

Perception of Body Image in Maya Adolescents and its Relationship with Body Dissatisfaction and Nutritional Status

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ABSTRACT

Body image is formed in childhood and adolescence and is influenced by socio-cultural situations and interpersonal relationships during life. When the characteristics of a subject's body do not correspond with the social models of beauty promoted by the media, body dissatisfaction (BD) appears, which is the set of negative emotions, thoughts, and attitudes towards the size and shape of one's body.

The objective of the present study is to know the body image perception (BIP) of Mayan adolescents and their relationship with body dissatisfaction and its nutritional status through the Body Mass Index (BMI) indicator. The population was of 292 students of the three grades of four secondary schools of the Municipality of Abalá, Yucatán, between the ages of 12 and 17, from which 50.7% were men. The Body Image Perception analysis, the Body Shape Questionnaire (BSQ) and the BMI were used. It was found that 38.9% of the population had BIP in disagreement with their BMI, with a higher prevalence in under-estimation in the overweight and obese population, even though 16.7% of the population had body mass index in obesity. Only 18.2% had BD being higher in women (11.7%) between the ages 13 and 14, with a higher prevalence in those with normal BMI and BIP, which shows that the influence of social pressure towards body figure does not necessarily affect people who are overweight.

Keywords: Body image; Body dissatisfaction; Perception of body image; Adolescents; Body mass index

INTRODUCTION

For the Mayas the human body was a reproduction of the cosmic structure, framed by four corners parallel to the cardinal points and a central core, called *tipté*; the bottom corner is known as *chun u nak*, which is at the pit of the stomach; the top corner is the *u uich puczical* which is found in front of the heart, and to the sides we find the *hay nak*. In this context, men do not rule over nature, but participate in a dialogue with it, where the general essence is time, to which all other elements are their subject, in a double interdependence in order to take advantage of all the bounty nature provides. "Man lives in the world, depends of everything around them, is governed by time, cannot conceive their existence without animals, plants, water, and earth..." [1].

Over time and after social transformations, the working systems of the Maya population have been modified; men have changed jobs going from peasants to temporary agricultural farmers or construction workers in large cities; and women have gone from tending the land and taking care of the home to working at maquila industries or as housemaids in urban communities. Urbanization, Hispanicization, and literacy have modified not only the livelihoods

of the Maya people, but also their sense of community. Efforts to integrate them to a national culture have created several degrees of change in their traditions, habits and social structure, including the loss of their mother tongue (Yucatecan Maya), their traditional garments (*huipil* and *rebozo* for women, and white *Filipinas* and *huaraches* for men), their religious beliefs and their cult to the dead, among others [2].

Currently we live in a society in which the perfect body image and a sense of eternal youth are symbols of success, happiness, health, and attractiveness to the opposite sex, so it is not surprising that a concern over physical appearance has become a priority for human beings; however, the excessive concern to comply with the media-promoted pressure (on the Internet, television, and magazines) towards beauty has led men and women of different ages, social strata, and cultures to adopt practices which endanger their health and lives [3].

Body image is a concept that has acquired great relevance in the current era, Rosen considered it as the way one perceives, imagines, feels and acts towards their own body. A more comprehensive definition developed by Raich, defines it as "a complex construct

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which includes both the perception we have of our whole body and each of its parts, as well as its movement and limits, the subjective experience of attitudes, thoughts, feelings and assessments” [4].

Body image begins to take form in childhood and is influenced by cultural situations, such as the idea of beauty which has been changing over time, and also depends on patterns adopted by different societies; by internal and external factors which interact with the context in which interpersonal relationships develop throughout life, that is, the influence of family, friends, schoolmates, and whether this influence was positive or negative will have an impact on the individual's self-esteem [5].

The emotional development of the person during adolescence is another influence to keep in mind since the internalized image of the body is intimately linked to the affective bonds that the individual has and to the body image they have because of the interaction with others. It is during adolescence that the concern over what their bodies look like starts and conflicts may arise. First, one wants to look good, be attractive and show off. On the other hand, one wants to hide all or some of the physical attributes one does not like, based on preconceived ideas, values, and feelings [6].

