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Factors Impacting Change for Hispanic Adolescents Who Perceive Themselves as Overweight

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Abstract

Childhood overweight and obesity remain a significant public health problem with a well-recognized spectrum of adverse short and long-term health, social and psychological outcomes. Hispanics and African Americans are two minority groups that have been greatly impacted by childhood overweight and obesity. It appears that an abundance of studies have been conducted with African Americans, but not many studies in particular were conducted with Hispanic adolescents. The goal of this research study was to look at the factors that impact change for Hispanic adolescents who perceived themselves as overweight using the Transtheoretical Model (TTM) of health behavior change by Prochaska and DiClemente [1-3]; Prochaska, et al. [4]; and Prochaska and Velicer [5].

A convenience sample of 80 Hispanic adolescents ages 14-18 and their primary caregivers were utilized in conducting this quantitative study design. A nine-figure silhouette illustration based on the Stunkard Figure Rating Scale (SFRS) was employed to determine the perception of adolescents towards their weight status. In addition, the Exercise: Stages of Change [6] and the 2013 Youth Risk Behavior Survey were used to determine the adolescent stage of change and actions employed for losing weight. The results of the study indicated that the greatest impact on stage of change for adolescent participants was knowing the benefits of weight loss. In addition, results indicated that there was a shared perception between adolescents and their primary care givers as it relates to bodyweight. This was different from other studies which showed a discordance between perception of weight between caregivers and their adolescents [7].

Keywords: Adolescent overweight and obesity; Adolescents' perception of body weight; care- givers perception and parental perception; Childhood overweight and obesity; Hispanic adolescent overweight and obesity; Perception

Introduction

Childhood overweight and obesity remain significant public health problems with a well-recognized spectrum of adverse short and long-term health, social and psychological outcomes [8]. As a result, obesity, in particular childhood obesity, are the focus in the United States (US) of many public health efforts [9]. Some interventions implemented include new regulations for food packages in the Special Supplemental Nutrition Program for Women Infants and Children (WIC) by the US Department of Agriculture. The Centers for Disease Control and Prevention (CDC) has funded state and community level interventions, and there have been numerous reports and recommendations issued by the Institute of Medicine, the US Surgeon General, and the White House [9]. The World Health Organization (WHO), in an October 2017 update on their factsheet on obesity and overweight, stated that childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood [10]. The WHO also reported that being overweight and obese were linked to more deaths worldwide than being underweight [11].

Although the problem of childhood obesity has affected every segment of society in the US, the rates seem to be higher among Hispanic adolescents and lower in Asian adolescents when compared with Caucasian adolescents. This higher incidence of obesity found among Hispanic adolescents appears to be further increasing over time [12,13]. The National Health and Nutrition Exam Survey (NHANES) data for 2011-2014 has shown that 17% of youth were obese. Of this 17%, for adolescents between the ages of 12-19 years old, the prevalence was 20.5%. There was no difference between the sexes [14]. Analyses of obesity trends in children from 1999 through 2014 showed an increase in prevalence between 1999-2000 and 2013-2014, but no change between 2003-2004 and 2013-2014 [14]. The prevalence of obesity among Hispanic children and adolescents was much higher (21.9%) in comparison to non-Hispanic Asian youth (8.6%), non-Hispanic white (14.7%), and slightly higher (19.5%) for non-Hispanic black youth [14].

In the 2016 data from the National Survey of Children's Health (NSCH), the prevalence of overweight and obesity in the state of Delaware was 30.9%, which is significantly higher than the national average of 20.5% with a state ranking of 25. A more detailed review of the data revealed that 39.4% of Hispanic adolescents were overweight or obese in comparison to 23.3% of non-Hispanic White and 33.4% of non-Hispanic Black adolescents [15]. The Youth Risk Behavior Survey [16] implemented by the CDC to monitor certain youth behaviors was another tool reviewed. The 2009-2013 Youth Risk Behavior survey (YRBS) data specific to the state of Delaware showed that high school students in the state were not statistically different than their peers nationwide in terms of the percentage that were classified as being overweight or obese [17]. The data for the 2015 YRBS showed 13.9% of adolescents nationwide as being obese and 16% being overweight in comparison to 15.8% for each of the two groups in the state of Delaware [18].

A review of the obesity fact sheet for the state of Delaware revealed the obesity rate for 2015 as 15.8% with a ranking of 10 among 43 states. The combined overweight and obesity rate was 30.9% with a ranking of 25 of 51 states [19]. Although the ranking of Delaware for childhood obesity has improved from 45 in 2003 to 25, there is still room for improvement [20]. A limited number of research studies were found that looked at Hispanic adolescents' perception of their body weight. Even fewer studies were found in which weight reduction interventions were used [21-23]. A further review of the literature did not produce any research studies that compared the primary caregiver's perception of their adolescents' body weight and the adolescents' perception of their own body weight.

