Influence of family health and body image on risk eating behaviors in teenagers

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ABSTRACT
Family health is challenged during a teenagers’ teen years due to the aspects of this life cycle stage; teenagers are more vulnerable to experience dissatisfaction with their body image and engage in risk eating behaviors (REB). The aim of this research was to analyze family health as a predictor of body image and the influence of both, family health and body image, for REB in teenagers. A sample of 361 adolescents from central, northeastern, and southeastern Mexico were randomly chosen: 151 men and 210 women between the ages of 11-19 years old. Structural equation model using parceling technique provided an alternate model ($\eta^2_{\text{REB}}=.91$, $p<.005$), indicating that family health can predict negative or positive body image ($\gamma_{\text{BI}}=-.41$, $p<.005$), and this in turn predicts REB ($\beta_{\text{REB}}=.95$, $p<.005$). Considering the finding, is concluded that influence of family health on the REB of adolescents can only be explained through body image.

Keywords: family health, risk eating behaviors, body image, structural equation models, parceling technique.

1 INTRODUCTION
The family provides a place of formation, health protection and recovery from diseases that a member may be going through (Louro Bernal, 2004). Family health forms the ability for the family to grow and to adapt to life cycle crises. It is more than the sum of the health of each member, when family health is present, it promotes the sense of belonging and mutual care among its members (De la Torre Mamani, 2017; Lima-Rodríguez & Lima-Serrano, 2012; Weiss-Laxer et al., 2020). It could be said that
family resources, and its development is due to the well-being and ability to provide care for their members (Weiss-Laxer et al., 2020).

On the other hand, adolescence should be the time in which youth learn how to develop healthy lifestyles encouraged by their family, however, the latest research suggests the opposite (Adolescent and School Health, 2021; Bautista-Diaz et al., 2020; Karbowniczek, 2020). Evidence suggests that teenagers who experience feelings of sadness, plan suicide, have inappropriate sexual behavior for their age, consume substances, are dissatisfied with their body image, and perform risk eating behaviors (REB), are increasing each year in several countries (Adolescent and School Health, 2021; Chacón-Quintero et al., 2016; Ortiz Cuquejo et al., 2017).

Therefore, family health has been challenged in adolescence, particularly due to the increase of teenagers dissatisfied with their body image. Similarly, research has been found (Iruloh & Wilson, 2017; Silva-Gutiérrez & Sánchez-Sosa, 2006) for analyzing family and the importance they give to the body image, thus explaining the appearance and maintenance of eating disorder. The outline suggests that depending on the relevance family members give to body image, the status of the family relationship and the amount of security and trust given by the family, are going to be the factors contributing to risk eating behaviors or protecting against them. This is because adolescents are at a stage where they are most vulnerable to experience dissatisfaction with their body image and engage in unhealthy behaviors (Cortez et al., 2016; Sevlywerty et al., 2021). Schilder (quoted in Traub & Orbach, 1964) mentions that body image is that which "is formed in the mind of the body itself, that is, the form in which the body appears to us" (pg. 53).

It is worth mentioning that, in the formation of body image, cognitive and affective components of adolescents are implicit, at the same time their body image confronts them with the paradigms of a social attraction of their culture, leading them to behave or have attitudes that bring them closer to the body image they feel that is ideal for cultural acceptance, whether they are being accepted or not (Bautista-Diaz et al., 2020; Cortez et al., 2016). As Breckler (1984) presents in his tripartite model, attitudes are expressed through thoughts, feelings, and behaviors. They are a learned tendency that cannot be directly observed, they are only inferred from people’s actions.

