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Research Article

What is the Relationship among Actual Body Image, Desired Body Image and Body Mass Index in 7-12 Year Old Children?

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Abstract

Purpose: The aim of this research project was to gain a better understanding of a child's perception of actual body image and desired body image compared to Body Mass Index (BMI). The study assessed the relationship among actual body image, desired body image, and BMI for the entire sample group and the subgroups of Hispanics and non-Hispanics. **Design:** A descriptive, correlational study of a convenience sample of children (n=80), ages 7 to 12 years old was conducted. **Methodology:** Using a standardized clinical protocol, demographic and growth measurement data were collected by trained clinic personnel with children who met project criteria. Clinic personnel obtained consent from parents and children, administered the Collins' pictogram body images, and determined current school grade, insurance status, and free/reduced lunch program participation. The main research instrument was the two-question pictogram containing Collins' seven gender specific child body pictogram/ silhouette figures of thin body image to an obese body image. Data were analyzed using Spearman correlation coefficients to assess the relationship between actual body image, desired body image, and BMI. **Findings:** Among the total sample of 80 children, actual body image and BMI/percentile were significantly correlated (46%) as was actual body image with desired body image (35%). BMIs for overweight and obesity accounted for 40 percent of the entire sample of participants. In the sub-group of ethnicity, actual body image and BMI showed a significant association (rho 42%) in the Hispanic population. Actual body image and BMI had a moderate association (38%) as did actual body image and desire body (42%) image among the non-Hispanic population. Half of the Hispanic participants were either overweight (14%) or in the obese (36%) category. Non- Hispanics had 18% in the overweight category and 14% in the obese category. **Conclusion:** The findings from this descriptive, correlational study may be useful to clinicians who address the health issues of childhood overweight and obesity with their patients. The correlation of 46 percent between actual and BMI percentile demonstrated a 25 percent R2 showing that 25 percent of actual body image was accounted for by BMI. Actual body image was significant in ideal body image in the entire sample, although to a lesser extent than actual to BMI. Hispanic children were over twice as likely to accurately perceive actual body image compared to non-Hispanic children. Hispanic's actual body image did influence desired body image. More research is recommended in the use of pictogram in a clinical setting with a larger population.

Keywords: Childhood obesity; Body image; Hispanic obesity

Introduction

For the first time in generations, children of the 21st century will have a shorter life span than their parents [1]. Death often will result directly from consequences of obesity. Diseases of high cholesterol, high blood pressure, heart disease, type 2 diabetes, stroke, gallbladder disease, fatty liver, osteoarthritis, sleep apnea, and many diseases are clearly linked to obesity [2]. Childhood obesity is the single reliable predictor of likelihood of chronic diseases and the longevity of a child's life.

Children who are overweight are receiving significant attention in the United States (U.S.). The U.S. ranks number one among developed countries as being the fattest in the world [3]. The prevalence of obesity was 19.3% and affected about 14.4 million children and adolescents between 2-19 years of age during 2017-2018 [3]. In 2017 and 2018, obesity prevalence was 25.6% among Hispanic children and 24.2% among non-Hispanic Black children [3]. Childhood weight affects all age groups, gender, races/ ethnicity, and economic levels in American society. According to CDC statistics, thirty-six percent of girls and thirty-five percent of boys are overweight or obese in the United States. The percentage of overweight or obese individuals tends to be higher in African and Hispanic children as well as children living in the southern region of the U.S [2]. According to CDC's national weight figures, Caucasian girls account for 25.6 percent of being overweight as Hispanic girls account for 38.6 percent and 41.3 percent of Black girls. The percentage for boys was broken down to Caucasian boys making up 30.1 percent, Blacks 36.9, and Hispanic at 40 percent. The American Academy of Child and Adolescent Psychiatry, 2011 noted children who became overweight or obese early in life have an 80 percent chance of becoming an obese adult and of having a poor body image perception [4].

Body image is a subjective concept of physical appearance based on self-observation and environment. Definition of actual and ideal body image varies among cultural groups, within ethnic groups, and within any other peer group to which a child belongs. A study by the University of Michigan noted that children who are obese are more likely to be bullied than their non-obese peers regardless of sex, race, socioeconomics, social skills, or achievement skills [5].

Misperception of body image has important implications for maintaining a healthy body. Very few studies have examined the relationship of body image perception and body mass index in children six to twelve years old and a limited amount of research has been done with regards to Hispanic children's perception of body image. Every culture in the world stresses specific ideals of body image that are influenced by culture and the physical environment. While many cultures idealized slender and average body image, overweight and obesity are very much idealized in Hispanic and Black races [5].

Body image perception is developed over time and changes during the course of one's lifetime and can affect ones' perception of weight. Body image satisfaction is being content with one's concept of actual image compared to desired image. Children, at an early age, are concerned with appearance and fitting in with their peers. Kostanski & Gullone showed children as young as eight years old report having high levels of body dissatisfaction and fears of being overweight. Studies put a child's age as young as three years old worrying about being "fat" [6-8]. Understanding a child's body image perception is crucial to implementing prevention and treatment programs.

With the United States government spending hundreds of millions of dollars educating Americans to eat less and exercise more, why are childhood obesity prevention programs not having more success? Assessing a child's body image perception of actual weight with desired may allow practitioner to determine if an unrealistic body image exists and an opportunity to initiate obesity prevention programs.

Project Problem

Body Perception

The area of body image is not new. An article Rosen and Ross, reviewed a study done in 1953 by Secord & Jourard that looked at satisfaction with body image and satisfaction with self-concept as positively related [9]. What is new is research that asks children about their views on body image. According to Rees, Oliver, Woodman, and Thomas, children are aware of their actual body image and are 75 percent accurate in assessing their own body shape when selecting from validated tools such as the Collins' pictogram. By the time children reach the age of twelve, they will likely judge the acceptability of their own body image with dissatisfaction.