Considering this increasing prevalence of childhood overweight and obesity among Hispanic adolescents nationwide as well as in the state of Delaware, it is of great importance that solutions are found that will effectively control this problem. It was also evident from the research of the literature that studies pertaining to Hispanic adolescents, are under-represented. A limited number of research studies were found that looked at Hispanic adolescents' perception of their body weight. Even fewer studies were found in which weight reduction interventions were used [21-23]. Conducting this research study looking at the adolescents' perception of their body weight, caregivers' perception and factors impacting change will add needed information to the Literature.

Institutional Review Board Approval

Before starting this research study, approval was obtained from Hampton University Institutional Review Board (IRB) and the Nemours Foundation IRB. Following these approvals, written permission was obtained from the outpatient practice that was to be used for collection of data.

Data Collection Procedures

After obtaining the relevant IRB approvals, all adolescent participants were required to give assent or consent in order to participate in the study. The assent form was in English, while the consent form was written in English and Spanish to accommodate the primary caregiver's language of choice. After signing the assent or consent form, the adolescents were asked to complete a demographic questionnaire. Each primary caregiver was assigned the same identification code as their adolescent. Adolescents and primary caregivers were assigned to separate rooms. Following completion of the consent form, the primary caregiver was asked to identify their child's weight according to the silhouettes on the Modified Stunkard Nine-Figure Rating Scale (MSFRS). The research assistant circled 'primary care giver' on the form collected from the primary caregiver to differentiate between the two. After adolescents completed the demographic data, they were asked to identify the silhouette figure that best resembled their own body weight also using the MSFRS. Each adolescent participant was given the silhouette figure corresponding to their gender. The research assistant circled 'adolescents' on the form when collected. In addition, the adolescents also completed the YRBS, and the stages of change continuous measure short form. At the end, anthropometric measurements (height and weight) were taken for each adolescent participant and their BMI calculated and recorded on the demographic questionnaire. Participants had only one visit to the research site, lasting for approximately 15 minutes. Completion of anthropometric measurements took approximately 5 minutes with an additional 10 minutes for the completion of the demographic data sheet and the three instruments that were utilized. Finally, adolescents and their primary caregivers were given an opportunity to ask any questions about the study. Once all questions were addressed, the participants were thanked for participating in the study.

Adolescents who participated in the study received a \$10.00 gift card which were distributed once all questionnaires and measurement were collected. Instruments from each adolescent and caregiver participant were placed in individual folders. All folders were placed in a portable filing cabinet. The cabinet was then locked in a closet in the researcher's office and the key was at all times with the researcher. All the consent and assent forms were placed in a separate folder and filed in a separate locked drawer in the researcher's office.

The YRBS

This instruments chosen for use in this research study were all instruments that have been previously used with the adolescent population to obtain results of perception, stages of change, and factors affecting stage of change. Reliability and validity of these instruments were obtained prior to use. Data collected in a study of construct validity and Figure rating scales, by Adami and colleagues, suggested construct validity of the scale as it confirmed their hypothesis of a positive correlation between Current Body Size and BMI z-score in both sexes. Spearman's correlation coefficient was utilized to verify the correlation between BMI z-score and Current Body Size. Correlation values were 0.62 ($p < 0.001$) for boys and 0.54 ($p < 0.001$) for girls [24,25].

This has been used on a biennial basis since 1990 to measure health risk behaviors of high school students nationwide. The authors conducted a test-retest reliability study of the YRBS by administering the questionnaire to 1,679 students grades 7 through 12. This was done on 2 occasions 2 weeks apart. A kappa statistic was computed each of the 53 self-report items and compared group prevalence estimates across the two testing occasions Kappas ranged from 14.5% to 91.1%; 71.7% of the items were rated as having usable or higher reliability (kappa = 61-100%). No significant differences between the prevalence estimates at time 1 and time 2 [26].

In their study validating the 5 stage of change measures, the authors found that measured variables exhibited a theoretically consistent pattern across stage of change (SOC), suggesting construct validity and potential usefulness for obesity prevention efforts [27].

Inclusion/Exclusion Criteria

Participants were included if they were able to read and write English and if they were between 14 and 18 years of age. Other inclusion criteria were that adolescents were of Hispanic origin and had a BMI at or above the 92%. Adolescents were not disqualified if they had any additional chronic conditions such as diabetes, hypertension or asthma. Participants were disqualified if they were unable to stand un-aided on a scale or if they were unable to read or write English.

Anthropometric Measurements

These measurements, including weight and height, were taken using standardized methods and are included in the demographic sheets. Although height and weight are routinely measured in most clinics, it was important to have them done accurately. Accuracy and consistency of measurements is also necessary for maintaining internal and external validity of the research study.