Constantly comparing our body measurements to the ideal standard of modern society; giving too much importance to the thoughts and feelings that our body provoke, mainly body weight or some body parts that one does not like about their physical appearance can be the beginning of situations that range from something simple like wearing loose clothes, wearing black to look thinner, to others that reveal a more complex emotional situation, such as constantly weighing oneself, comparing oneself to other people in a negative way, avoiding going out, stop eating, etc.

When a subject's body characteristics do not correspond to society's ideals of beauty, body dissatisfaction (BD) appears, which is the set of negative emotions, thoughts and attitudes towards the size and shape of one's body [4].

We can say that a person has a negative body image when they misjudge their bodily forms, when they are convinced that only others are attractive, and they obviously feel uncomfortable with their physical appearance. This is also associated with low self-esteem, anxiety, depression, and insecurity that affect social interactions and this can become a factor in performing harmful behaviours towards one's health, such as personal weight control through a restriction or excessive consumption of food, drug abuse, excessive exercising, among others [7,8].

Furthermore, it is paradoxical that while the media promote an excessively slender body in women and a muscular one in men, developed and developing countries evidence high incidences of overweight and obesity in all stages of life. In Mexico, the mid-term assessment results of the National Health and Nutrition Survey (ENSANUT from its Spanish initials) conducted in 2016 show that 4 out of every 10 adolescents between ages 12 to 19 are overweight or obese, with a combined incidence of 36.3%, higher in women (39.2%) than in men (33.5%) [9]. The preliminary results of the 2018 ENSANUT show an increase of 1.8% points in the prevalence of excess weight (38.1%), with 23% being the incidence of overweight and 15.1% the prevalence of obesity in Mexican adolescents in general [10].

In rural areas, the 2012 ENSANUT survey results indicate that the combined overall prevalence was 52%, depicting an 18% increase compared to the 2006 survey results [11].

‘This contrast, between the requirements of a fashionably body aesthetic model and an overweight and obese reality, is what has triggered in today's society the increase of BD in adolescents, which is considered from a psychological point of view as one of the key variables which predisposes, precipitates, and perpetuates risky food practices present in eating disorders, mainly among the adolescent population [12].

Different studies have concluded that women have higher BD than men [13-15]. Statistics indicate that 23% of women in Latin America have BD, which increases between ages 13-15 and stays until age 18 [16].

Trejo et al. in 2010 worked with 231 high school students with an average age of 13.6 years, to whom the BSQ was applied, finding that 17.7% of them had mild BD and 0.5% of them moderate BD. They also found 32% of combined prevalence of overweight and obesity and a significant correlation between body mass index (BMI) and BD, higher in women than in men. It was concluded that BD is greater in women when their BMI is higher [15].

Meza and Pompa in 2013 carried out a study with 849 high school students aged 11-16 using the Self-concept Scale (SCS), the Body Attitude Test (BAT), and the BSQ. The results showed that the BD was presented in overweight and obese students, significantly higher in women than in men [17].

In another study by Soto et al., in 2013 to 291 junior high school and high school students between 13 and 19 years, using the Eating Disorders Inventory (EDI-2), observed that the prevalence of overweight and general obesity was 27.5%, very similar between men and women (28% and 27% respectively); while the BD was higher in females (21.9%) than in males (11%) [14].

One study was conducted in the city of Toluca, State of Mexico in 2018, with 635 students (367 women and 268 men) of 15 and 16 years, four public high schools which the aims was to compare the perceived BD and desired. It departed from the hypothesis that the perceived image will be different from the desired among in Mexican adolescents and it was considered that women would present greater dissatisfaction. We found that women were dissatisfied with specific parts of their body and want to move closer to canons of extreme thinness. Moreover, the men said as ideal have an athletic body, with strength and virility and a higher body weight [18].

