS-21): The 21-item DASS scale was applied to evaluate symptoms of depression, anxiety and stress during the last week. It has a Likert-type scale with response options ranging from "Did not apply to me at all" to "Applied to me very much, or most of the time". The scale has a Cronbach's alpha of .93 (Gurrola et al., 2006; Lovibond & Lovibond, 1995).

**Table 1. Participants description**

| Group | 4A | 2B | 4C |
|---|---|---|---|
| Experimental condition | MI | MI | PE |
| Participants pretest | 36 | 49 | 39 |
| Do you exercise or play any sports? | Yes 80.6%<br>No 19.4% | Yes 42.9%<br>No 57.1% | Yes 41%<br>No 59% |
| Do you have access to places to exercise? | Yes 83.3%<br>No 16.7% | Yes 73.5%<br>No 26.5% | Yes 59%<br>No 41% |
| In the last three months, have you done anything to lose weight? | Yes 30.6%<br>No 69.4% | Yes 55.1%<br>No 44.9% | Yes 53.8%<br>No 46.2% |
| Participants postest | 42 | 46 | 54 |
| Do you exercise or play any sports? | Yes 100% | Yes 43.5%<br>No 56.5% | Yes 48.1%<br>No 51.9% |
| In the last three months, have you done anything to lose weight? | No 100% | Yes 58.7%<br>No 41.3% | Yes 46.3%<br>No 53.7% |

The Self-Efficacy Questionnaire to Regulate Physical Exercise: Composed of 18 items, the questionnaire evaluates beliefs about the ability to perform physical activity or physical exercise in various situations. It has response options ranging from 0 to 100 with intervals of 10 points, where 0="I can't do physical exercise" to 100="I can definitely do physical exercise". In its translation into Spanish, the authors reported a Cronbach's alpha of .91(Fuentes Vega & González Lomelí, 2020).

Food and Physical Activity Beliefs: To evaluate beliefs about healthy behaviors, the items of beliefs in food and physical activity were applied with a risk perception scale for obesity. These are 16 statements about behaviors, with a Likert scale that goes from "Strongly disagree" to "Strongly agree." The authors report an alpha of .98 (Escobedo et al., 2022).

Mindful eating: The six-item negative version of the Conscious Eating Scale (Olvera-Ruvalcaba et al., 2021) mindful-eating (ME was used, which measures the lack of full attention during the act of eating, with five response options ranging from "Always" to "Never", where the higher the score, the greater the lack of full attention in food consumption. The authors report an alpha=.86.

## Program description

The intervention consisted of six weekly sessions with a duration of 50 minutes. The psychoeducational program consisted of four central themes: Healthy Lifestyle, Barriers to Health, Mindfulness and the ABC of Emotions. Table 2 shows the agenda for each psychoeducational session.

Motivational interviewing was implemented in a session prior to the psychoeducational sessions and was applied in a group format in two phases. For Phase 1, Motivation for Change, participants were given a sheet of open-ended questions to encourage self-reflection and observation. Participants first responded in writing and then participated in a group discussion guided by the instructor, who used the technique of provoking discrepancy in which he asked questions about goals and steps to follow to improve aspects related to lifestyle, and the technique of affirmation to emphasize the strengths and efforts of students to achieve change, and reflection to summarize and confirm that what the students mentioned during the session was understood.

Phase 2 consisted of strengthening commitment to change, in which the decisional balance technique was applied with questions such as: What do you think will happen if you do not make positive changes in your physical activity? What would be the benefits?

**Table 2. Psychoeducational program agenda**

| Session | Issue | Components |
|---|---|---|
| 1 | Healthy lifestyle 1 | Introduction<br>Nutrition: nutrients and breakfast<br>Benefits of physical activity |
| 2 | Healthy lifestyle 2 | Emotional vulnerability<br>PLEASE skills: taking care of physical health to prevent emotional crisis |
| 3 | Barriers to health | Identify my barriers to healthy habits<br>Pros and cons: Make decisions regarding your health. |
| 4 | Mindfulness 1 | Mindfulness<br>Meditation practice |
| 5 | Mindfulness 2 | Mindful eating<br>Body acceptance |
| 6 | ABC of Emotions | Emotional reactions |