For this research study weight and height measurements were taken by the research assistant. Participants' weight, without shoes and with light clothing, were measured to the nearest 0.1kg using an electronic scale. To ensure accuracy in measurement, the scale was calibrated by using a known weight on the days of data collection. Prior to each adolescent being weighed, the scale was checked for a zero reading. Height was measured to the nearest 0.1cm using a stadiometer. Adolescents were asked to stand without shoes and socks, with their back against the scale and their head in an upright position. The stadiometer had a fixed vertical back-board and an adjustable headboard. The headboard was lowered until it firmly touched the participant's head and then a direct measure was taken.

From these measurements, the BMI (weight in kilograms divided by height in meters squared) was calculated. The adolescents were then placed in categories (overweight, obese or morbidly obese) using the age-and-gender-specific BMI data of NHANES. Overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children and teens of the same age and sex. Normal weight falls between the 5th and 85th percentile, while underweight includes a BMI that is less than the 5th percentile [28]. Extreme (morbid) obesity is defined as a BMI at or above 120% of the sex-specific 95th percentile on the CDC BMI-for-age growth charts [14].

Modified Stunkard Nine-Figure Rating Scale (MSFRS)

The SFRS has been frequently utilized in research studies to determine perception. The SFRS was adopted from the Danish adoption register, which was previously applied to mental illness [29]. For the purposes of this research study, the SFRS was modified to silhouettes of adolescents with Hispanic features. Permission to modify the silhouettes was obtained. In a research study by Cohen and Pasquet [30], the researchers mentioned that most studies do not use figural drawings or silhouette scales based on real human shapes. It was further mentioned that silhouette scales were used that lacked morphology and color of skin of target population [30].

This Concern Prompted the Modification of the SFRS. It was determined that the adolescent would better identify with a silhouette with their features than with an adult silhouette without a real human shape. The modified silhouettes were composed by a graphic designer and were validated by three different researchers at Nemours Foundation. The SFRS was given to the graphic designer to get the concept of what he was being asked to do. Multiple revisions were completed. Each revision was submitted to the director of the nursing research department at Nemours Foundation. Each time there were corrections these were communicated to the graphic designer for adjustment. On the fourth revision the instrument was approved for use.

Adolescents, as well as their primary caregiver, were asked to identify the silhouette in the series from very thin to very large, that best represented their or their adolescents' current body size.

There were nine male and nine female silhouettes, and participants were given the silhouette representing their gender or their adolescent's gender. The MSFRS was able to determine the adolescents' as well as their primary caregiver's perception of current body size. Survey Question: Included on the demographic questionnaire the participants were asked "what is the greatest impact on your desire to lose weight". There were three choices (a) My primary care giver thinks I need to lose weight, (b) My Peers think I need to lose weight, (c) Knowing the benefits of me losing weight. Participants could only choose one of the three answers.

The 2013 YRBS

This survey is distributed every two years to collect data from high school students grades 9 through 12. The YRBS was developed in 1990 by the CDC to monitor six types of health-risk behaviors that contribute to the leading causes of death and disability among youth and adults. These risks include behaviors that contribute to unintentional injuries and violence, sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection. Other health risk behaviors being monitored are alcohol and other drug use, tobacco use, unhealthy dietary behaviors and inadequate physical activity. In addition, the YRBS also measures the prevalence of obesity and asthma among youth and young adults [31-33].

Eleven Likert-type questions were chosen from the Delaware YRBS which pertained to diet and exercise. The first two of the eleven questions pertained to body weight. In the first question the participants were asked to choose from five answers, how they would describe their weight. The answers ranged from very thin to very overweight. The second question asked the participant to then choose what they were trying to do about their weight. The answers presented ranged from lose weight to do nothing about their weight. The remaining nine questions asked what food participants ate or drank during the previous seven days. Participants were made aware that "Food eaten" included snacks as well as food eaten at home, school, at a restaurant or anywhere else. There were seven answers from which the participant had to choose. These ranged from zero days to four times per day. The use of this instrument helped to decide how the adolescents saw themselves as well as determine the actions taken to address their body weight [32].

Exercise: Stages of Change Short Form

For this instrument participants were given a definition of regular exercise which is any planned physical activity performed to increase physical fitness.

This activity should be performed 3-5 times weekly for 60 minutes per session. Examples of relevant activities were given to ensure participants were clear of what was being asked.

The CDC [34] provides guidance on healthy physical activity habits. It was noted that the national recommendation is that children and adolescents aged 6 to 17 years should have 60 minutes (1 hour) or more of physical activity each day. These guidelines also encourage children and adolescents to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer a variety [34].

Participants were then asked if they exercised regularly according to the definition provided. The five choices were: (a) Yes, I have been for MORE than 6 months, (maintenance stage), (b) Yes, I have been for LESS than 6 months (action stage), (c) No, but I intend to in the next 30 days (preparation stage), (d) No, but I intend to in the next 6 months (contemplation stage), (e) No, and I do NOT intend to in the next 6 months (pre- contemplation stage) [6].