Race/Ethnicity

The United States has an epidemic obesity problem with children of all races and ethnicities [1]. Hispanic children have higher risk factors toward overweight or obesity [1]. The concern to the United States is that the Hispanic population as the majority ethnicity group in America will bring many health risks of chronic diseases and medical cost. With their disposition to overweight problems and risk of growing up to become obese adults, the risks related to chronic diseases will put a financial burden on the United States. As previously noted, eighty percent of overweight or obese children will remain overweight or obese in their adult years [1]. Few studies have been done examining the prevalence of body

dissatisfaction in Hispanic children especially in 6 to 12 year old [10]. Gardner, et al. acknowledged that "very little is known about how Hispanic children view their body size" [11].

Many studies have shown that young Caucasian, Hispanic, and Native American females are more likely to have body image dissatisfaction than Asian and African females [12,13]. Body dissatisfaction puts women at greater risk for body image distortion [12]. Existing studies on males reveals that males are less likely to show preference on body size. Thinner bodies are preferred and accepted by Caucasian females while African females prefer bodies with extra weight, especially in the buttock.

Misperceived Body Self-Image

Body image is one's perception of self, based on cultural standards, family, friends, media, and one's own standards of attraction and feeling good. According to research study from the University of Texas Medical Branch at Galveston, Texas, men and women misperceived body weight by nearly 25 percent [14]. Rahman, et al. identified 82 percent of African American woman and 75 percent of Mexican-American women met the BMI criteria for being overweight or obese and more likely than white women to misjudge their weight as being normal [14]. Chang and Christakis identified self-perception of weight appropriateness as an important component of weight-loss behavior [15]. The findings were consistent with previous studies of showing white women and girls are more likely than other races to experience body dissatisfaction and admit to feeling overweight, thus will start exercising and monitoring nutrition.

If overweight adults have a misrepresentation of their self-perception, overweight children may not be immune to thinking they too have normal weights [16]. A study by Maximova, et al. showed that "children who live in the same environment in which people see on a daily basis, such as parents and schoolmates who were overweight or obese, may develop inaccurate perceptions of what constitutes appropriate status" [17]. McCullough, et al. noted an increased BMI in children is associated with lower self-perceptions of social acceptance and physical appearance [18]. Not being socially accepted leads to loneliness that further disconnects children into perceiving of having a normal self-image [19].

Measuring Body Dissatisfaction

Current literature indicates the need to understand children's perceptions of body image. Children of different races have different views of body image. African Americans were less concerned with body image than Caucasians' [20]. African Americans and Hispanic adults tend to be satisfied with a bigger body frame and less likely to consider themselves as obese [21]. Silhouette picture are a popular means to assessing body image attitudes and perceptions [22]. According to Pulvers, et al.,

silhouette drawings were a popular means of assessing body image attitudes and perceptions due to their minimal cost, low participant burden, and ease of administration" [22]. One of the most popular figure rating scales was developed by M.E. Collins in 1991, while researching pre-adolescent children [23]. Collins figures consisted of two identical sets of female and male silhouettes. Participants would mark their perception of their current body image and desired body image [24]. King & Murray described Collins' Body Image instrument as being free from detail and ethnically neutral [23].

Body figure rating scales were used to assess self-perception. They were simple and quick to use. The body figures were silhouette of children in a variety of different shapes. Bias was reduced, as the scales require less verbal fluency to comprehend and makes them especially appealing in the assessment of children [25]. Collins examined the reliability and validity of body figure rating scales. Reliability and validity were consistent with prior studies showing body figures rating scales as valid measures of body image [24,26].

Truby and Paxton developed a children's gender-appropriate scale to measure adiposity using a seven body scale [25]. The body figures produced ordinal data and were translated to interval scales [25]. A one-way analysis of variance (ANOVA) was used to compare the difference between actual and perceived body image. Their findings support the reliability of using body figures as indicators toward body size. Another study by Truby et al. analysis body image scale findings by using Pearson correlations to measure BMI and body image. The test-retest reliability of scores derived from the study was examined using paired t tests and Pearson product moment correlations [27].

Project Framework

The Self-Discrepancy Theory was the selected framework for this project. Tory Higgins developed the theory as a means to understand and explain the different types of discrepancies that exist between self representation and motivational predispositions that allow humans to achieve equilibrium among the perception, emotion, imagination, and physical being [28]. The theory assumes humans are motivated to achieve balance among the inner self with the outer self. Only when equilibrium is achieved are humans happy with their body. The theory proposes inconsistencies will arise if balance is not met and will lead to psychological discomfort and negative behavioral emotions. Negative body image has often been a risk factor for behavior problems--obesity as well as having an eating disorder as anorexia or bulimia.

The theory has three basic domains of self: the *actual* self, the *ideal* self, and the *ought* self [28]. Higgins described the domains as: (a) the *actual* self-representing the attributes that one believes of actually possessing or others view as having, and is a

person's basic concept of who one is; (b) the *ideal* self-representing "the attributes that someone (yourself or another) would like you to have or possess" and motivates self to change, improve, or achieve; and (c) the *ought* self-representing "the attributes that someone (yourself or another) believes that one ought to possess. Higgins proposed that there are two views looking at *self*; 1) from an individual's standpoint, and 2) significant others (parents, medical providers, and peers). Discrepancies between one's own self-concept and others self-concept could produce an identity crises, especially during adolescence when it is a time to explore and learn about themselves. Sometimes a child's self-image does not necessary reflect reality [29].

This study looked at the actual/own vs. ideal/own of the Self-Discrepancy Theory. Examining one's perception of self and comparing this perception to actual weight, ideal weight, and BMI, may determine if there was an unrealistic view of a child's body image. More importantly, the study will be looking at the correlation between actual body weight, ideal body weight, and body mass index/percentiles. The discrepancy results when there was a difference between an individual's actual attributes and the ideal attributes that one wishes or desire to possess [28]. The unrealistic perception will be important in treating children who are overweight or obese. If there was a mismatch between self-image and ideal self then this is likely to affect how one see himself [30].