As can be seen, there is a coincidence in the results of some works carried out in urban areas; however, in rural areas, where the indigenous population predominates, studies are scarce, perhaps because the instruments in this type of population may have not been validated yet, since the instruments are translated from English, which include questions that are difficult to answer and because ideologies, habits, and customs from their ethnicity are mixed with those of modern times [19].

Rosas et al., conducted a study in 2015 in Chile with the objective to identify differences in the risk of eating disorders and BD in Mapuche and non-Mapuche students and to associate these variables with the nutritional status. There were 130 adolescents between the ages 14-21, 95 of the Mapuche ethnic group and 35 non-Mapuche ethnic groups who received the Eating Attitudes Test (EAT-40) and the BSQ. The results showed that there were no significant differences between Mapuche and non-Mapuche students with respect to BD, but a statistically significant difference was found to be greater in overweight and obese women than

in men. It was concluded that risk factors for eating disorders, including BD, are affecting indistinctly rural and indigenous areas, due to social and cultural changes associated with body aesthetics and beauty canons [20].

Therefore, the present work was carried out to know the body image perception (BIP) of Maya adolescents and their relationship with the BD and their nutritional status through the BMI indicator.

MATERIALS AND METHODS

Participants

The population included 292 students from the three grades of four secondary schools in the Municipality of Abalá, Yucatán. The participation was voluntary through a letter of agreement and of informed consent, addressed to their parents who authorizing their inclusion in the study. In a previous meeting parents were informed of the purpose of the study, the confidentiality of the information, and the freedom to withdraw from the study when they wished, without detriment to their child, as stipulated in the General Law of Health on research with human beings [21].

Students who for some reason could not answer the instruments or could not be measured and weighed were excluded.

Instruments

Analysis of the body image perception (BIP): This method, validated for schoolchildren and adolescents, is formed by nine masculine and feminine anatomical silhouettes [22], which are progressively more robust and represent different ranges of BMI. Each silhouette is assigned a BMI, from 17 kg/m² to 33 kg/m² and is related to low weight (silhouette1), normal- weight (silhouettes 2-5), overweight (silhouettes 6-7) and obesity (silhouettes 8-9). Participants are asked to select a figure that, according to their perception, corresponds to their body image. In these images, the BMI assigned is not visible. Comparing the values of the perceived BMI with those of the real BMI obtained a pattern of compliance or dissatisfaction of the individual with their own figure is obtained.

Body shape questionnaire (BSQ): It evaluates dissatisfaction with weight and body image through 34 questions and six possible answers: never, almost never, sometimes, many times, almost always, and always [23]. Its international cut-off point is equal to 105. This questionnaire has been validated for Mexican women, from which two normative discomfort factors arise, one which refers to the discomfort with body shape, that is considered normal and that does not cause a health risk, and a pathological malaise which provokes unhealthy behaviours (fasting, vomiting, use of laxatives, diuretics, etc.) that may result in health risks and life-threatening situations. From this validation, the cut-off point of 110 was determined for the Mexican population [24].

Procedure

Groups of students were taken to a specific room for body measurements, which were performed by trained personnel following the anthropometric reference manual by Lohman et al. [25].

The Body Mass Index (BMI) was taken as an indicator of the nutritional status to compare it with the Body Image Perception Analysis, which is why weight and height measurements were necessary. To measure the weight a digital scale of the brand SECA, model 803, with ± 100 g of precision was used; the participants were asked to stand in the centre of the platform of the scale bare

feet, with their body weight evenly distributed between both feet, facing forward, and maintaining a straight position.

To measure height, a SECA brand model 213 stadiometer with 1mm accuracy was used; the participants were asked to stand straight on a flat surface bare feet, feet together at the heels (approximately at 30°); heads were in a horizontal Frankfurt plane, legs straight, and shoulders relaxed. The heels, hips and the back of the head were verified to be touching the vertical surface on which the stadiometer is located [25].

Subsequently, the BMI was determined and converted to z-score, classified according to: low weight ($\leq -1,040$), healthy ($\geq -1,036$ and $\leq 1,030$), overweight ($\geq 1,036$ and $\leq 1,649$) and obesity ($\geq 1,645$); the students were classified according to the Frisancho cut off points, which included people from Mexican and Maya origins [26].