Data Analysis

The Statistical Package for the Social Sciences (SPSS, version 22) was utilized to provide descriptive statistics of the sample population. The distribution of weight perception in relation to BMI-based weight status was examined. Bivariate analyses with chi square (X^2) tests was then conducted examining the correlation between weight perception and BMI-based weight status for each adolescent. A multivariate logistical regression was conducted to examine first the conflicting or discordant weight perception in comparison to concordant weight perception or perceptions that were in agreement.

To assess the adolescent SOC, each adolescent was classified into one of the first four SOC as discussed by Prochaska and Velicer [5] which are pre-contemplation, contemplation, preparation, and action. Bivariate analyses were conducted to see if there was a relationship between the adolescent stage of change and their level of BMI. Additionally, Pearson's correlation coefficient analyses indicated the significant external factors that influenced stage of change and determined the relationship between stage of change and weight perception.

Results

Demographic information of the sample included, gender, age, grade and BMI (Table 1). In addition to the 80 Hispanic adolescents there were also 80 primary caregivers who were all Hispanics and comprised of both sexes.

Gender

Statistics on gender of the adolescents revealed, there were more female participants, ($n = 47$, 58.8%) than were male participants ($n = 33$, 41.3%).

Age

The sample consisted of 80 Hispanic adolescents. whose ages ranged from 14-18 years, with the mean age being 15.6 years (Table 1).

Grade

The majority of the adolescents, ($n = 23$, 28%), were in the 11th grade. A small number of participants ($n = 3$, 2.5%) although 18 years old, had recently completed high school, but had not yet started college. These were the participants categorized as 'Other' (Table 1).

BMI

All of the adolescent participants ($N = 80$) had a BMI at or above the 92nd percentile and were therefore all considered overweight. There was one participant with a BMI of 91.5% that was excluded. The majority of participants ($n = 47$, 58.8%) had a BMI between the 98th and 100th percentile.

Demographic Variable	n	%
Gender		
Male	33	41.3
Female	47	58.8
Age		
14	21	26.3
15	14	17.5
16	26	32.5
17	12	15
18	7	8.8
Grade		
8 th	14	17.5
9 th	17	21.3
10 th	18	22.5
11 th	23	28.7
12 th	6	7.5
Other	2.9	2.5
BMI		
92%	1	1.3
93%	6	7.5
94%	7	8.8
95%	4	5
96%	8	10
97%	7	8.8
98%	17	21.3
99%	12	15
Ethnicity		
Mexican	39	48.75
Puerto Rican	24	30
Dominican	3	3.75
Venezuelan	1	1.25
Brazilian	1	1.25
Columbian	1	1.25
Not Identified	11	13.75

Table 1: Characteristics of the sample population.

A total of 18 adolescents (22.5%) had a BMI in the 100th percentile and fell in the category of morbidly obese or very obese. Only one adolescent, 1.2%, had a BMI within the 92nd percentile. The majority of adolescents (n = 48, 60.1%) fell in the category of obese.

Ethnic Distribution

The majority of adolescents (n = 39, 48.75%) were from Mexican background. The second largest group of participants (n = 24, 30%) were Puerto Rican. Eleven participants (11.5%) did not identify their ethnicity; instead they documented Hispanic/Latino.

	Age	Gender	Grade	Nationality	BMI
N Valid	80	80	80	80	80
Missing	0	0	0	0	0
Mean	15.6375	1.59	2.925	1.35	0.9736
S.D.	1.26535	0.495	1.38505	1.05662	0.02318

Table 2: Statistics.

All the adolescent participants were fluent in English (n = 80). The number of primary caregivers who spoke English versus Spanish or both was not determined. Caregivers were however, given the ability to choose the language they preferred to be communicated in. The consent form as well as the MSFRS were both given to caregivers in their preferred language choice. The majority of caregivers chose Spanish (n = 43, 53.7%) versus English (n = 37, 46.3%). The research assistant, was fluent in both languages.

Research Question 1

The first research question addressed what SOC will the majority of Hispanic adolescents be in, who perceived themselves as overweight. The hypothesis stated that the majority of Hispanic adolescents who perceived themselves as overweight would be in the action stage of change.

To answer this question and test the hypothesis, the researcher first determined which adolescents perceived themselves as overweight (n = 72, 90%). The SOC for this subset of adolescents were then determined by analyzing the answers given on the Exercise: Stages of change (short form). To test the hypothesis, frequencies for stage of change were obtained (Table 3). The majority of adolescents (30.5%, n = 22) were in the action stage as predicted. Females (n = 13, 59%) were more likely to be in the action stage than their male counterparts (n = 9, 40%). Of note, the total number of participants in the maintenance stage was not significantly different (n = 21, 29.1%).

