

## INTRODUCTION

Adolescence is considered a period of intense biopsychosocial changes, and it requires specific nutritional needs. Healthy eating habits are essential to the appropriate growth and development of this age group, however, literature has shown a tendency of inadequate eating habits among youth.

The **Transtheoretical Model** (TTM) describes changes, not as something punctual, instead, as a series of steps that take place according to someone's degree of motivation. Individuals are classified among five stages of change, which are determined by their motivation. The way to promote improvement through the stages is represented by the processes of change. As the individuals progress throughout the stages it is expected an increase in their self-efficacy, as well as the recognition of more benefits than barriers to the behavior change.

Therefore this work aimed to describe how the TTM was applied to nutritional interventions for adolescents.

## METHODOLOGY

- The development of this work followed The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) directions, therefore it is registered on PROSPERO Website (#CRD42018096819).
- Databases searched were Adolec, Google Scholar, LILACS, PsycINFO, PubMed, Science Direct, and Web of Science. Only randomized controlled trials and quasi-experimental designs written in English, Spanish and Portuguese that applied the TTM to nutritional interventions targeting adolescents were included, without restrictions to time of publication.
- Titles and abstracts searched were submitted to the software *Mendeley*. Data extraction occurred through the usage of a table based on instructions of *Centre for Reviews and Dissemination for Undertaking Reviews in Healthcare*. Quality and risk of bias were assessed through a questionnaire, developed by *Effective Public Health Practice Project*.

For further information please e-mail us at [jeryfour@hotmail.com](mailto:jeryfour@hotmail.com)

## RESULTS

**Quality Assessment:** Three articles were classified as weak, four as moderate ones and three studies were considered strong.

**Population:** Age ranged from seven to nineteen.

**Study design:** Sample size varied between 50 to 4158 participants. A total of seven randomized controlled trial and four quasi-experimental studies were included. Most studies had one follow-up measurements, with exception of three. Study duration (including pretest and posttest measurements) ranged from one month to three years, with plenty of them having six months of duration or more.

**Exposure to the intervention:** In one study participants were exposed to the intervention only once, while three interventions had weekly sessions, and another send printed magazines once a month. One study enabled access to a website during a period of nine months, with support from teachers.