In their respective rooms, the researchers proceeded to apply the instruments to identify the PBI and the presence of BD. About of the application of the BSQ; given the complexity of some questions and terms used, it was necessary to do the application in an assisted way, that is, when the secondary school students did not understand any question or word, they were explained to the whole group, sometimes using synonyms or examples.

Statistical analysis

The data was captured in Excel v.2016 and analysed using the statistical package STATA v.13 for Windows. The study was descriptive cross-sectional. Pearson's Chi-square was used to compare percentages and Pearson's correlation (Student's T and Anova) for the comparison of measurements.

RESULTS

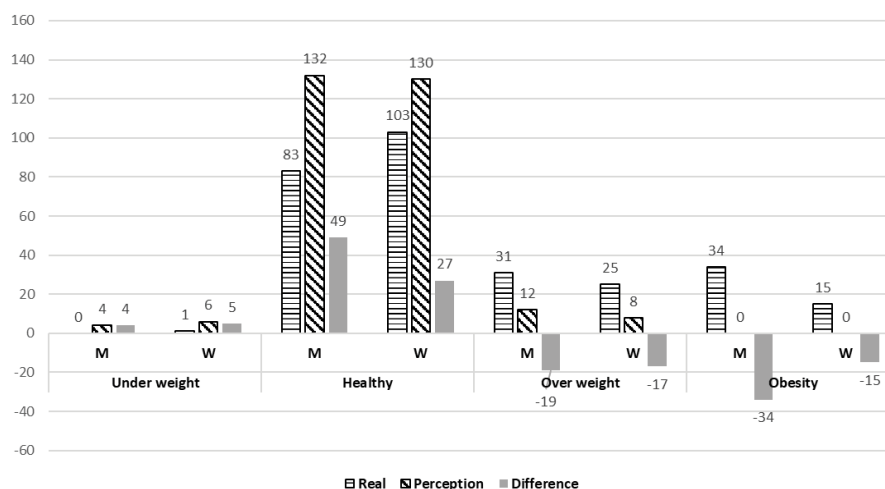
The study population consisted of 292 students from the three grades of secondary school of the communities of Mucuyché, Temozón and Uayalceh, as well as the municipal capital Abalá, from which 50.7% were men and 49.3% women, with a minimum age of 12, maximum of 17, and the average age was 13,5 (SD 0.064).

The total number of students by grade level was 111 (38.0%) for student of the first grade, 102 (34.0%) of the second, and 79 (27.0%) of the third.

According the BMI indicator, 186 (63.8%) of the participants were healthy, as can be seen in Figure 1; 56 (19.2%) were overweight, 49 (16.7%) obese, and only one person (0.3%) was underweight. Women presented low weight and healthy weight more frequently, whereas men presented a higher frequency of overweight and obesity. The prevalence of excess weight (overweight and obesity) was 35.9%, also higher in men (22.2%) than in women (13.7%).

Based on the application of the Body Image Perception Analysis (BIP), differences between real and perceived BMI were observed, both in men and women. There was an increase of 4 men and 5 women with underweight with a difference of + 3.1%; also, 49 men and 27 more women perceived themselves with a healthy BMI with a difference of + 26.0%. In the case of overweight, 12 men and 8 women perceived themselves with a difference of -12.3% and no one perceived them as obese with a difference between the real BMI of -16.7% (Figure 1).

From the BSQ application, it can be affirmed that only 18.2% of the study population had BD, this proportion being higher in women (11.6%) than in men (6.6%).



Source: Result of the application of the body image perception analysis (BIP) and the determination of the BMI. M= men; W= woman *Z-score and Frisancho cut points were used.

Figure 1: Body mass index (BMI) z-score, real and perceived of the study population by sex.

It is important to take a note that, in women, BD was presented in a greater proportion in the first year of secondary school (5.2%) while in men in the second year (3.1%).