Stage of Change	Total	%	Male	Female
			n	n
Pre-contemplation	3	4.1	1	2
Contemplation	11	15.3	4	7
Preparation	15	20.8	3	12
Action	22	30.5	9	13
Maintenance	21	29.1	14	7

Table 3: SOC of Hispanic Adolescents who perceive themselves as overweight.

Research Question 2

The second research question addressed what factors impact SOC in Hispanic adolescents who perceived themselves as being overweight. The hypothesis stated that Hispanic adolescents' SOC would be impacted by their primary caregiver.

To answer this research question and test the hypothesis, frequencies for impact on SOC were obtained (Table 4). Knowing the benefits of losing weight was reported as having the greatest impact on SOC (n = 50, 69.4%). The least impact on SOC was that of their peers (n = 3, 4.2%). The number of adolescents who were impacted by their primary caregivers was (n = 17, 23.6%).

Impact on Change	n	%
Primary care giver	17	23.6
Peers	3	4.2
Knowing the benefits	50	69.4
Not reported	2	2.8

Table 4: Greatest impact on SOC.

Research Question 3

The third research question addressed when shown silhouettes of various body sizes, what percentage of Hispanic adolescents will correctly perceive a body size that is similar to their actual body weight? The hypothesis stated that approximately 50% of Hispanic adolescents, when shown silhouettes of various body sizes, would choose a body size similar to their actual body weight.

To answer this research question and test the hypothesis, frequencies for silhouette perception of weight were obtained (Table 5). As shown, (n = 46, 58.8%) selected a body size similar to their actual body size. Interestingly (n = 25, 31.3%) of participants perceived themselves as being overweight, while (n = 12, 15%) of participants perceived themselves as obese and (n = 9, 12.5%) perceived themselves as morbidly obese.

	n	%
Silhouette 1 (extremely underweight)	2	2.5
Silhouette 2 (underweight)	13	16.3
Silhouette 3 (normal weight)	5	6.3
Silhouette 4 (normal weight)	4	5
Silhouette 5 (normal weight)	8	10
Silhouette 6 (overweight)	9	11.3
Silhouette 7 (overweight)	16	20
Silhouette 8 (obese)	12	15
Silhouette 9 (morbidly obese)	9	12.5

Table 5: Silhouette perception of weight.

Only (n = 15, 18.75%) of participants correctly chose a silhouette that was their actual body weight. Although all of the participants were overweight, only (n = 2, 2.5%) chose a silhouette that was extremely underweight. A significant number (n = 13, 16.3%) chose a silhouette that was underweight, and (n = 17, 21.3%) selected a silhouette that was normal weight.

Research Question 4

The fourth research question addressed what percentage of adolescents, when asked if they considered themselves as overweight, normal weight or underweight, will correctly perceive themselves as being overweight? The hypothesis stated that 40% of Hispanic adolescents, when asked the question about being overweight, normal weight or underweight, will correctly perceive themselves as being overweight. To answer this research question and test the hypothesis, frequencies of adolescents' perception as revealed from question one on the YRBS instrument was conducted (Table 6).

Word description	n	%	Male	Female
Very underweight	1	1.3	n 0	n 1
Slightly underweight	2	2.5	0	2
About the right weight	5	6.3	4	1
Slightly overweight	41	51.2	19	22
Very overweight	31	38.8	10	21

Table 6: Adolescents' perception of weight using the YRBS.

The majority of participants (n = 72, 90%) described themselves as being overweight. Of this number, (n = 43, 59.7%) of females described themselves as overweight in comparison to (n = 29, 43%) of males. Of the eight participants who did not describe themselves as overweight, (n= 1, 1.3%) described himself as very underweight, while (n = 2, 2.5%) described themselves as slightly underweight. The majority (n = 71, 98.6%) of the 72 participants who perceived themselves as being overweight indicated they wanted to lose weight as revealed from responses to question two on the YRBS instrument (Table 7). There were (n = 30, 37.5%) of participants who accurately chose their actual body weight.

Choices	n	%
Lose weight	71	98.6
Gain weight	0	0
Stay the same	1	1.4
Not doing anything	0	0

Table 7: Action by participants who perceived themselves as overweight.

In looking at the eating habits of adolescents who wanted to lose weight (n = 71), it was noted that three adolescents (4.2%) indicated drinking juice four or more times per day while (n = 12, 16.9%) had no fruit juice in the past seven days (Table 8). Six adolescents (8.4%) had fruit four or more times per day, 10 adolescents (14%) did not have any fruit in the last 7 days. No adolescent indicated eating green salad, potatoes, carrots or soda four or more times per week. One adolescent ate other vegetables four or more times per day (1.4%). Two adolescents (2.8 %) had milk 4 or more times per day, and 12 had no milk in the last seven days (16.9%). There were 31 adolescents (43.7%) who ate breakfast four or more times per week (15 females and 16 males), and seven adolescents (8.9%) had no breakfast in the last 7 days. From these results, although 71 adolescents indicated they wanted to lose weight, there were only (n = 22, 30.5%) adolescents indicated being in the action stage of change and (n = 21, 29.1%) in the maintenance stage. It was noted that only six adolescents met the daily requirement for fruit intake and only one met the requirement for vegetable intake.