Therefore, risk eating behaviors are complex, because they are behaviors and/or actions that show they are eating deviations. They are located within a continuous line, between a normal diet and the diagnosis of an eating disorder (Hunot et al., 2008). Although risk eating behaviors are more frequent than eating disorders, there is a lack of studies related to this topic. What has been discovered is that teenagers’ physical and psychological health is at risk, and they are a gateway to developing eating disorders (Bautista-Diaz et al., 2020; Mattar et al., 2022; Unikel-Santoncini et al., 2004).
Considering there is a lack knowledge about these variables, the aim of this research was to analyze family health as a predictor of body image and the influence of both on adolescent risk eating behavior conducted in four public and private middle schools and high schools, from the southeast, northeast, and center of Mexico.

2 METHOD
2.1 PARTICIPANTS

The participants consisted of 840 students between the ages of 11 and 19 years old, from four public and private schools in the southeast, northeast, and central Mexico. The research sample was a non-probabilistic selection for convenience, it consisted of 151 (41.8%) men and 210 women (58.2%), with an age range of 11-19 years old (M = 15.45, SD = 1.47) giving a total of 361 participants. 48.5 % of the students were from the north-east, 32.4% from the center and 19.1% from southeastern Mexico; while 73.1% of the participants were from private schools and 26.9% of the participants were from public schools.

2.2 PROCEDURE

The sample was taken with the permission and approval of the Research Committee and the Research Ethics Committee of the [authors] school board and parents of the students who participated. Prior to the application of the questionnaire the informed consent was read and explained to the students, therefore, each of them had the opportunity to decide their participation in the research. The tests were applied online at a specific hour stipulated, a priori by the research team during the months of November and December 2020.

2.3 INSTRUMENTS

The questionnaires used, were a Family Health Status Self-perception Questionnaire, developed in Spain (Lima-Rodríguez, et al. 2012) and adapted in Mexico with adolescent populations by [authors] (2021). The questionnaire has a reliability of $\alpha = .845$ and an acceptable validity according to the KMO measure (Kaiser-Meyer-Olkin) =.810. It has 20 items, scored on the Likert scale, divided in five dimensions: family climate, family integrity, family functioning, family coping and resistance.

To evaluate the attitudinal aspects of body image and dissatisfaction with weight, the Body Shape Questionnaire (BSQ) that was used was developed by Cooper et al. (1987) and validated with the Mexican population by Vázquez Arévalo et al. (2011). This questionnaire consists of 34 items, which are scored on the Likert scale and two dimensions: normative body discomfort and pathological body discomfort, the internal consistency was $\alpha = .98$. 

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The Eating Attitude Test-26 (EAT-26) created by Garner et al. (1982) was used to measure risk eating behaviors and has been widely used in several countries and was validated in Mexico by Franco Paredes et al. (2016). The EAT-26 study has been shown to be useful in identifying abnormal eating behaviors and it has been used as a screening method to identify people at risk of developing an eating disorder. The reliability of the questionnaire is $\alpha = 0.83$ and the validity of KMO = 0.81, consists of 26 items, scored on the Likert scale, divided in three dimensions: diet, bulimia and concern for food and oral control.

3 DATA ANALYSIS

Descriptive statistics were used such as frequencies of age, sex, and regions of the country, using the program IBM SPSS version 21 (Statistical Package for the Social Sciences). Likewise, confirmatory factor analysis was performed with measurement models for each of the questionnaires used. The means of each questionnaire were calculated, they were the indices for the correlational analysis, these indices constituted first and second order measurement models which later were used to create the empirical model.

Therefore, the proposed theoretical model was performed using structural equation modeling (SEM) using the IBM SPSS AMOS version 21 (Analysis of Moment Structures) program, through the parceling techniques to identify the predictions between the variables. For each questionnaire used, its components were recoded. And in the final model only significant correlations of parceling techniques were used. On the other hand, to determine whether the data obtained supported the theoretical model, the goodness-of-fit indices described in Table 3 were used (Manzano Patiño, 2018).

4 RESULTS

In this research family health (FH) was the exogenous variable and body image (BI) and risk eating behaviors (REB) were endogenous variables. Figure 1 shows the theoretical model proposed, which also shows the latent variables of this research.