Higher frequency of BD was found in the community of Abalá (43.4%), followed by Uayalceh (24.6%). With respect to age, the highest prevalence was found between 13 (22.6%) and 14 (20.7%) years of age, followed by 12 (15.1%) years of age.

When the BIP and the BMI results were related, a significant positive association was found between the variables $r=0.71$ ($p=0.00$) where it can be observed that 3.5% of the population perceived themselves as underweight, 4 men and 6 women, having a nor healthy mal BMI. 89.9% of the participants perceived themselves as having healthy weight, 79 men and 96 women (60.1%) with healthy BMI; 29 men and 23 women (17.8%) with overweight BMI; 24 men and 10 women (11.7%) with obesity BMI, and a woman (0.3%) with underweight BMI.

The 6.6% of the population perceived themselves as overweight, one woman (0.3%) with nor healthy BMI; two men and two women (1.2%) with overweight BMI and 10 men and 5 women (5.1%) with obesity BMI. It is relevant to mention that 16.8% of the population presented BMI in obesity, however, no participant perceived themselves with obesity, as can be seen in Table 1.

In Table 2 where the results of the BIP and BD were related, a moderate association was found $r=0.40$ ($p=0.00$) between the variables; it was found that out of 18.2% of the participants who presented BD, 14.7% presented BIP in healthy weight (5.5% men and 9.2% women) and 3.5% with overweight (1.1% men and 2.4% women).

Out of the 18.2% of the study population that presented BD, the highest frequency occurred in people with a healthy BMI (7.9%), followed by overweight (5.5%) and with obesity (4.8%). Significantly higher in women ($r=0.36$) ($p=0.001$), as can be seen in Table 3.

Table 4 shows the relationship between BIP, the BD and the BMI of the study population by sex; 61.1% of the population presented BIP according to their BMI; 59.9% presented healthy BMI and perceived themselves as with healthy weight, with a significantly higher frequency in women (32.8%) than in men (27.1%); of these,

only 7.6% had BD, significantly higher in women (4.8%). 1.2% of the population had BMI in overweight and perceived themselves as overweight, with the same proportion between the sexes (0.6%); but only women presented BD.

Moreover, the 38.3% of the population underestimated their BMI, when presenting BIP lower than their real BMI; 3.5% had healthy BMI and perceived themselves as underweight, did not present BD and the proportion was significantly higher in women (2.1%). 18.0% had BMI in overweight and BIP in healthy-weight, often significantly higher in men (10.0%), 4.9% of them had BD, more frequently in women (2.8%). 11.9% with BMI in obesity, presented BIP in healthy-weight, significantly higher in men (8.5%); 2.3% of them presented BD, more frequently women (1.7%). Finally, 4.9% presented BMI in obesity and BIP in overweight with a higher frequency significantly higher in men (3.2%); 2.5% of them had BD, frequently significantly higher in women (1.4%).

BMI was over-estimated by 0.6% of the population, when their BIP was greater than their real BMI. One woman (0.3%) with healthy BMI, presented BIP in overweight and BD and another woman (0.3%) with BMI in underweight presented BIP in healthy weight.

DISCUSSION

There have been many studies about the situations prevailing in rural areas and the factors that cause and maintain them; among these factors are the low economic resources available, the lack of social assistance, the lack of information about health aspects, low academic preparation, the deeply rooted influence of their culture, among others; all this has repercussions on the nutritional status of adolescents, from chronic malnutrition which has decreased slightly in recent years, to excess weight (overweight and obesity) which beings in childhood and continues into adulthood; the latter has increased its prevalence 3.1% from 2006 to 2016 and 1.8% from 2016 to 2018 in urban communities and 18% from 2006 to 2012 in rural areas [9,10,27,28].

In a country with a high prevalence of obesity, it is not strange that the excess weight in the study population is 38.1% (ENSANUT 2018), higher in men than in women [10]. These data differ from the prevalence of 58.3% found in the study of Meza et al., with students from Monterrey, but coincide with the results of Trejo et

Table 1: Relationship between of the body image perception (BIP) and the BMI of the study population by sex.