Action	Did not	%	4/more/day	%
100 % juice	12	16.9	3	4.2
Eat fruit	10	14	6	8.4
Eat green salad	41	57.7	0	0
Eat potatoes	39	54.9	0	0
Eat carrots	49	69	0	0
Other Vegetables	18	26.7	1	1.4
Drank soda	23	32.4	0	0
Glasses of milk	12	16.9	2	2.8
Ate breakfast	7	8.9	31	43.7

Table 8: Eating habits of adolescents who perceive themselves as overweight.

In table 9, we see correlations between weight related variables. This study found the highest correlation to be between primary caregivers' perception (r = .787, p < 0.01) and adolescents' visual perception. There was also a strong correlation between the primary caregiver's perception and their adolescents' BMI (r = .547) indicating that the higher the BMI the larger the silhouette that was chosen. Furthermore, there was no significant correlation found between adolescents' description of their weight and their visual perception of their weight (r = .188).

Subscale	1	2	3	4
1. Primary caregiver's visual perception	1	.547**	.247*	.787**
2. BMI		1	.238*	.323**
3. Adolescents' description of weight			1	0.188
4. Adolescents' visual perception				1
* p = .247, and .238, ** p < .01				

Table 9: Correlations between weight-related variables.

Discussion

Hypothesis 1

This hypothesis proposed that the majority of Hispanic adolescents who perceived themselves as overweight would be in the action stage of change. This hypothesis was slightly supported by the research findings as demonstrated by the frequencies for SOC obtained which showed that a slight majority of participants (22, 30.5%) were in the action stage (Table 2).

These results differ from Bourdeaudhuij, et al. [35] study, which looked at adolescents and stage of change, which showed that there were more adolescents in the maintenance stage than in the action stage. Sanaeinasb et al. [36] findings also differed, showing that the majority of adolescent participants were in the preparation stage, followed by contemplation and thirdly the action stage. Although the hypothesis was supported, it was noted that the number of participants in the maintenance stage was not significantly different. In this study more females than males were in the action stage. It is noteworthy to mention that none of the studies guided by the TTM used participants that were of a single ethnicity, which suggests that race could have impacted the results of these studies and the present study. Some of the research studies reviewed [21,37,38] investigated Hispanic adolescents as a subgroup and then compared them with other subgroups such as non-Hispanic blacks, non-Hispanic whites and Asians. Future research studies guided by the TTM are needed that will look solely at Hispanic adolescents.

Hypothesis 2

The second hypothesis stated that the Hispanic adolescents' SOC would be mostly impacted by their primary caregiver. This hypothesis was not supported from the results. The majority of adolescents indicated that the greatest impact on stage of change was knowing the benefits of losing weight. However, primary caregivers ranked second in having the impact, followed by peers.

The result, while contrary to the proposed hypothesis, was similar to other research studies looking at reasons adolescents change [39,40]. Zaitsoff and Taylor [40] looked at adolescents with eating disorders and found that quite often there was ambivalence about recovery by these adolescents. The reason for this ambivalence, according to this study, may be related to the treatment outcome of the program in which they participated. This differs from the present study as adolescents indicated that knowing the benefits of losing weight impacted their reason for change. In another study Mei-Yen and associates [39] investigated if overweight adolescents perceived the need to reduce weight and take healthy actions. They found overweight adolescents who perceived a need to reduce weight had significantly higher action-taken rates. These adolescents had higher scores on life appreciation, social support, stress management and exercise [39]. This also differs from this study where although adolescents acknowledged that they needed to lose weight, less than half of them were in the action stage of change.

Hypothesis 3

This hypothesis proposed that approximately 50% of Hispanic adolescents when shown silhouettes of various body sizes will choose a body size similar to their actual body weight. This hypothesis was supported in that 58% of adolescents chose the correct body size. Of this number, 6.5% were males and 93.5% were females. The literature supports Hispanics consider overweight as meaning one is healthy and strong [7].