## Procedure

The study was approved by the Institutional Ethics Committee of the Technological Institute of Sonora. Consent and assent were provided to the adolescents, emphasizing data confidentiality and anonymity of the participants. Meetings were held with school directors and teachers, and three groups that had not carried out interventions of this type in the last year were selected. Psychology students were trained, who came to the school and taught the sessions during a class called "Tutorials". The intervention began in February 2024 and ended in May 2024. In the psychoeducation condition, a pre-evaluation and introduction was carried out in session 1 and then the topics were taught. For the motivational interviewing condition, a pre-evaluation was applied and then the students were given a questionnaire with open motivational interview-type

questions. Once they answered, they were asked to participate with their answers before the group. Finally, the psychoeducational sessions began.

## Analysis of results

Data was captured in the SPSS 24.0 statistical program for demographic and descriptive statistical analyses. To determine the normality of the data, they were evaluated using the coefficients of asymmetry and kurtosis. Asymmetry values between -1 and 1 and kurtosis of -2 and 2 were a normal distribution. The results showed normality in all variables in the pretest and posttest, so parametric tests were used. An analysis of variance (ANOVA) with the Tukey test was used to find significant differences between the three participating groups at both times of the study. In addition, to evaluate the differences between two conditions at the end of the intervention, a *t* test for independent samples was used.

# Results

The frequency of fruit, vegetables, snack and soft drink consumption at the beginning of the intervention is presented below. It is noteworthy that the group with the lowest fruit consumption in the last week was 4A, as 20 students mentioned not having consumed it; in this same group, 20 students mentioned consuming vegetables 4 to 3 times a week, followed by 2C with 18 students who reported the same. In the 2C group, there were more students who consumed snacks 4 to 3 times a week with 10 students. In 4A, 23 students mentioned

**Table 3. Food consumption frecuency**

| Group | | 4A n=36 | 2B n=49n=ecuencia de consumo en a de consumo de frutas, verduras, botanas y refrescos al iniciar la intervenciantes en ambos momentos d | 4C n=39 |
|---|---|---|---|---|
| Fruit consumption in the last week | Never | 20 | 15 | 12 |
| | 2-1 times | 8 | 15 | 15 |
| | 4-3 times | 4 | 13 | 5 |
| | 5-6 times | 4 | 6 | 7 |
| | 7 times | 0 | 0 | 0 |
| Vegetables consumption in the last week | Never | 2 | 3 | 4 |
| | 2-1 times | 5 | 14 | 11 |
| | 4-3 times | 20 | 18 | 13 |
| | 5-6 times | 9 | 14 | 11 |
| | 7 times | 0 | 0 | 0 |
| Snack consumption in the last week | Never | 7 | 19 | 20 |
| | 2-1 times | 25 | 20 | 12 |
| | 4-3 times | 4 | 10 | 5 |
| | 5-6 times | 0 | | 2 |
| | 7 times | 0 | 0 | 0 |
| Soft drink consumption in the last week | Never | 5 | 13 | 22 |
| | 2-1 times | 6 | 20 | 11 |
| | 4-3 times | 23 | 11 | 3 |
| | 5-6 times | 0 | 5 | 3 |
| | 7 times | 0 | 0 | 0 |

consuming soft drinks or sugary drinks 4 to 3 times a week, while in 4C, 22 students mentioned not having consumed drinks of this type in the last week (Table 3).

ANOVA analysis demonstrates pre-test significant differences in three variables, first the lack of conscious eating F (2, 119) = 6.70, p = .002, being the group 4A with the best score (M = 1.74) than the other groups. Second, the beliefs towards food F (2, 119) = 5.67, p = .004, being again the 4A the group with the greatest difference (M = 3.38) and finally in the DASS-21 differences were found between the group 4A (M = 1.44) and 4C (M = .97) F (2, 119) = 5.44, p = .005.

Student t tests were performed to determine the differences between psychoeducation and motivational interviewing groups. Table 4 shows the comparison between the results of the post-evaluation of the DERS-15 and DASS-21 scales, of the group with motivational interviewing and the group with psychoeducation. The results show that there were no significant differences between both experimental conditions for these variables. The differences between conditions for the DERS-15 scale indicate a small effect size (d=0.26), while in the DASS-21 scale there is no effect size (d=.04). The statistical power for both variables is low.