The Self-Discrepancy theory provided the theoretical framework for this study as to the possible relationships among actual image, desired self-image, and BMI. Self-discrepancy theory was beneficial to this study because it provided an insight that children may not have expressed. Sometimes what is not being said is more important than what was said. Body figure scales allow children to express their self-image without having to speak in a clinical setting.

Project Objectives

The purpose of this study was to determine the relationship among actual body image, desired body image, and BMI in 7-12 year-old children. The study had four objectives:

1. Assess child's actual self- image,

2. Assess a child's desired body image,

3. Assess relationship between desired body image and actual body image, and

4. Determine if a correlation exists among actual body image, desired body image, and BMI for the

a) Entire sample

b) Hispanics only subgroup

c) Non-Hispanic only subgroup

Methods and Procedures

Project Design

The proposed project was designed as a descriptive correlational study investigating the relationship among self-body image (actual), desired body-image and BMI. Empirical data were collected through the use of a convenience sample of 7-12 year old children at a pediatric clinic in West Texas. The data were collected by medical assistants and a nurse manager who obtained the required demographics from electronic medical records and interview-based questions. Prior to the recruitment of participants, the study received Institutional Review Board (IRB) approval from the University of Texas at Arlington and a Letter of Agreement from the clinic to collect data.

Data were obtained from a single patient encounter by clinic personnel trained in data collection process by the primary investigator, and personnel who completed the National Institute of Health web-based training course "Protecting Human Research participants" and signed a letter to collect data. Clinic personnel observed clinical standardized, practice guidelines when obtaining data so as not to deviate from clinic work protocol. Clinic personnel collected demographic data from participant, parent, and EMR regarding age, gender, race/ethnicity, current grade, insurance, and free/reduced lunch. Clinic personnel called participant from waiting room to exam room after having signed in for their appointment. Upon entrance to clinic, the participant were weighed and measured for height before being escorted into the exam room. It was at this time the clinic personnel introduced the study if participant met the criteria of being between the ages of 7 through 12 years old. Participants (child and parent) were educated on the aim of the study of exploring a child's perception of how they viewed their body in relation to height and weight. They received an information sheet outlining the study with a participation form attached. The information sheet was presented on a 7-year-old reading level to both child and parent(s) for all to understand the study. Participation required a signed consent/assent form from both child and parent. Participants were told they could refuse to give consent for participation without repercussion. Participants were also told they could stop at any time during the study.

In order to reduce bias, the participants were provided a gender-specific pictogram prior to being seen by the medical provider. The children who met criteria completed a two question pictogram questionnaire on the actual body image and desired body image as they looked at Collins' children images of seven figures ranging from very thin to obese [24]. Actual body image was defined as their current body image. Desired body image was defined as the body they would like to have. Both questions

showed the same seven images so as not to confuse the participants. Clinic personnel were instructed to ask the participant whether they wanted to circle the figure after hearing the question or allow the clinic personnel to circle the figure after hearing the question asked. The only questions asked to the participant and parents were in regards to "free or reduced" lunch at school and current school grade. Information about age, gender, insurance, race, height, weight, and BMI was obtained from the electronic medical record by the clinic personnel.

Population and Sampling

The population for this project consisted of children, 7-12 years old, who were seen at the West Texas Medical Association Pediatric Clinic. In order to obtain a large enough sample, children eligible for the project included all race/ethnicities between the ages of 7 to 12 years old who agreed to participate in the study by having written consent from a parent and child.
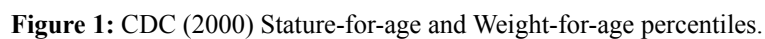
Measurement Methods

Data obtained was per a standardized protocol. Trained health certified medical assistants collected standardized measurements of height and weight. As per clinic protocol, participants were measured in lightly dressed clothes and without shoes when being weighe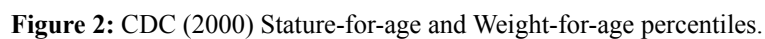d and measured for height. An electronic, calibrated scale was used to obtain the precise weight to a tenth of the decimal point. Height was assessed by having children standing with feet together with back against an eight-foot measuring stick fastened to the wall. Children were instructed to stand tall and straight as the medical assistant used a level T-square that rested upon a child's head for precise measurement reading.

Body Mass Index

Body Mass Index was calculated using the clinic's electronic medical record program. The program uses the CDC recommended BMI calculations of weight (in pounds) dived by height (inches). For those forms that did not have the BMI, the primary investigator used the formula, =(I:I*703)/H:H^2, to calculate BMI. Following the CDC's gender specific BMI Index-for-age percentiles, a percentile score was established by the primary investigator of this project (Figures 1 and 2). The CDC uses one of four categories to classify the BMI percentile [1]:

- Underweight – BMI is below the 5th percentile

- Normal weight – BMI is at or above the 5th percentile and below the 85th percentile

- Overweight – BMI is at or above the 85th percentile

- Obese - BMI is at or above the 95th percentile

Figure 1: CDC (2000) Stature-for-age and Weight-for-age percentiles.

Figure 2: CDC (2000) Stature-for-age and Weight-for-age percentiles.

Pictogram and Questionnaire

A pictogram of Child Figure Drawing Scale by Dr. Collins was used (Appendix A) [24]. Permission was obtained to use the Collins instrument as long as credit was provided in the study's reference page. The Likert scale is a pictorial instrument of seven gender-specific body images of the same height illustrating body weight from very thin to obese. The Collins' tool was used in conjunction to the questions being asked test to assess actual image and desired body image. This study incorporated two identical sets of seven gender-specific body images with a two question questionnaire. The body images used in the form were not assigned weight classification so as not to influence the selection of body image. The first question "circle the child that you look like" is listed prior to the 1st set of gender-specific figures. The second question asked "circle the child you want to look like" and is listed in front of a new "seven gender-specific image" set of children. The Collins' pictorial instrument had a retest reliability coefficient of 0.71 and 0.59 on a sample of 43 participants when identifying self-identity and ideal self [10]. Fisher, et al. considered the retest reliability as acceptable in his research study [10]. Significant correlation between selected figures and actual body size (measured by BMI) has been found in children as young as seven years old. According to Peterson, Ellenberg, and Crossan, BMI has received recognition as an important measurement in body image literature. This method has shown good test-retest reliability and has been widely used in body image research [26]. BMI percentiles were used as they are easier for clinicians to recognize and understand than BMI.