Figure 1: Selection Process for this study

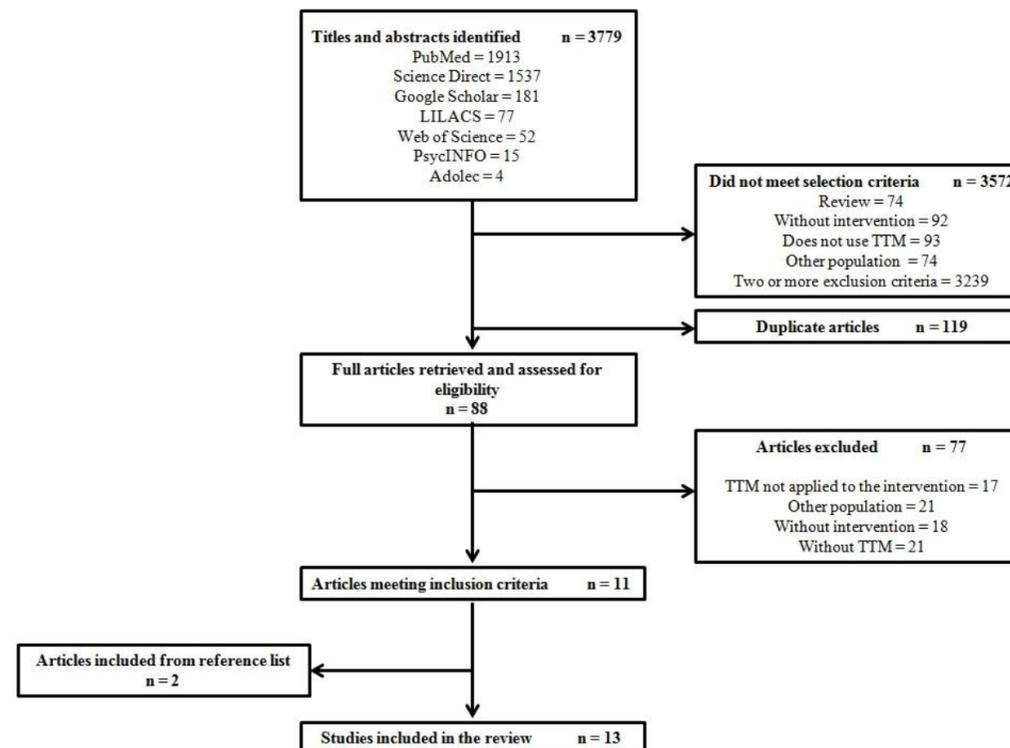


Figure 2: Assessment of the stages from one study

<p><b>Q</b> Do you exercise regularly (at least 5 times a week for 30 minutes including Vigorous activity 3 times a week for 20 minutes)?</p> <p>You answered: A. Yes, I have been for MORE than 6 months. (Maintenance Stage of Change)</p> <p>You answered: B. Yes, I have been for LESS than 6 months. (Action Stage of Change)</p> <p>You answered: C. No, but I plan to in the next 30 days. (Preparation Stage of Change)</p> <p>You answered: D. No, but I plan to in the next 6 months. (Contemplation Stage of Change)</p> <p>You answered: E. No, and I do NOT plan to in the next 6 months. (Pre-Contemplation Stage of Change)</p>	<p><b>Stage tailored Feedback – Physical Activity</b></p> <p>Congratulations you are a role model for your class!</p> <p>Hurray, you are on your way!</p> <p>A definite date and a plan mean you are on your way to healthy exercise!</p> <p>Thinking about being active is the first step in getting there – be a specific as you can about what you can start and WHEN!</p> <p>Think about some benefits of being active. We know you can!</p>
<p><b>Q</b> Are you willing to do ALL 5 of the things to the right to eat healthy?</p> <p><b>OFTEN</b> eat low fat snacks instead of high fat ones <b>ALMOST ALWAYS</b> eat pizza without meat or extra cheese <b>OFTEN</b> use low fat or no dressing on salads <b>SOMETIMES</b> avoid eating at fast food restaurants <b>OFTEN</b> use low fat margarine or no butter on bread products</p> <p>You answered: A. NO, and I do NOT intend to in the next 6 months. (Pre-Contemplation Stage of Change)</p> <p>You answered: B. YES, and I intend to in the next 6 months. (Contemplation Stage of Change)</p> <p>You answered: C. YES, and I intend to in the next 30 days. (Preparation Stage of Change)</p> <p>You answered: D. YES, and I have been, but for LESS than 6 months. (Action Stage of Change)</p> <p>You answered: E. YES, and I have been for MORE than 6 months. (Maintenance Stage of Change)</p>	<p><b>Stage tailored Feedback – Dietary Fat</b></p> <p>Think about some benefits of healthy eating.</p> <p>Thinking about changing is the first step in getting there!</p> <p>A definite date to start with a plan means you are on your way to healthier eating!</p> <p>Hurray, you are a success! Keep at it!!</p> <p>Congratulations! You can be a role model for your class!</p>

**Usage of the model:** All studies assessed stages of change, except for one. Seven studies included measures for decisional balance, five of them measured self-efficacy, and only one study measured processes of change. Four studies applied the model combined with another behavior change theory.

**Intervention strategies:** Two

studies intended to prevent obesity, three of them focused on a low-fat diet. In one study students were impelled to reduce cancer risk behaviors and the remaining studies intended to improve fruit and vegetable consumption. Six studies also included an intervention for physical activity.

**Main results:** Eight studies obtained positive results. In three of them the fruit and vegetable consumption improved, in two of them participants had a better weight management when compared with the control group and in two studies the physical activity raised. In five studies participants progressed through stages of change or improved decisional balance measurements.

## CONCLUSIONS

There are some limitations related to the studies included in this review, such as the differences of their designs, the time of exposure to the intervention and still, the usage of the model associated with other behavior change theories. Nevertheless, the TTM seems to be a successful strategy in nutritional interventions in adolescents. Studies that compare the usage of the TTM with other behavior change theories are suggested, so that it is possible to reach a better understanding of its effectiveness.