On the other hand, self-efficacy to perform physical exercise was evaluated. It was found that there were significant differences between both conditions, with the motivational interviewing group having the highest mean regarding self-efficacy (6.33). This difference has a large effect size (d=.59) and low statistical power. Likewise, no mindful eating was lower in the group with motivational interviewing (1.91), compared to the group with psychoeducation (2.48), being a significant difference, with a large effect size (d=.53) and a low statistical power (Table 5).

Table 6 shows the differences in beliefs about healthy behaviors. The results indicated significant differences between both groups, both in beliefs about healthy eating behavior (3.54), and in beliefs about physical activity (3.64). The scores were better in the group with psychoeducation.

Student t test was performed to determine the differences between the pre-evaluation and post-evaluation in each group. The group with motivational interviewing shows significant differences in all variables, with a large effect size and high statistical power (Table 7).

## Discussion

The objective of the present study was to know the effect of a psycho-educational intervention with motivational interviewing on aspects related to the physical and mental health of high school students.

**Table 4. Comparison of emotional regulation and symptoms between two groups**

| Variables | M.I. | | Psychoeducation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | *t* | *dft* | *p* | *d* | 1 - *β* |
| DERS[1] | 2.05 | .715 | 2.26 | .856 | -1.582 | 140 [-.47 .05] | .116 | 0.26 | .48 |
| DASS[2] | .98 | .519 | .95 | .699 | .282 | 140[-.17 .23] | .778 | .04 | .30 |

[1] Difficulties in Emotion Regulation Scale

[2] Depression, Anxiety and Stress Scale

**Table 5. Comparison between groups of self-efficacy for exercise and no conscious eating**

| Variables | M.I | | Psychoeducation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | *t* | *dft* | *p* | *d* | 1 - *β* |
| SQRPE[1] | 6.33 | 1.728 | 5.16 | 2.153 | 140 | 3.550 | .001 | .59 | .54 |
| CES[2] | 1.91 | .991 | 2.48 | 1.134 | 140 | 3.191 | .002 | .53 | .48 |

[1] Self-Efficacy Questionnaire to Regulate Physical Exercise

[2] Conscious Eating Scale

**Table 6. Comparison between groups of beliefs about healthy behaviors**

| Variables | M.I | | Psychoeducation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *t* | *dft* | *p* | *D* | 1 - *β* |
| HFB [1] | 2.47 | 1.404 | 3.54 | .463 | -6.585 | 114.66 [-1.4 -.67] | .000 | 1.02 | 2.47 |
| PAB [2] | 2.39 | 1.357 | 3.64 | .523 | -7.784 | 122.497[-1.3 -.74] | .000 | 1.21 | 2.39 |

[1]Healthy Food Beliefs

[2]Physical Activity Beliefs

**Table 7. Comparison between the pre-evaluation and post-evaluation of the group with motivational interviewing**

| Variables | Pre-evaluation | | Post-evaluation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *t* | *df* | *p* | *d Cohen* | 1 - *β* |
| Dificulties for emotional regulation | 2.49 | .538 | 1.67 | .000 | 9.19 | 35 [.64 1.0] | .000 | 2.15 | 1 |
| Self-efficacy for physical exercising | 5.44 | 1.39 | 7.44 | .000 | -8.60 | 35[-2.4 -1.5] | .000 | 2.03 | 1 |
| No conscious eating | 1.74 | .744 | 1.33 | .000 | 3.28 | 35[.15 .65] | .002 | 0.77 | .91 |
| Beliefs in healthy eating behavior | 3.38 | 2.43 | 1.10 | .000 | 56.3 | 35[2.2 2.3] | .000 | 1.32 | .99 |
| Beliefs in physical activity | 3.56 | .222 | 1.00 | .000 | 69 | 35[2.48 2.63] | .000 | 4.7 | 1 |
| Anxiety, depressive and stress symptoms | 1.44 | .456 | .81 | .000 | 8.25 | 35[.47 .78] | .000 | 1.9 | 1.9 |

Two experimental conditions were compared: psychoeducation and psychoeducation with motivational interviewing. The results showed significant differences between both conditions in the self-efficacy variables to perform physical exercise and mindful eating, with the groups with motivational interviewing having the best average. The effect size was large, although the statistical power was not high, indicating that the results cannot be generalized.