Data Analysis

There were 81 questionnaire and data forms for data analysis. All forms met criteria for inclusion except for one form that was omitted as it was an outlier and it was believed that participant may have misunderstood the questions being asked.

Data were entered into an Excel Word spreadsheet and transferred for analysis using SPSS, a statistical analysis and data management software system. Data was analyzed with Spearman correlation coefficients to assess the relationship between actual body image, desired body image, and BMI. A University of Texas at Arlington statistician, reviewed findings and assisted in accuracy of computation as well as interpretation of data figures.

Data collected was analyzed using International Business Machine (IBM) Statistical Package for Social Sciences (SPSS) Statistics Premium Grad Pack, version 20.0, a statistical analysis and management software system. Data was first looked at by descriptive statistics for an overview view. Power analysis using G*Power 3.1 for study was calculated using an anticipated r of .30, power of .80, and alpha of .05 [31]. Spearman's Ranked Ordered Correlation Coefficient was used to analyze the data and indicated correlation among ordinal variables. Effect size of rho results were determined to be:

- small >= 0.10

- moderate >= 0.30

- large if >= 0.50

Project Limitations

Several limitations must be noted in this study. Recruitment was restricted to children in a single clinic practice. The sample size was small and smaller samples produce less accurate estimates than larger samples.

Results

Sample Characteristics

Data were gathered from a convenience sample of 80 participants. Table 1 summarizes sample data demographics for age, sex, race/ethnicity, grade, insurance and free/reduced lunch, which was a proxy measure for socioeconomic status. Approximately 59% of participants were under the age of nine years. Males slightly outnumbered female participants 52.5 to 47.5 percent. Non-Hispanics (55%) outnumbered Hispanics (45%). Third and fourth grades accounted approximately 47.5 percent of the sample population. The majority of participants had insurance and were on a free/reduced lunch program.

	n	%
Ethnicity		
Hispanic	36	45.0
Caucasian (non-Hispanic)	41	51.3
Black (non-Hispanic)	2	2.5
Other (non-Hispanic)	1	1.3
Total	80	100.0
Sex		
Female	38	47.5
Male	42	52.5
Total	80	100.0
Age		
7	13	16.3
8	21	26.3
9	13	16.3
10	10	12.5
11	13	16.3
12	10	12.5
Total	80	100.0
Grade		
1	5	6.3
2	12	15.0
3	19	23.8
4	19	23.8
5	8	10.0
6	10	12.5
7	5	6.3
8	2	2.5
Total	80	100.0
Insurance		
No	15	18.8
Yes	65	81.3
Total	80	100.0
Free/Reduced Lunch		
No	35	43.8
Yes	45	56.3
Total	80	100.0

Note: Mean Age=9.24, SD=1.671

Table 1: Sample Characteristics.

Actual Body Image

The Collins' pictogram figure was designed to examine participants' actual body image and desired body image [24]. The figures ranged from underweight size to obese size (Figure 3). Collin did not specify the category to which the seven figures might possibly belong: underweight, normal weight, overweight, or obese. For the purpose of this study, the primary investigator categorized the seven body figures as follows: number 1-2 represented underweight image, number 3-4 represented normal weight image, number 5-6 represented overweight image, and number 7 represented the obese image.

Figure 3: Collins' Pictogram Figures (used with permission).

Table 2 summarizes the pictogram image chosen. As noted, one of the data forms collected was thrown out as it was deemed an outlier as this one participant chose figure number one as the actual image and may have misunderstood the question being asked (Circle the boy/girl you look like?) as his BMI placed him as obese. Participants selected the figure that resembled their current (actual) body image. The majority of participants (72.5%) selected pictogram images 3 and 4. Twenty-six percent selected an overweight image (5 & 6) as their actual body image. No participant selected number seven (the obese figure).

Pictogram Images	n	%
1=underweight	0	0
2=underweight	1	1.3
3=normal weight	24	30.0
4=normal weight	34	42.5
5=overweight	17	21.3
6=overweight	4	5.0
7=obese	0	0

Total	80	100.0

Table 2: Actual Body Image.

Desired Body Image

Table 3 summarizes desired body image or the image the child would like to be. Approximately 85 percent of total sample selected images 3 and 4 as corresponding to the desired body image. However, 10 percent of participants depicted the desired body image they preferred as being thin (underweight) while 5 percent would like to be overweight. What was alarming was the ten percent who preferred images 1 and 2 as the pictogram images that represented the underweight body image.

Pictogram Images	No.	%
1=underweight	4	5.0
2=underweight	4	5.0
3=normal weight	25	31.3
4=normal weight	43	53.8

5=overweight	4	5.0
6=overweight	0	0
7=obese	0	0
Total	80	100.0

Table 3: Desired Body Image.

Relationship between Actual and Desired Body Image

Table 4 depicted the perceptions of body size between actual and desired. At first glance, the actual and desired body image percentage centered in Figure 3. Figure 3 had a slight increase of one percent while figure 4 increased around eleven percent. A decrease in body image percentage of sixteen percent was noted in figure 5 from actual body image and desired body image. As noted, there was a percentage of participants who desired to be underweight. When the participant were asked to choose actual body image, 72.5 percent selected normal weights while 26 percent selected being overweight. As to desired body image, 85 percent selected normal weight and only 5 percent selected the overweight. Ten percent selected the underweight figure, a difference of 8.7 percent from the actual percentage of 1.3 percent.