Body image perception	Sex	Body Mass Index (BMI)				Total
		Low Weight ($\leq 1,040$)	Healthy ($\geq 1,036$ and $\leq 1,030$)	Overweight ($\geq 1,036$ and $\leq 1,649$)	Obesity ($\geq 1,645$)	
Low Weight (Silhouette 1)	M	-	4 (1.4%)	-	-	4 (1.4%)
	W	-	6 (2.1%)	-	-	6 (2.1%)
Healthy - weight (Silhouettes 2-5)	M	-	79 (27, 1%)	29 (9.9%)	24 (8.2%)	132 (45.3%)
	W	1 (0.3%)	96 (33.0%)	23 (7.9%)	10 (3, 4%)	130 (44.6%)
Overweight (Silhouettes 6-7)	M	-	-	2 (0.6%)	10 (3.4%)	12 (4.0%)
	W	-	1 (0.3%)	2 (0.6%)	5 (1.7%)	8 (2.6%)
Total		1 (0.3%)	186 (63.9%)	56 (19.0%)	49 (16.8%)	292 (100.0%)

Source: Result of the application of the Body Image Perception Analysis (BIP) and the determination of the BMI. M= Men; W= Woman.
Pearson correlation $r = >0.5$

Table 2: Relationship between body image perception (BIP) and body dissatisfaction (BD) of the study population by sex.

Body image perception	No body dissatisfaction <110		With body dissatisfaction > 110		Total
	M	W	M	W	
Low Weight (Silhouette 1)	4 (1.4%)	6 (2.1%)	-	-	10 (3.5%)
Healthy-weight (Silhouettes 2-5)	117 (40.0%)	102 (34.9%)	16 (5, 5%)	27 (9.2%)	262 (89.6%)
Overweight (Silhouettes 6-7)	9 (3.1%)	1 (0.3%)	3 (1.1%)	7 (2, 4%)	20 (6.9%)
Total	130 (44.5%)	109 (37.3%)	19 (6.6%)	34 (11.6%)	292 (100.0%)

Source: Result of the application of the body shape questionnaire (BSQ) and the analysis of the body image perception (BIP).

M= Men; W= Woman

Pearson correlation $r = <0.5$.

Table 3: Relationship between BMI and body dissatisfaction (BD) the study population by sex.

BMI	Without body dissatisfaction < 110		With body dissatisfaction ≥ 110		Total
	M	W	M	W	
Low weight ($\leq 1,040$)	0	1 (0.3%)	0	0	1 (0.3%)
Healthy ($\geq 1,036$ and $1,030 \leq$)	75 (25.7%)	88 (30.1%)	8 (2.8%)	15 (5.1%)	186 (63.7%)
Overweight ($\geq 1,036$ and $\leq 1,649$)	25 (8, 6%)	15 (5,1%)	6 (2,1%)	10 (3,4%)	56 (19,2%)
Obesity ($\geq 1,645$)	29 (9.9%)	6 (2.1%)	5 (1.7%)	9 (3.1%)	49 (16.8%)
Total	129 (44.2%)	110 (37.6%)	19 (6.6%)	34 (11.6%)	292 (100.0%)

Source: Result of the application of the Body Shape Questionnaire (BSQ) and the determination of the BMI.

M= Men; W= Woman

Spearman correlation $r = <0.05$.

al., who reported a prevalence of 32% in Zacatecas students and those of the National Survey of Health and Nutrition (ENSANUT) 2016 half-way results, which prevalence of excess weight was 36.3%. The previous data are reported for urban areas and show profound differences from the rural areas data in 2012, where the prevalence of excess weight was 52%, 18% higher than in 2006. This difference could be the result of the under appreciation with which people perceive overweight and obesity in rural areas, which increases over time, resulting in an increase on risk of chronic diseases at very early stages in life and a negative augury due to the lack of effective prevention, health care, dietary and nutrition support programs in indigenous rural areas [9,11,15,17].