In a systematic review on the effectiveness of motivational interviewing in people with malnutrition, it was found that motivational interviewing had a significant effect on reducing the body weight of the participants in different measures throughout the treatments. Furthermore, the authors mention the positive effect of motivational interviewing on other behavioral, psychosocial and physiological variables, even in those studies where motivational interviewing did not have an effect on the body weight of the participants. This indicates that motivational interviewing has an effect on variables that can be mediators in behavioral change, such as motivation and physical activity. Therefore, motivational interviewing as a tool in therapeutic treatments could help in the adoption and establishment of healthier behaviors, which is beneficial for physical health and quality of life.

The application of motivational interviewing was analyzed in different contexts and health variables in primary care, through systematic reviews and meta-analysis, where it was found that motivational interviewing showed effectiveness in diet and physical activity. Motivational interviewing, as part of other cognitive-behavioral interventions, has shown favorable results in quality of life, impulsive food consumption, self-control and body image (Gálvez Espinoza et al., 2018).

With respect to the variables related to emotional regulation and symptoms of depression, anxiety and stress, no significant differences were found between both experimental conditions. This may be due to the

fact that the psychoeducational sessions were the same for both conditions, in which topics and strategies to regulate emotions, mindfulness, and tolerance for discomfort were addressed. In a study focused on training in emotional regulation in adolescents who presented indicators of obesity, it was found that those who had a four-session training improved in emotional awareness and in emotional regulation strategies such as problem solving and evocation of a positive mood, compared to the control group.

Furthermore, in the analysis of the pre-evaluation and post-evaluation, improvements were found in the trained group in emotional awareness measured with the DERS scale (Debeuf et al., 2023). In another study, which sought to evaluate a program based on the dialectical behavioral therapy manual (DBT STEPS-A) in a Mexican university, no significant changes were found in emotional regulation or in symptoms of depression, anxiety and stress, measured with the DASS. While, when comparing groups with different experimental conditions, where in one of them the DBT STEPS-A program was applied in conjunction with personal development sessions, it was found that this group had better results compared to the control group and the group that alone had DBT training. The authors suggest that adaptations should be made to the programs to strengthen themes and that the number of sessions could influence the results (Huerta H. et al., 2020).

This is similar to what was found in the present study, where when comparing the results of the pre-evaluation and post-evaluation within a group that was in the fourth semester of high school with the experimental condition of motivational interviewing, significant differences were found and favorable not only in emotional regulation and in the DASS-21 scale, but in self-efficacy for physical exercise and mindful eating. At the end of treatment, the effect size was large and the statistical power was high. It is important to mention that, although the group analyzed had positive effects on most of the variables, another group analyzed with the same experimental condition in the study, but which belonged to the second semester, did not have significant differences in the initial and final evaluation, so it must be studied if there are conditions that promote improvement, such as the age or sex of the participants, which can be mediators of the treatment.

Motivational interviewing has been used in obesity and overweight treatments in adolescents. It has been concluded that motivational interviewing improves the results of participants in a program with components of social cognitive theories, modeling and games aimed at adolescents and their families (Castrillon et al., 2023). Furthermore, in a case study on eating problems, it was found that using motivational interviewing techniques with cognitive behavioral treatment had a positive effect on the symptoms of depression and anxiety, and on the patient's emotional regulation (Beltrán & Sepúlveda, 2018).

On the other hand, it was found that the variables of beliefs in healthy behaviors in the motivational interviewing groups had a significant deterioration. While in the group with psychoeducation, their beliefs about healthy eating and physical activity improved compared to the motivational interviewing group. That is, students with psychoeducational sessions improved some beliefs regarding the way they eat, such as a healthy breakfast and the benefits of physical exercise, with a large effect size. However, within the same psychoeducation group, no statistically significant differences were found between pre-evaluation and post-evaluation in any of the variables.

One of the main limitations of this study was the intervention time, since, due to school programming, sometimes the groups could not attend the sessions for a full week, which could have affected the results. In addition, it was not possible to control the attendance of the students to their class, which was the space where the intervention was given. This caused variations in the number of participants between the initial and final evaluation. Since the groups were pre-established by the educational institution, this could have caused a bias in the results, so it is recommended to be cautious with them. Likewise, another important limitation is the sample size, this could have affected the statistical power and therefore the detection of significant differences between measurements. Although an effect size was found in some variables, it is necessary to carry out studies with larger samples and with better control of extraneous variables or the loss of participants.