Pictogram Images	Actual		Desired	
	No.	%	No.	%
1=underweight	0	0	4	5.0
2=underweight	1	1.3	4	5.0
3=normal weight	24	30.0	25	31.3
4=normal weight	34	42.5	43	53.8
5=overweight	17	21.3	4	5.0
6=overweight	4	5.0	0	0
7=obese	0	0	0	0
Total	80	100.0	80	100.0

Table 4: Relationship between Actual Body Image and Desired Body Image.

Table 5 illustrates the actual body image with desired body image for categories that were collapsed to more easily understand the ratings. Normal weight category increased by thirteen percent while rating in overweight category decreased by twenty-one percent. Underweight category saw a rating increase less than 9 percent. No participant chose category 7 (obese) in either actual body image or desired body image.

	Actual		Desired	
	n	%	n	%
Underweight (1-2)	1	1.3	8	10.0
Normal Weight (3-4)	58	72.5	68	85.1
Overweight (5-6)	21	26.3	4	5.0
Obese (7)	0	0	0	0
Total	80	100.0	80	100.0

Table 5: Pictogram Whole Sample.

Body Mass Index

At data collection, participants had their weight and height measured and converted to BMI and then to body mass index percentile (Table 5). The mean BMI was 19.1 with a range of 11.3 to 33.0. The BMI percentile mean was 65.4 with a range of 1.00 to 99.0. A descriptive analysis was conducted using SPSS statistics 20. Ages ranged from seven to twelve years with a mean 9.24 and SD 1.67. As seen in Table 6, just over half of the participants were in the normal healthy weight as defined by the Center for Disease Control [1]. Overweight and obesity accounted for 40 percent of the participants (Table 6).

Category	n	%
1=Underweight: (<= 4.99)	4	5.0
2=Normal Weight: (5.00 - 84.99	44	55.0
3=Overweight: (85.00 - 94.99	13	16.3
4=Obese (Obese: (>=95.00)	19	23.8
Total	80	100.0

Table 6: Body Mass Index/percentile.

A comparison is shown in Table 7 between actual body image and BMI percentile category. One percent selected underweight in the actual category. BMI established that 5 percent was the correct number for those who were underweight. The majority of participants selected normal weight by 73 percent whereas BMI placed it as 55 percent of participants. Overweight was selected 26 percent of the time while BMI placed it as 16 percent. Participants rated actual body image bigger than BMI. No participant chose body image 7 in the actual body image picture although BMI placed it at almost 24 percent. One of four participants has a BMI equal or greater than 95 percentile.

Category/Percentile	Actual n	Actual %	BMI n	BMI %
Underweight (1-2) and <4.99	1	1.3	4	5.0
Normal Weight (3-4) and 5.0-84.99	58	72.5	44	55.0
Overweight (5-6) and 85-94.99	21	26.3	13	16.3
Obese (7) and >95.00	0	0	19	23.8
Total	80	100.0	80	100.0

Table 7: Actual Body Image vs. BMI/Percentile Category.

Relationship among Body Image and BMI

To determine if relationships exist, a Spearman Rank Correlation Coefficient (rho) was calculated. The rho correlation coefficient was significant and showed a small positive relationship between actual and desired BMI of .35, p=0.01. Assuming the two variables are constant, participants could be inferred of wanting to lose weight to a desired body image. When actual body image was compared to body mass index percentile, the rho again showed correlation significance. The correlation of 0.46 demonstrated a 21% R^2 showing that 21% of the actual body image was accounted for by the BMI (Table 8). Correlation was significant that participants were aware of their weight when selecting the pictogram figure that corresponded to their actual body image.

N= 80	Desired	Actual	BMI
Desired	1		
Actual	.35[**]	1	
BMI	-.11	.46[**]	1
Note: Correlation is significant at the [**]ρ=0.01.			

Table 8: Whole Sample-Correlation among Desired Body Image, Actual Body Image and BMI/percentile.

Sub-analysis Hispanics versus non-Hispanic

For a better understanding of BMI and Percentile, ethnicity was broken down to subgroups of Hispanic and non-Hispanic. The total sample number for Hispanic and non-Hispanic was eighty participants.

Hispanic sample characteristics

Table 9 is a modification of Table 1. The table data figures are specific for Hispanic and non-Hispanic. In both subgroups, males slightly outnumbered females. Hispanics participants were noticeably older in the age category. There was an even distribution in grade category for Hispanics while non-Hispanics had a concentration among third and fourth grades. There were small differences noted in the insurance category with the majority in both groups having some kind of insurance. As to the "free/reduced lunch" category, Hispanics outnumbered non-Hispanics Caucasians by two to one in receiving a free or reduced lunch.

	Whole Sample n	Whole Sample %	Hispanic n	Hispanic %	Non-Hispanic n	Non-Hispanic %
Ethnicity						
Hispanic/Latino	36	45.0	36	45.0		
Caucasian (non-Hispanic)	41				41	
Black (non-Hispanic)	2	55.0			2	55.0
Other (non-Hispanic)	1				1	
Total	80	100.0	36	45.%	44	55.0%
Sex						
Female	38	47.5	17	47.2	21	47.7
Male	42	52.5	19	52.8	23	52.3
Total	80	100.0	36	100.0	44	100.0

Age						
7	13	16.3	5	13.9	8	18.2
8	21	26.3	9	25.0	12	27.3
9	13	16.3	2	5.6	11	25.0
10	10	12.5	5	13.9	5	11.4
11	13	16.3	7	19.4	6	13.6
12	10	12.5	8	22.2	2	4.5
Total	80	100.0	36	100.0	44	100.0
Grade						
1	5	6.3	0	0	5	11.4
2	12	15.0	6	16.7	6	13.6
3	19	23.8	7	19.4	12	27.3
4	19	23.8	6	16.7	13	29.5
5	8	10.0	6	16.7	2	4.5
6	10	12.5	6	16.7	4	9.1
7	5	6.3	3	8.3	2	4.5
8	2	2.5	2	5.6	0	0
Total	80	100.0	36	100.0	44	100.0
Insurance						
No	15	18.8	8	22.2	7	15.9
Yes	65	81.3	28	77.8	37	84.1
Total	80	100.0	36	100.0	44	100.0

Free/Reduced Lunch						
No	35	43.8	8	22.2	27	61.4
Yes	45	56.3	28	77.8	17	38.6
Total	80	100.0	36	100.0	44	100.0
Note: Hispanic Mean Age=9.67, SD=1.84; non-Hispanic Mean Age=8.89, SD=1.45						

Table 9: Sample characteristics.