The proposed theoretical model was tested through SEM, this was used to predict family health, body image and REB, using IBM SPSS AMOS version 21 (Analysis of Moment Structures). To reduce the scales and their dimensions, parceling techniques were used, which improved the adjustments of the model, stabilized the estimates of parameters, and obtained a more stable robust construction (Bandalos, 2002).
First and second order measurement models were obtained from parceling each variable. To obtain a fit measurement model of each variable, items with residual covariances greater than 2 were eliminated because they were related to each other. When evaluating the criteria for modifications, each item and its dimensions were theoretically revised to decide whether to delete them or not.

The family health variable measurement model consisted of eight items and three dimensions: family coping consists of three items, family functioning two items and family resistance with three items. Both the first-order and second-order models showed very acceptable goodness-of-fit criteria (see Table 1 and Table 2).

The body image variable measurement model was formed with nine items and its two original dimensions were kept: normative body discomfort with four items and pathological body discomfort with five items. The first and second order models showed very acceptable goodness-of-fit criteria (see Table 1 and Table 2).

Likewise, the risk eating behaviors variable measurement model consists of nine items, and the three original dimensions were kept: diet with three items, bulimia, and concern for food with three items, and oral control with three items. The first and second order models showed acceptable goodness-of-fit criteria (see Table 1 and Table 2).

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<th>DF</th>
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<th>RMS</th>
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<td>.922</td>
<td>.949</td>
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<td>.916</td>
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Based on these results, the first and second order measurement model for the family health, body image and risk eating behavior was considered acceptable. These three measurement models were the basis to propose the SEM of this research and thus be able to infer, empirically, the predictor relationship between the variables.

An empirical model was found which indicates that self-perception of family health is a significant predictor of body image ($\gamma_{BI} = -42, p<.005$) for adolescents and this in turn significantly predicts risk eating behaviors ($\beta_{REB} = .99, p<.005$). It was also observed that self-perception of family health is not a significant predictor of risk eating behaviors ($\gamma_{REB} = .07, p>.005$) in adolescents in the studied population. The whole empirical model explains 92% of the family health, body image and risk eating behaviors, the values of goodness-of-fit indexes were significantly high (see Figure 2 and Figure 3).

After observing the empirical model fitted to the theoretical model, then a predictor was not significant, an alternative structural model is proposed where body image is observed as a mediating variable between family health and risk eating behavior. To reach the alternative model that best fits the theoretical model and obtain acceptable goodness-of-fit indices; in the revised estimates there were no violators in the regression of weight where $p < .05$, correlations between errors across covariances in index modifications were verified and the residual standardized covariances were less than 2 to improve goodness-of-fit indices.

The alternative model proposed that family health predicts in a negative way the body image of adolescents ($\gamma_{BI} = -41, p<.005$), and this at the same time predicts risk eating behavior ($\beta_{REB} = .95, p<.005$). The influence of family health on the risk eating behavior of adolescents who participated in this research can be explained through body image.
By proposing an alternative model, predictions between the variables are better theoretically explained ($\hat{\eta}^2_{REB}=.91$, $p<.005$). In this model, the body image of adolescents predicts directly a risk eating behavior ($\beta_{REB}=.95$, $p<.005$). This means that the greater the satisfaction of the adolescents with the way of looking at their bodies, results in less probability of risk eating behavior.

There is a correlation in risk eating behavior’ dimensions, bulimia and concern for food and oral control ($r=17$, $p<.005$). This correlation suggests that items of these two dimensions shows risk behaviors, and some degree of cognitive distortion may be present.

The criteria for evaluating the goodness-of-fit that were used in the measurement models and in the alternate model are described in Table 3; in it the rejection criteria according to the index referred (Bandalos, 2002; Manzano Patiño, 2018) is shown.

![Figure 3. Proposed alternative model.](image)

Table 3 Goodness-of-fit indexes and reference criteria.