In addition, it is necessary to know if variables such as academic stress or the classroom environment had an effect on the results, so it is recommended to have an

evaluation of the student's perception of these aspects, since they can be a treatment abandonment indicator. Likewise, have anthropometric and behavioral measures to know if there is an effect on them, and include variables related to the student's social support. In any case, these results allow us to know the results of treatments applied within educational contexts aimed at the healthy lifestyle of adolescents.

Finally, it is recommended that future studies apply more controlled methodological designs such as random assignment of participants to reduce selection bias, provide individualized follow-up to reduce the impact of irregular attendance to sessions, physical and mental health history, replicate the study in different educational contexts and populations in order to generalize results and finally take into account qualitative aspects that can give depth to the students' experiences, as well as know possible barriers, as well as apply an evaluation of the stage of change in which the participant is.

## Conclusions

This study evaluated the effect of a psychoeducational intervention with motivational interviewing on the physical and mental health of high school students, comparing two groups: one that received only psychoeducation and another that received psychoeducation with motivational interviewing. The results showed that the group with motivational interviewing presented significant improvements in self-efficacy to perform physical exercise and mindful eating, with a large effect size, although there were no differences in emotional variables such as anxiety and stress.

However, some groups did not show improvements, especially those in earlier semesters, suggesting the need to study mediators such as age. Furthermore, beliefs about healthy behaviors worsened in the motivational interviewing groups, while they improved in the psychoeducation-only groups. Limitations such as interruption of sessions and withdrawal of participants could have affected the results. It is recommended to evaluate the impact of factors such as academic stress and social support in future studies.

## References

Bandura, A. (2004). Health Promotion by Social Cognitive Means. *Health Education & Behavior*, *31*(2), 143–164. https://doi.org/10.1177/1090198104263660

Beltrán, L., & Sepúlveda, A. R. (2018). Efectividad de una intervención cognitivo-conductual combinada con técnicas de la entrevista motivacional en bulimia nerviosa: Un estudio de caso. *Información psicológica*, *116*, 79–94. https://doi.org/10.14635/IPSIC.2018.116.7

Boelens, E., Braet, C., Debeuf, T., Wante, L., Volkaert, B., & Verbeken, S. (2022). A brief emotion regulation training in children and adolescents with obesity: A feasibility study. *Obesity Research & Clinical Practice*, *16*(4), 330–336. https://doi.org/10.1016/j.orcp.2022.07.006

Burns, R. D. (2019). Enjoyment, self-efficacy, and physical activity within parent-adolescent dyads: Application of the actor-partner interdependence model. *Preventive Medicine*, *126*, 105756. https://doi.org/10.1016/j.ypmed.2019.105756

Castrillon, J., Margai, L., Zitkovsky, H. S., Price, L. L., & González, S. (2023). Improving Health Behaviors and Weight Parameters With Motivational Interviewing and the TEEEN Program in an Ethnically and Socioeconomically Diverse Pediatric Population. *American Journal of Medicine Open*, *10*, 1–6. https://doi.org/1-6

De La Rosa-Gómez, A., Hernández-Posadas, A., Valencia, P. D., & Guajardo-Garcini, D. A. (2021). Análisis dimensional de la Escala de Dificultades en la Regulación Emocional (DERS-15) en universitarios mexicanos. *Revista Evaluar*, *21*(2), 80–97. https://doi.org/10.35670/1667-4545.v21.n2.34401

Debeuf, T., Verbeken, S., Boelens, E., Volkaert, B., Tanghe, A., Michels, N., & Braet, C. (2023). Emotion Regulation Training as an Add-on in the Treatment of Obesity in Young Adolescents: A Randomized Controlled Superiority Trial. *Behavior Therapy*, S0005789423001405. https://doi.org/10.1016/j.beth.2023.12.005

Dias, P. C., Bastos, A. S., Marzo, J. C., & García Del Castillo Rodríguez, J. A. (2016). Bienestar, calidad de vida y regulación afectiva en adolescentes portugueses. *Atención Primaria*, *48*(7), 432–439. https://doi.org/10.1016/j.aprim.2015.09.005