Hispanic and Non-Hispanic Actual Body Image

In Table 10, the majority of Hispanics selected the normal weight images followed closely by an overweight image. Non-Hispanics selected normal weight image by almost 85 percent with 16 percent selecting an overweight image in the selection of actual body image. Hispanics rated themselves as overweight two and half times more than did the non-Hispanics.

Pictogram Images	Hispanic		Non-Hispanic	
	n	**%**	**n**	**%**
1=underweight	0	0	0	0
2=underweight	1	2.8	0	0
3=normal weight	4	11.1	20	45.5
4=normal weight	17	47.2	17	38.6
5=overweight	11	30.6	6	13.6
6=overweight	3	8.3	1	2.3
7=obese	0	0	0	0
Total	36	100.0	44	100.0

Table 10: Actual Body Image.

Hispanic and Non-Hispanic Desired Body Image

All participants favored pictogram images number one through five (Table 11). No participant in either group selected pictogram image number six and seven. The majority of all participants selected normal weight as their desired body image. A similar percentage in each group selected underweight pictogram images while no one selected the obese image. Hispanic participants selected desired overweight pictogram image by slightly less than a 4 to 1 ratio although this number of children was actually small.

	Hispanic		non-Hispanic	
Pictogram Images	n	%	n	%
1=underweight	2	5.5	2	4.5
2=underweight	1	2.8	3	6.8
3=normal weight	9	25.0	16	36.4
4=normal weight	21	58.3	22	50.0
5=overweight	3	8.3	1	2.3

6=overweight	0	0	0	0
7=obese	0	0	0	0
Total	36	100.0	44	100.0

Table 11: Desired Body Image.

Relationship between actual body image and desired body image: Hispanic participants' data skewed toward a thinner body image (Table 12). Nine percent of Hispanics selected the underweight body image compared to non-Hispanics of 11 percent. The majority of participants in both groups selected the normal weight category. For Hispanics, pictogram image number five has a significant difference of 22 percent toward the thinner desired body images as it decreased from 30 percent to just over eight percent. For non-Hispanic, a 10 percent difference was noted from actual to desired body image in category five. A decrease was noted in non-Hispanics from overweight actual body image to the desired body image. Non-Hispanic participants also selected underweight pictogram images one and two. No participant in either group selected pictogram images six and seven for their desired category.

	Hispanic				Non-Hispanic			
	Actual		Desired		Actual		Desired	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1=underweight	0	0	2	5.6	0	0	2	4.5
2=underweight	1	2.8	1	2.8	0	0	3	6.8
3=normal weight	4	11.1	9	25.0	20	45.5	16	36.4
4=normal weight	17	47.2	21	58.3	17	38.6	22	50.0
5=overweight	11	30.6	3	8.3	6	13.6	1	2.3
6=overweight	3	8.3	0	0	1	2.3	0	0
7=obese	0	0	0	0	0	0	0	0
Total	36	100.0	36	100.0	44	100.0	44	100.0

Table 12: Relationship between Actual Body Image and Desired Body Image.

Table 13 shows pictogram categories that are combined. The majority of both Hispanic and non-Hispanic choose normal weight. Overweight remained a choice in both groups but there was a significant shift away from overweight actual body image toward the normal weight category. Also noted was the increase in both Hispanics and non-Hispanics toward being underweight. Hispanics selected overweight by over three to one in the desired category.

	Hispanic				Non-Hispanic			
	Actual		Desired		Actual		Desired	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Underweight (1&2)	1	2.8	3	8.4	0	0	5	11.3
Normal weight (3&4)	21	58.3	30	83.3	37	84.1	38	86.4
Overweight (5&6)	14	38.9	3	8.3	7	15.9	1	2.3
Obese (7)	0	0	0	0	0	0	0	0
Total	36	100.0	36	100.0	44	100.0	44	100.0

Table 13: Relationship between Actual Body Image and Desired Body Image.

Body Mass Index

The distribution of overweight and obesity between subgroups of Hispanic and non-Hispanic participants points toward Hispanics participants (Table 14). Forty percent of Hispanics were overweight or obese while non-Hispanics accounted for 32 percent. In the BMI/Percentile category, Hispanics were noted to have almost three times an obese BMI than did non-Hispanics. There were no Hispanics in the BMI/Percentile 1 category while Non-Hispanic Caucasian had nine percent of participants. Half of Hispanic participants were in the normal weight category compared to 59 percent of non-Hispanics. Hispanics had a mean of BMI/percentile of 20.6 with a standard deviation of 4.8 while non-Hispanics had a mean of 17.8 and a standard deviation of 4.2.

	Hispanic		Non-Hispanic	
BMI/Percentile	n	%	n	%
1 (Underweight <= 4.99)	0	0	4	9.1
2 (Normal Weight =5.00 - 84.99)	18	50.0	26	59.1
3 (Overweight = 85.00 - 94.99)	5	13.9	8	18.2
4 (Obese >=95.00)	13	36.3	6	13.6
Total	36	100.0	44	100.0

Table 14: Body Mass Index Category using Percentile.

Table 15 compares Hispanic and non-Hispanic actual body image with BMI percentiles. Discrepancies exist among actual body image and BMI. Hispanic and non-Hispanic participants did not select the obese pictogram but when compared to BMI, 36% of Hispanics and 14% of non-Hispanics were obese. The majority of Hispanics and non-Hispanics favored normal weight as their actual body image when only 50% of Hispanics and 60% on non-Hispanics were. Hispanics over estimated their actual overweight body image by 25 percent when compared to non-Hispanics who under estimated by over 2 percent. Overweight in the BMI category curved upward toward the obese category by over 25 percent for Hispanics while decreasing by 4 percent for non-Hispanics.