These results were also similar to a study conducted by Ceballos and Czyzewska [41]. The researchers also utilized silhouette drawings based on the figure rating scale to assess body image. In addition to the silhouettes, participants were asked to select words from a checklist of 16 positive, and 16 negative adjectives that they felt best described the personality traits of the target figure. This study sample included 71.5% Hispanic and 28.5% European Americans (EA) adolescents. Females represented 60% and males 40% of the entire sample. Gender distribution among the Hispanics were 43% males and 57% females [41]. The researchers found that participants with an unhealthy BMI selected larger body figures than did participants with a healthy BMI [41]. In addition, it was found that the Hispanic/Latino male participants showed a significantly less negative attitude towards the obese male body silhouette when compared with the EA male participants. This ethnic difference was not significant among female participants. There was no comparison between male and female Hispanic/Latino participants. On a whole, females were shown to be more dissatisfied with their bodies ($p < .001$) than males [41]. This result by Ceballos and Czyzewska [41] showing females being more dissatisfied with their bodies is loosely similar to results of this study, which showed a greater percentage of females identifying themselves as overweight.

Hypothesis 4

This hypothesis proposed that approximately 40% of Hispanic adolescents when asked the question about being overweight, normal weight or underweight would correctly perceive themselves as being overweight. The results obtained did not support this hypothesis. More than 90% of participants perceived themselves as being overweight. Of this number, more female participants 59.7% perceived themselves as overweight in comparison to male participants 43%. These findings are similar to the 2013 YRBS conducted where 40.3% of Hispanic females and 27.1% of Hispanic males described themselves as being overweight.

When comparing Hispanic adolescent females' responses to that of White and Black females, it was observed that a higher percentage of adolescent Hispanic females described themselves as overweight (40.3%) compared to Blacks (33.4%) and (35.8%) Whites [32]. Similarly, results from the 2015 YRBS showed more females (38.2%) than males (25.3%) describing themselves as being overweight. When reviewed by race, Hispanic adolescent females (45.3%) described themselves as overweight, versus White females (35.7%), Black females (34.9%); White males (24.9%), Black males (20.9%) and (28.0%) of Hispanic male (CDC, 2016b).

Hispanic adolescents' desire to lose weight indicated a higher percentage of females (60.6%) were trying to lose weight when compared to males (31.4%). When assessed by race, Hispanic females (66.4%) had a higher tendency to lose weight than (40.0%) Hispanic males [42]. It was not determined from the present research study if more females were trying to lose weight versus males. The reason was due to the sample size and the fact that there were more female participants than male participants.

Ancillary findings. Further analysis of the data revealed ancillary findings that are noteworthy and will now be discussed. It was noted that although the majority of participants who perceived themselves as overweight (98.6%) wanted to lose weight, a smaller percentage (36%) were in the action stage of change. The findings suggest that there is some hesitancy in taking action for change. It is possible that these individuals were having a problem with decisional balance of weighing pros and cons for change. Prochaska and Velicer [5] mentions decisional balance as one of the dependent measures determining when change occurs. Decisional balance reflects the individual's relative weighing of the pros and cons of change [5]. It is possible that these individuals were having a problem with decisional balance of weighing the pros and cons for change [5]. It was also noted that of the adolescents (98.6%) who wanted to lose weight, the majority (90%) were not meeting the recommended requirements of eating five servings of fruits and vegetables daily.

From previous studies [41,43-46] looking at weight perception of adolescents and weight perception of parents of their children, it was shown that there was a difference between parents' perception of their child's weight and the child's actual weight. Similarly, the adolescents perceived weight and actual weight was also different. As a matter of curiosity and having available data, Pearson's correlations were computed between primary caregiver's visual perception of BMI, adolescents' visual perception of BMI, as well as adolescents' description of weight. The results showed the highest correlation between primary caregivers' visual perception and adolescents' visual perception followed by primary caregivers' perception and their adolescents' BMI indicating that the higher the BMI the larger the silhouette that was chosen. It is apparent that parents do have an accurate perception of their adolescents' body weight. There was no significant correlation found between adolescents' description of their weight and their visual perception of their weight. Although adolescents perceived themselves as overweight, they did not describe themselves as such.

Tarassenko and colleagues [8], explored the accuracy of perception of child overweight and obesity by the children themselves, their guardians and by their HCPs. Additionally, they explored the degree of agreement between their perceptions, and relationships with weight loss attempts. It was noted that parents who failed to recognize that their child is overweight or that their child's weight is a health problem are usually less likely to be ready to make changes to help their child lose weight [8]. Tarassenko and colleagues [8] utilized weighted percentages; sensitivities and Cohen's kappas; and adjusted prevalence ratios to analyze their data. The results showed that the sensitivity of guardians' perception among overweight children who perceived themselves as such was a fair to slight agreement.

Guardians' perception among obese children perceiving themselves as such was fair [8]. Unlike the results by Tarassenko and colleagues [8], the results of this present study showed some significance between the primary caregivers' visual perception and BMI.