Escobedo, P., Gaxiola, J. C., García, R., & Acosta, C. O. (2022). Diseño y validación de una escala Percepción de riesgo de obesidad y creencias sobre alimentación y actividad física en adolescentes de secundaria. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, *31*(2), 68–74. https://mail.rpd-online.com/index.php/rpd/article/view/705

Framson, C., Kristal, A. R., Schenk, J. M., Littman, A. J., Zeliadt, S., & Benitez, D. (2009). Development and Validation of the Mindful Eating Questionnaire. *Journal of the*

*American Dietetic Association*, *109*(8), 1439–1444. https://doi.org/10.1016/j.jada.2009.05.006

Fuentes Vega, M. D. los A., & González Lomelí, D. (2020). Adaptación al español del cuestionario de autoeficacia para regular el ejercicio (Spanish adaptation of the self-efficacy questionnaire to regulate exercise). *Retos*, *38*, 595–601. https://doi.org/10.47197/retos.v38i38.75225

Gálvez Espinoza, P., Gómez San Carlos, N., Nicoletti Rojas, D., & Cerda Rioseco, R. (2018). ¿Es efectiva la entrevista motivacional individual en la malnutrición por exceso? Una revisión sistemática de la literatura. *Atención Primaria*, S0212656717307618. https://doi.org/10.1016/j.aprim.2018.04.006

González, M. V., & Rodríguez, M. A. (2021). Creencias en obesidad y cirugía bariátrica: Análisis de contenido para diseñar una escala. *Revista de Psicología*, *39*(1), 253–287. https://doi.org/10.18800/psico.202101.011

Gratz, K. L., & Gunderson, J. G. (2006). Preliminary Data on an Acceptance-Based Emotion Regulation Group Intervention for Deliberate Self-Harm Among Women With Borderline Personality Disorder. *Behavior Therapy*, *37*(1), 25–35. https://doi.org/10.1016/j.beth.2005.03.002

Gurrola, G. M., Balcázar, P., Bonilla, M. P., & Virseda, J. A. (2006). *Estructura factorial y consistencia interna de la Escala de Depresión Ansiedad y Estrés (DASS-21) en una muestra no clínica. 8*(2), 3–7. https://www.redalyc.org/pdf/314/31480201.pdf

Huerta H., J. N., Reyes Ortega, M. A., Sotelo González, C. E., Gil Díaz, M. E., Lima Téllez, Z., Gutiérrez-Cardona, C. R., & Barrientos García, M. T. (2020). Evaluación de la efectividad del programa DBT STEPS-A en estudiantes universitarios mexicanos. *Psicología y Salud*, *31*(1), 103–112. https://doi.org/10.25009/pys.v31i1.2680

Hulbert-Williams, L., Nicholls, W., Joy, J., & Hulbert-Williams, N. (2014). Initial Validation of the Mindful Eating Scale. *Mindfulness*, *5*(6), 719–729. https://doi.org/10.1007/s12671-013-0227-5

Juarascio, A. S., Parker, M. N., Hunt, R., Murray, H. B., Presseller, E. K., & Manasse, S. M. (2021). Mindfulness and acceptance-based behavioral treatment for bulimia-spectrum disorders: A pilot feasibility randomized trial. *International Journal of Eating Disorders*, *54*(7), 1270–1277. pbh. https://doi.org/10.1002/eat.23512

Kristeller, J. L., & Wolever, R. Q. (2010). Mindfulness-Based Eating Awareness Training for Treating Binge Eating Disorder: The Conceptual Foundation. *Eating Disorders*, *19*(1), 49–61. https://doi.org/10.1080/10640266.2011.533605

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U

Medina García, C., Jáuregui, A., Blas, N., Campos, I., Macías, N., López-Ridaura, R., & Barquera, S. (2024). Promoción de actividad física en escolares y adolescentes. *Salud Pública de México*, *66*(4, jul-ago), 435–445. https://doi.org/10.21149/15787

Olmedilla, A., & Andreu, M. D. (2002). PROPUESTA DE INTERVENCIÓN PSICOLÓGICA PARA EL CONTROL DE HÁBITOS ALIMENTARIOS EN DEPORTISTAS JÓVENES. *Cuadernos de Psicología del Deporte*, *2*(2).