	Hispanic				Non-Hispanic			
	Actual		BMI/%		Actual		BMI/%	
	n	%	n	%	n	%	n	%
Underweight (1&2)	1	2.8	0	0	0	0	4	9.1
Normal weight (3&4)	21	58.3	18	50.0	37	84.1	26	59.1
Overweight (5&6)	14	38.9	5	13.9	7	15.9	8	18.2
Obese (7)	0	0	3	36.3	0	0	6	13.6
Total	36	100.0	36	100.0	44	100.0	44	100.0

Table 15: Actual Body Image vs. BMI Percentile Category.

Hispanic correlation: A correlation analysis was conducted to examine association between actual body image, desired body image, and BMI/Percentile (Table 16). There was a statistically significant correlation between actual body image and BMI. The correlation of 0.42 demonstrated an 18 percent R^2 showing that 18 percent of the actual body image was accounted for by BMI. The results between actual/desired and desired/BMI were too small to show significant statistics.

n=36	Desired	Actual	BMI
Desired	1		
Actual	.19	1	
BMI	-.32	.42*	1

Note: Correlation is significant $^*\rho<.05$

Table 16: Hispanic - Correlation among Desired Body Image, Actual Body Image and BMI/Percentile.

Non-Hispanic: There were statistically significant relationships in body image between actual and ideal (Table 17). As noted about, the correlation of 0.38 demonstrated a 14 percent R^2 showing that 14 percent of the actual body image was accounted for by BMI. The correlation of 0.42 percent R^2 showed that 18 percent of desired body image was accounted for by actual body image.

n=44	Desired	Actual	BMI
Desired	1		
Actual	.42**	1	
BMI	.04	.38*	1
Note: Correlation is significant $^{**}\rho<.01$ and $^*\rho<.05$			

Table 17: Non-Hispanic-Correlation among Desired Body Image, Actual Body Image and BMI/Percentile.

Discussion

This study assessed whether the relationship of children's chosen actual body image and ideal body image correlated with BMI for the whole sample and subgroups. The study also assessed for a relationship among actual body image, desired body image, and BMI.

Entire Sample

In this study, there were minor differences in the demographics variable of age, race/ethnicity, gender, and grade. However, the study did find that 35 percent of children did not have insurance. CDC acknowledges that children living in the poverty level are more at risk for becoming overweight or obese as a result of not having healthy foods to eat. The CDC reported that half of all uninsured children live in just six states- Texas, California, Florida, Georgia, Arizona and New York [1]. It is interesting to also note that in the school lunch program, over half of the children (56%) in the study met the requirements of receiving free/reduced meals. Families of four who make less than twenty-one thousand annually or below the 130 percent of the annual prosperity level guidelines are entitled to participating in the free/reduced lunch program [32]. USDHHS statistics shows San Angelo as having 60 percent of their children on the free/reduced program compared with Texas at 62 percent.

Actual body image: Data suggested that 72 percent of the children rated themselves as being normal weight. Rees et al. acknowledged that 75 percent of the time children are able to accurately select their actual body image from silhouetted pictograms drawings. When actual body image was measured using a clinical BMI, only 55 percent had a normal weight. Children underestimated their weight by 17 percent. Those who rated themselves as overweight increased from 26 percent to 40 percent with 24 percent of those actually being in the obese category. While the correlation of 0.46

demonstrated a R^2 showing that 25 percent was accounted by the BMI, 75 percent of the shared variance between ABI and BMI is accounted by unknown variable or variables. Overweight and obesity accounted for 40 percent of participants when BMI was calculated. Obese participants overestimated their actual body size and underestimated their size.

Desired body image: As expected, the majority of children selected normal weight (85 percent) in the desired body image category. What is alarming is that 10 percent of the participants wanted to be in the underweight category and 5 percent of the participants wanted to be in the overweight category. There was significant correlation between actual body image and desired body image. The differences between actual body image and desired body image could only be explained by the R^2 of 16 percent showing that 16 percent of the actual body mass index was accounted by BMI. Eight-four percent of how a participant selected the desired body image was to an unknown variable or variables. The R^2 finding may stimulate patient-parent-doctor discussion on weight loss activities [33]. As noted by Banitt et al., a person's cultural and environment influences a person's ideal body image as well as their equilibrium of being happy with one's own body [21].

Hispanic and non-Hispanic subgroups

Demographic characteristics: As previously noted in the whole sample demographics, data showed little difference in age, gender, age, and grade between Hispanic and non-Hispanic groups. What is interesting is that in the age category, there were much older Hispanics in ages eleven and twelve compare to non-Hispanics who were ages seven, eight, and nine. Hispanics were less likely to have insurance compare to non-Hispanics [34]. In the study, there were 78 percent of Hispanics on free/reduced lunch program compared to the national average of 32 percent of Hispanic children [32]

Actual body image: A dramatic finding was noted to how Hispanics rated themselves in the actual overweight category (39 percent) when compared to non-Hispanics of 16 percent. Non-Hispanics may have a misperception of body image or Hispanics continue to be honest about their actual body image as noted by Rees et al. of children being honest with actual body image. No participant in the non-Hispanic group selected pictogram images one or seven in the actual body image although BMI placed it at 11 percent.

Desired body image: As with the whole sample, both Hispanic and non-Hispanic rated normal weight as their choice. Another finding suggested that Hispanics chose overweight body image by three times more than non-Hispanics. Hispanics still viewed the overweight category in the desired body image as sought-after [21]. Hispanic participants selected desired overweight pictogram image by slightly 4 to 1 ratio. Overweight in the BMI category curved upward toward the obese category by over 25 percent for Hispanics while decreasing by 4 percent for non-Hispanics. Hispanics were noted to have almost three times an obese BMI than did non-Hispanics. While overweight may be desirable, no participant in both subgroups rated themselves in the obese category. Non-Hispanics rated underweight by as desirable by 11 percent compare to 8 percent Hispanics.