Even if there are social, economic, and cultural differences between urban and rural populations, there is evidence that the ideology and cultural messages of the media as well as the changes in customs and consumer goods have created new ways to live life as individuals, family and community members; a process which has affected every social class and ethnic group, including the Mayas from the Yucatan [2,15,17].

It has been identified that overweight and obesity could be considered as risk factors for the development of eating disorders due to their relationship with the genesis of BIP and BD, which justifies their study because when BIP is negative, it can lead to psychological alterations, such as low self-esteem, anxiety, depression, and even suicidal ideas that are present in both urban and rural areas [12,23].

From the comparison of the real BMI with BIP in study participants, it was found that only one person presented BMI in underweight and 10 people perceived themselves as underweight (+3.5%); 186 people presented healthy BMI and 262 (+89.7%) perceived themselves as such; 56 people presented BMI in overweight, yet only 20 (-6.8%) were perceived as such. 49 people presented BMI in obesity, but nobody perceived themselves with that BMI (-16.7%). These results were compared with the study conducted by Oliva-Peña et al., in which it was found that 22 people presented BMI in underweight and 6 (-19.1%) were perceived as such; 52 presented healthy BMI and 67 were perceived (+17.9%) as such; 10 people presented BMI in obesity and 11 were perceived as such (+1.2%) [29]. Differences with underweight and obesity were identified, since in the present study more people perceived themselves as underweight than those who show it, while nobody perceived themselves as obese when 16.8% suffers from it. In the study by Oliva et al., in both cases it was the opposite. However, in the case of healthy weight there was a coincidence, in both studies a greater number of people perceived themselves with healthy weight than those who presented it; these discrepancies may be due to the fact that the population studied by Oliva et al. is suburban and is more influenced by the customs and consumption habits of the urban area, as well as having more access to the media and social networks. Nevertheless, the introduction of social networks in rural communities is increasing; parks with free wi-fi and cyber cafés have had a deep impact on the access and use of information and communication technologies (ICTs), allowing fashion, beauty, and body image content to reach even the least likely of places [30,31].

It is possible that in this study no one has perceived themselves as obese because adolescents often have different opinions about body weight, which vary according to gender and ethnic conditions, and depend largely on their parents' opinions regarding their children's

body weight. Similarly, women tend to have negative ideas about their bodies, perceive themselves as fatter than they are, while men seem to think they are thinner [32].

On the other hand, BD has been considered as a factor prior to the establishment of eating disorders and is considered internationally as a diagnostic criterion. It has also been considered as a mediating variable between the social pressure exerted on women to maintain a certain body image [33]. In the present study, the prevalence of BD found was higher in women, this in agreement with most studies on the subject [14-17,19,33]. This situation may have as a precedent that women in adolescence have fewer personal resources of self-acceptance and self-criticism than men, and that makes them more susceptible to comments and criticism towards their figure, and to fall into the influence of the ideal of thinness promoted by the media and social networks [19].

It is also important to note that BD was presented with a higher prevalence among individuals ages 13 and 14, coinciding with data from the study by Rodríguez and Cruz who mentioned that BD appears between the ages of 13 and 15 and remains until the age of 18 [15,33]. Starting at such an early age, adolescents begin to develop emotional problems associated with their physical appearance such as low self-esteem, depression, anxiety, feeling of inefficiency, etc. which affect their social interactions and generate a negative self-evaluation that results in a tendency to overestimate their weight, to believe that they weigh more kilos than they actually do, and want to lose them to fit into the body ideal promoted by society, especially among the female sex [15,29,33].

Of the relationship between the study variables (BMI, BIP and BD), it can be affirmed that 61.1% of the population had a BIP according to their BMI; the rest of the population perceived themselves inadequately: 0.6% overestimated their BMI and 38.3% underestimated it. These data differ from the study conducted by Ortega et al., where it was found that only 22.3% of the participants in the study perceived themselves accurately. It also differs from the results found by Atalah et al., who found that 20% of the population had concordance between real and perceived BMI, 60% over-estimated and 30% underestimated it.

