

Research Article

A Multicenter Study Evaluating the Stages of Change in Food Consumption with Warning Labels among Chilean University Students

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Objective. To analyze the stage of change in food consumption with warning labels among Chilean university students. **Materials and Methods.** Cross-sectional study which applied surveys in universities from all over the country. Study included 4807 participants of 18 to 40 years of both sexes who were asked about the level of knowledge of the new food law and food consumption with warning signals, including questions regarding their willingness to behavior change according to Prochaska's transtheoretical model. To compare continuous variables, Student's t-test was used in the statistical package SPSS 22.0, and $p < 0.05$ was considered a significant difference. **Results.** Of the total number of respondents, 99.3% of the students indicated that they know about the food law, classifying foods with signals in the precontemplation stage. Compared by sex, we observed that women give greater importance to behavior change in all of foods ($p < 0.001$). Underweight students give less importance to change in unhealthy foods, while obesity students give more importance but do not show more confidence in behavior change ($p < 0.05$). **Conclusion.** The university students show a low importance and confidence to make behavior change, aspects associated with sex and nutritional status. It is necessary to strengthen nutritional food education and not just talk about structural measures.

1. Introduction

Worldwide changes in dietary patterns towards greater consumption of highly processed foods have been well recognized [1, 2].

National data from Chile shows the consequences of these bad eating habits. According to the 3rd National Health Survey, people between 20 and 24 years of age have a 33.6% prevalence of low HDL, 20.8% high triglycerides, 9.6% high total cholesterol, 32.9% elevated LDL cholesterol, 13.6% metabolic syndrome (age range 15-24), 18.4% moderate to high cardiovascular risk (age range 15-24), 2.1% morbid obesity, 22.5% obesity, and 35.8% overweight (age range 20-29) [3].

College students, who are found in this age group, are particularly vulnerable to unhealthy eating environments, have poor eating habits, often eat between meals, fast for many hours during the day, do not eat breakfast, and prefer fast food, rich in saturated fat, sugar, and salt [4, 5].

Food preferences relate to the fact that in this period college students are responsible for selecting their meals, the patterns, and frequency of consumption of each food [6]. Eating habits are characterized by a low consumption of fruits, which is related to long hours of study, classes at diverse times, increases in nightlife, and a scarce budget, among other factors. Low fruit consumption can consequently worsen overall diet and nutritional status [7–11].

In addition to the above, Chile is the largest consumer of sugar-sweetened beverages in the world, displacing Mexico and the United States [12] and one of the largest consumers of ultra-processed foods [13], foods that are particularly desired by young people.

Considering the current food problem in Chile, on June 26, 2016, Law 20.606, the Chilean Law of Food Labeling and Advertising came into force. The law has 3 main parts: (i) bans on the sale of foods in schools, (ii) advertising bans aimed at children under 14 years of age, and (iii) warning labeling on foods; the latter is indicated in decree 13/2015 of the Ministry of Health [14]. The main characteristic of this law is the use of warning signals on the front of packaging represented by 4 black octagons with white letters when levels of critical nutrients (calories, saturated fats, sugars, and sodium) exceed the allowed limits. A particular food may have up to 4 warning labels if levels of each critical nutrients exceed recommendations.

The Transtheoretical or Stages of Change Model in health behavior was first described in 1979 by James Prochaska and was consolidated during the 1990s as one of the most innovative proposals in the area of health promotion and disease prevention [15]. It offers possibilities to plan and execute interventions based on the stage of change the populations, for whom actions are directed, finding themselves in precontemplation, contemplation, preparation, action, and maintenance. Several publications recognize the ability of the model to describe and explain the different stages that are common to most processes of behavioral change and that, at the beginning of the 1990s, were progressively incorporated into the investigations and interventions of a large number of behaviors already recognized as health

risks [15]. The American College of Sports Medicine adapted the classic model of evaluation of Prochaska's stages of change to include the importance placed on making a change and the confidence to do so. Precontemplation: the person did not express interest in adopting a certain habit. Contemplation: the person expressed interest to change their behavior and adopt the habit but was not willing to do so in the next 6 months. Preparation for action: the person was willing to adopt a habit within the next 30 days and had also incorporated certain habits or isolated actions leading to behavior change. Action: the person adopted a behavior less than 6 months ago. Maintenance: the person had maintained the behavior for more than 6 months.

The objective of the present study was to analyze the stage of behavioral change among university students to stop eating foods that contain warning labels and compare results by sex and nutritional status.

2. Material and Methods

We conducted a cross-sectional study. Surveys were created in Google Forms and sent to university students from all over the country. Chilean men and women between 18 and 40 years old were invited to participate. Exclusion criteria: persons with a visual disability. The population of university students in Chile was used for the sample size calculation. With a 95% confidence level and 3% error margin, we calculated that a sample of 1067 students was needed. The study was developed following the Declaration of Helsinki regarding working with human participants and approved by the Ethics Committee at San Sebastián University.

Participants provided informed consent prior to the start of the study, after which sex, age, weight, height, college major, and university were asked. Next, participants were asked if they were aware of the new food labeling law (Law 20.606), if they were aware that the law allows for the identification of foods with critical nutrients, and if they understood what that exceed critical nutrients (Figure 1).

In addition, the consumption of foods containing warning labels was evaluated. Prior to the beginning of the study, 10 foods that had 1 or more warning labels were selected via expert opinion. The selected foods were carbonated drinks, sugary juices, cookies, sweet snacks, French fries, chocolate, cold cuts, soups, ice cream, and breakfast cereals.

If a student reported eating a food with a warning label, they answered two additional questions related to desire to make a change in behavior: (1) how important is it for you to stop consuming the food? (scale of 1 to 10, with 1 meaning "not important" and 10 "very important"); (2) how confident do you feel that you will be able to stop consuming the food (scale of 1 to 10, with 1 meaning "not confident" and 10 "very confident").

The questions corresponded to the adaptation made by the American College of Sports Medicine to the classic model of evaluation of the stages of change. Recently, the scales to measure importance and confidence have been recognized by the American Academy of Nutrition and Dietetics as very effective to achieve changes in eating behavior [16]. Both