Conclusion

The statistics make it clear that childhood obesity is an epidemic. The prevalence of this epidemic shows no signs of decline. The causes of childhood obesity are many and complicated. To date, prevention programs have had limited success. This study has shown that two out of five Hispanic children are overweight or obese compare to non-Hispanic who align with the national average of one out of three children being overweight or obese. Dramatic is the fact that 50 percent of Hispanics children were considered overweight or obese compare to non-Hispanics of 30 percent. What is new is that this study showed that Hispanics selected actual body image of overweight by two and a half times more than non-Hispanics. While dramatic, it was not surprising that no participant chose the obesity category in the actual body image and desired body image categories. Further study is needed as the Collins tool may not be sensitive to overweight or obese small differences. Maybe the participants recognized that they were overweight but did not want to admit that they were actually obese. A second view could be that the participants were not able to distinguish nor recognize which of Collins's figures were overweight or obese when they made their selection.

Further research is needed in the prevalence of childhood obesity. Behavior management is needed if children are expected to maintain a normal weight. It all starts in the self of one's identity in order to adopt eating healthy eating habits and incorporate physical activity into life style behaviors. It is prudent to understand that children, parents, and medical providers may have a misperception of children's body image and only with education will prevention programs be successful. Summerbell, et al. stated that the most successful prevention programs have been with behavior change interventions combined with sustainable clinical support and family involvement [35].

Implications

Evidenced-based research has shown that intervention and prevention strategies save lives. Literature review revealed intervention and prevention strategies work as long as the motivation is there and a constant reminder is present, either from the parent or practitioner during every clinical visit. Literature reviewed showed adherence to maintaining a normal body weight depends on having a clear picture of body image, starting behavior modification at an earlier age, and continued education on nutrition and exercise. Literature review also noted that parents are not being educated on the gender specific BMI for age percentile. The data from this study showed that children may not accurately be able to distinguish actual body image from self and need preventive care guidance.

The findings of this study will add to the knowledge base concerning overweight/obese body image in children 7 to 12 years old. Future research should include a larger sample and a variety of clinical sites. Decreasing morbidity and mortality related to obesity should be the goal of all medical providers and maybe a pictogram could lead to a discussion on losing weight.

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Age of child

Gender of child

- ◯ Male
- ◯ Female

Race/Ethnicity of child

- ◯ Hispanic or Latino
- ◯ Caucasian/Non-Hispanic
- ◯ African Black
- ◯ Other _____

Grade (Upcoming School Year)

Insurance

- ◯ Yes
- ◯ No

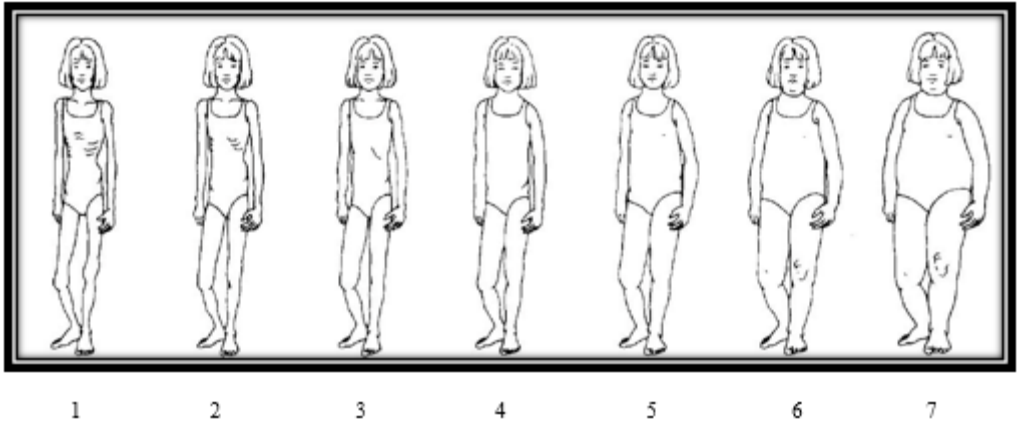**Free/Reduced Lunch Program**
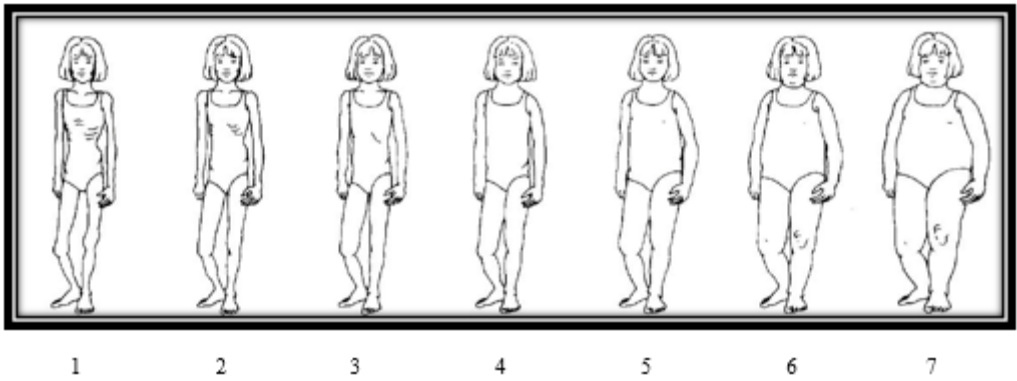
- ◯ Yes
- ◯ No

Growth Measurements:

1. Current **Height** (report either cm OR inches): _____

2. Current **Weight** (report either in pounds OR kg): _____

3. **Body Mass Index** (BMI): _____

4. Body Mass Index **Percentile** (if available): _____

Appendix A: BMI Pictogram Data.

Circle the girl you **look** like?

Circle the girl you **like** to be?

Appendix B: Pictogram Questionnaire.