It is important that both the adequate PBI, as in the over-estimated women were more frequent, while the under-estimation, took place among men, a situation that coincides with the study of Atalah et al., who states that there is five times more risk of underestimating weight in men, since they have the idea that this has to do with their greater muscle mass, in addition to that they worry less and underutilize health services [28].

Only 18.2% of the participants presented BD: 8.2% had BIP according to their BMI; 0.3% over-estimated it and 9.7% underestimated it. These results are in contrast with some authors who state that the higher the BMI, the greater the BD, since 16.7% of the participants presented obesity, yet none of which perceived themselves as such. In this group, the higher frequency of BIP in the three levels is higher in women [15,16,19].

Finally, 38.9% of the population have BIP in disagreement with their BMI; over-estimation occurred in women with low and normal BMI. However, the under-estimation was presented in the participants with normal BMI, but mainly with overweight and obesity, more frequently in men. This in coincidence with

Table 4: Relation between the perception of body image (BIP), body dissatisfaction (BD) and the BMI of the study population by sex.

BMI	BD ≥ 110	Low weight (Silhouette 1)		Healthy-weight (Silhouettes 2-5)		Overweight (Silhouettes 6-7)		Total
		M	W	M	W	M	W	
Low weight (≤ -1,040)	No	-	-	-	1 (0.3%)	-	-	1 (0.3%)
	Yes	-	-	-	-	-	-	-
Healthy (≥ -1.036 and 1.030 ≤)	No	4 (1.4%)	6 (2.1%)	71 (24, 3%)	82 (28.1%)	-	-	163 (55.9%)
	Yes	-	-	8 (2.8%)	14 (4.8%)	-	1 (0.3%)	23 (7.9%)
Overweight (≥ 1,036 and ≤ 1,649)	No	-	-	23 (7, 9%)	15 (5, 1%)	2 (0, 6%)	-	40 (13,6%)
	Yes	-	-	6 (2, 1 %)	8 (2.8%)	-	2 (0.6%)	16 (5.5%)
Obesity (≥ 1.645)	No	-	-	23 (7.9%)	5 (1.7%)	6 (2, 1%)	1 (0.3%)	35 (12.0%)
	Yes	-	-	2 (0.6%)	5 (1.7%)	3 (1.1%)	4 (1.4%)	14 (4.8%)
Total		4 (1.4%)	6 (2.1%)	133 (45.6%)	130 (44.5%)	11 (3.8%)	8 (2.6%)	292 (100%)

Source: Result of the application of the body shape questionnaire (BSQ), of the analysis of the body image perception (BIP) and the determination of the BMI.

M= Men; W= Woman

Anova p <0.001 with an adjusted r equal 45.3%

Atalah et al., who demonstrated that excess weight explained the under estimation of body weight in their study and affirmed that under estimation causes people to maintain inappropriate eating behaviours and perpetuate an altered health condition.

CONCLUSION

The present study demonstrates that despite the deep rooted cultural ideas in Maya adolescents from rural areas of the Yucatan, the media and technology messages have influenced similar risky behaviours to those found in urban areas concerning eating disorders, such as: the higher prevalence of BD in women and the presence of BD at early ages of life, the presence of BD in women who presented BMI and BIP in normality, which shows that the influence of social pressure on the body figure does not necessarily affect overweight and obese people, as evidenced in many similar studies in urban areas; in fact, it draws attention that a third of the population presents BIP in disagreement with their BMI, mainly the underestimation takes place in men with overweight and obesity, since when they do not perceive the reality of how the repercussions of an inadequate lifestyle in adolescence could affect their health in adulthood.

When the only group that presented BD is observed, the higher frequency of BIP in adequate perception, over-estimation and under-estimation takes place among women, who traditionally are more susceptible to criticism and have developed their self-acceptance less than men, which in turn creates more BD.

Finally, it is important to highlight that, out of the 16.7% of the population that presented BMI in obesity, nobody perceived themselves as such; this is an area of opportunity for educational work at this stage of life with the purpose of promoting the good reception of healthy lifestyles.

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