<table>
<thead>
<tr>
<th>Category</th>
<th>Statistic</th>
<th>Abbreviation</th>
<th>Criteria</th>
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<td>P</td>
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<td>≥ .05</td>
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<td>Approximation</td>
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<td>GFI</td>
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<td>Adjusted Goodness-of-Fit Index</td>
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<tr>
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<td>Tucker-Lewis Index</td>
<td>TLI</td>
<td>≥ .90</td>
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<tr>
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<td>Comparative Fit index</td>
<td>CFI</td>
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<td>Incremental Fit Index</td>
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<td>Normed Fit Index</td>
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5 DISCUSSION

In this research, family health was analyzed as a predictor of body image and the influence of both on adolescent risk eating behaviors in four public and private middle and high schools, belonging to the Southeast, Northeast, and Central Mexico. To achieve this objective, SEM was used with the parceling technique, which allowed the creation of first and second order measurement models, that explained the variables with a reduced structure and very high adjustment goodness indices.
It is concluded that the family health variable negatively predicts the body image of adolescents through the dimensions: family resistance, coping and family functioning. That is, when adolescents perceive that their family gives them belonging and care, there is less chance of experiencing pathological body discomfort and the body image is not altered. These results are consistent with Franco Paredes et al. (2010) and Salazar-Molar et al. (2021) who corroborate that risk eating behavior is associated with the internalization that the adolescent has formed based on an aesthetic body model that provides its environment; they feel that they do not reach that standard and may be a reason for the teenagers to perform the risk eating behavior.

Likewise, the body image that adolescents acquire based on their family health will predict the risk eating behaviors. These findings corroborate what was found in other investigations, which indicate that the family teaches its members the aesthetic and behavioral standards in early stages of development; depending on the assessment of body image, it determines the risk eating behavior that they will practice (Behar, 2010; Franco Paredes et al., 2019).

The proposed alternative model explains, that when adolescents perceive there is some alteration in their body image, then there is a high probability that they will develop some risk eating behavior. This is consistent with several studies (Linville et al., 2011; Londoño-Pérez & Moreno Ruge, 2017) which suggest that dissatisfaction with body image, persistent concern for food, weight, or body shape, associated with perfectionism and interoceptive awareness; are part of the risk eating behavior in people who have subsequently formed some form of eating disorder.

It can be concluded that family health indirectly influences body image through the risk eating behavior of adolescents, between the ages of 11 and 19 years old. Indirect prediction is explained through the three dimensions that form the family health variable, which evaluates the family’s coping and decision-making skills, their knowledge and attitudes towards health and the level of cohesion between them (Lima-Rodríguez et al., 2009). In contrast to other studies where variables such as family function and climate with eating disorders were analyzed, it was found that, if there is direct prediction, this is because other family health variables have been studied along with eating disorders (Losada & Bidau, 2017; Ngozi Iruloh & Wilson Chukwu, 2017).

A correlation was observed in the risk eating behavior variable, between the dimensions of bulimia and concern for food and oral control (Garner et al., 1982). The correlation indicates that both dimensions were interpreted by adolescents as attitudes that indicates whether cognitive distortion exists. Since the research was conducted in a nonclinical population, there is a low chance of cognitive distortion because these dimensions discriminate between subjects with or without cognitive distortion. Therefore, depending on the level of family health that the adolescent has, it will indicate whether the body image that has been internalized is distorted or not.
The alternative model found in this research that explains the variables of family health, body image and risk eating behavior will contribute to generate future approaches to understand these important aspects, in the lives of Mexican adolescents.

The main limitation of this research was the online data collection, the participants were at home completing the questionnaire. And there was also no homogenization of the sample in demographic data such as the type of school and region of the country, and the same risk eating behavior questionnaire was used for men and women.

Therefore, the recommendations are aimed at further conducting national and international research to learn more about these behaviors, that put the health of adolescents at risk. It is recommended to expand the number of participants in the sample, considering the differences in their age ranges, and analyze other important variables such as, the dimensions of family health separately, self-esteem, the type of family, and/or comparison with clinical population.
REFERENCE