Olvera-Ruvalcaba, A. J., Gómez-Peresmitré, G., & Velasco-Rojano, E. (2021). Construction and validation of a mindful eating scale: A first approximation in the Mexican population / Construcción y validación de una escala de alimentación con atención plena: Una primera aproximación en población mexicana. *Revista Mexicana de Trastornos Alimentarios/ Mexican Journal of Eating Disorders*, *10*(2), 162–172. https://doi.org/10.22201/fesi.20071523e.2019.2.547

Orte, C., Quesada, V., Valero, M., & Pozo, R. (2022). La entrevista motivacional en programas socioeducativos familiares con adolescentes: Una revisión sistemática. *Revista de Investigación Educativa*, *40*(1), 127–145. https://doi.org/10.6018/rie.435031

Rodrigues, M., Rodrigues de Oliveira, F., & de Sousa, A. F. (2020). Mindfulness, mindful eating e comer intuitivo na abordagem da obesidade e transtornos alimentares/ Mindfulness, mindful eatining and intuitive eating in the approach to obesity and eating disorders. *SMAD Revista Eletrônica Saúde Mental Álcool e Drogas (Edição em Português)*, *16*(3), 118–135. https://doi.org/10.11606/issn.1806-6976.smad.2020.165262

Schantz, B. L., Toner, E. R., Brown, M. L., Kaiser, N., Chen, A., Adhikari, S., Hoeppner, S. S., Bui, E., Simon, N. M., & Szuhany, K. L. (2024). Examining the relationship between emotion regulation, sleep quality, and anxiety disorder diagnosis. *Journal of Mood & Anxiety Disorders*, *8*, 100072. https://doi.org/10.1016/j.xjmad.2024.100072

Shamah-Levy, T., Gaona-Pineda, E. B., Cuevas-Nasu, L., Valenzuela-Bravo, D. G., Morales-Ruan, C., Rodríguez-Ramírez, S., Méndez-Gómez-Humarán, I., Ávila-Arcos, M. A., Álvarez-Sánchez, C., Ávila-Curiel, A., Díaz-trejo, L. I., Espinosa-Galindo, A. F., Fajardo-Niquete, I., Perea-Martínez, A., Véjar-Rentería, L. S., & Villalpando-Carrión, S. (2024). Sobrepeso y obesidad en población escolar y adolescente. *Salud Pública de México*, *66*(4, jul-ago), 404–413. https://doi.org/10.21149/15842

Thompson, R. A. (1994). EMOTION REGULATION: A THEME IN SEARCH OF DEFINITION. *Monographs of the Society for Research in Child Development*, *59*(2–3), 25–52. https://doi.org/10.1111/j.1540-5834.1994.tb01276.x

Urfa, O., & Aşçı, F. H. (2023). The effects of rational emotive behavior therapy and motivational interviewing on emotions, automatic thoughts, and perceived performance of elite female volleyball players. *Psychology of Sport and Exercise*, *69*, 1–8. https://doi.org/10.1016/j.psychsport.2023.102497

Vohra, S., Punja, S., Sibinga, E., Baydala, L., Wikman, E., Singhal, A., Dolcos, F., & Van Vliet, K. J. (2019). Mindfulness-based stress reduction for mental health in youth: A cluster randomized controlled trial. *Child & Adolescent Mental Health*, *24*(1), 29–35. pbh. https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=pbh&AN=134324828&lang=es&site=ehost-live&custid=s4090146

Winkens, L. H. H., Van Strien, T., Barrada, J. R., Brouwer, I. A., Penninx, B. W. J. H., & Visser, M. (2018). The Mindful Eating Behavior Scale: Development and Psychometric Properties in a Sample of Dutch Adults Aged 55 Years and Older. *Journal of the Academy of Nutrition and Dietetics*, *118*(7), 1277-1290.e4. https://doi.org/10.1016/j.jand.2018.01.015

World Health Organization [WHO]. (2021). *Mental health preparedness and response for the COVID-19 pandemic* (pp. 1–7). OMS. https://apps.who.int/gb/ebwha/pdf_files/EB148/B148_20-sp.pdf