Limitations of the Study

This research study was developed to identify if Hispanic adolescents who are overweight perceived themselves as such and to determine what they were doing about their weight. Although the majority of adolescents were in the action stage, the reasons other adolescents remained in the pre-contemplation and contemplation stage were not identified. If adolescents were satisfied with their weight, this may have been a contributory factor to why they were in the pre-contemplation and contemplation stages of change. If the availability for adolescents to eat healthy and to exercise is known, it would help to identify other reasons adolescents were not in the action stage of change. The researcher is unsure why adolescents did not have the required servings of fruits and vegetables and were not eating breakfast every day. It was not known if fruits, vegetables and breakfast were available. There were a few participants who, although they met the age requirement, were not yet in high school, and the YRBS questions used were developed for high school students. Although the questions appeared straightforward, interpretation could have been affected for students who were not yet in high school. Another limitation of the study was using all participants that were overweight. Having some participants at a healthy weight or slightly underweight would perhaps lend more validity to perception of underweight, overweight or normal weight. In addition to increasing validity it would be helpful to see if these adolescents with a healthy weight or those slightly underweight would perceive themselves correctly. Another limitation to the study is that all the participants were from the same geographical area and health care facility. It is possible that the practices by the healthcare providers at this facility may have impacted the adolescents' perception of their weight, and their efforts to implement lifestyle changes. The results of the study apply to other Hispanic adolescents in the geographical area; the results cannot be generalized to Hispanic adolescents on a whole. The socioeconomic status of the families was not obtained for the present study. The socioeconomic status of families may affect availability of fruits, and vegetables and ability to exercise. The sample size was not large enough to further examine the relationship between age and perception of being overweight. Additionally, the instrument utilized to look at stage of change did not identify types of activities.

Implications for Nursing

It is critical that health care providers become active participants in the war against childhood overweight and obesity. One very effective strategy is for every child to be screened. It is also important that if a child is identified at risk for being overweight or is overweight, that education is provided on healthy attainable goals for achieving and maintaining a healthy weight. In addition, due to the psychological effects of overweight and obesity that adolescents face it is imperative that this problem is considered a priority by healthcare.

It was demonstrated from this study that the greatest impact on the Hispanic adolescents' desire to have a healthy lifestyle was not their peers or their primary care providers, but the adolescents themselves knowing the benefits of losing weight. Healthcare providers should routinely discuss the benefits of weight loss, as this serves as motivation for overweight and obese adolescents to choose a healthy lifestyle. Scheduling regular follow up appointments for adolescents who are overweight is also necessary to track their progress. During follow up appointments, providers should acknowledge and praise every positive change regardless of how small, as this will serve to encourage the adolescent in their effort to lose weight. It takes a series of processes both overt and covert to move from one stage to the next. Encouragement and praise can be one of the processes utilized to help the adolescent to move through the stages [5].

The problem of overweight and obesity is rising at a tremendous rate among Hispanic adolescents [9,47,48]. This suggests that Hispanic adolescents are an "At-Risk" group. Learning more about the Hispanic culture especially as it pertains to dietary habits would be advantageous when planning care.

This study explored stage of change of Hispanic adolescents who are overweight. Knowledge of perceptions can help focus on moving the adolescent from one stage to the next. The TTM of behavior change can be used more often in nursing research, complementing the nursing theories that are presently in use. Other approaches to health promotion tend to focus primarily on social or biological influences on behavior, the TTM focuses on the decision making of the individual [49]. The decision made by the adolescent identifies their readiness to change which is important to know so that health education can be focused on the individual's readiness and not just on their being overweight or obese.

Recommendations for Further Research

As the problem of childhood obesity continues to loom in our society especially among Hispanic adolescents, it would be expedient to assess if Hispanic adolescents utilize available resources in their community conducive to weight loss. Exploring reasons that hinder progress through the stages of change for Hispanic adolescents would be valuable for future study. Using the exercise stage of change continuous form questionnaire rather than the exercise stage of change short form should be considered for future research. The exercise stage of change continuous forms contains 24 rather than five questions and asks more detailed questions about exercise habits. Additionally, looking at types of activities adolescent males engaged in versus adolescent females for weight loss is an area for further research. Reducing the problem of overweight and obesity among Hispanic adolescents will greatly benefit from these suggested recommendations for further research and is necessary to provide a strong evidence base for programs and policies.

Conclusion

The rise of overweight and obesity among Hispanic adolescents remain an area of great concern that leads to short and long-term health problems. Although not well used in adolescent research, the Transtheoretical Model of Behavior Change is effective in recognizing the adolescents' stage of change to alter their weight. The results of this study demonstrate that adolescents who perceive themselves as overweight are cognizant to actually do something about it. The research also shows that there is a difference between adolescents' visual perception of their body weight and their word description of their weight. This suggests that adolescents respond better to how they see themselves. Adolescents' perception of their BMI is similar to that of their primary caregiver's perception of the adolescents BMI, which is different from what is seen in the literature.

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