The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

Jerickson Abbie S Flores, Jana F Fragante*, Jan Jorge M Francisco, Jan Paolo P Dipasupil, Patrick Steven D Damaso, Alfonso L Gutierrez, Kristian Kent T Dela Guerra, Marckie M Escudero, Royce Ann G Estella, Ma Katrina A Evasco, Shaena Gayle S Galang, Jeffrey M Humarang, Ma Luisa Villavicencio and Rogin S Sison

Makati Medical Center, Department of Medical Education and Research, Section of Community Medicine, Makati City, Philippines

*Corresponding Author: Jana F Fragante, Makati Medical Center, Department of Medical Education and Research, Section of Community Medicine, Makati City, Philippines.

Abstract

Introduction: Malnutrition is one of the rapidly growing health problems affecting the world at present. Children affected are not only at risk for significant health problems, but also face many psychological and social consequences, including low self-esteem. School age children are specifically vulnerable to develop poor self-esteem specially when their peers find them physically unattractive. Thus malnutrition, whether obesity or undernourishment, plays a significant role.

Objectives: This research aims to determine if there is a significant difference on the level of self-esteem among Filipino children ages 9 - 12 years old with abnormal body mass index (BMI) and those children with desirable BMI.

Methodology: Using a cross-sectional study design, the correlation between body mass index (BMI) and self-esteem was observed among children ages 9 - 12 years old. Participants took the Hare self-esteem questionnaire, which is specifically designed to measure self-esteem in school age children. The lowest possible score is 15 and the highest possible score is 45. A total of 1140 students with ages 9 - 12 years old from Cembo Elementary School (public school) participated in the study.

Results and Conclusion: Among the participants, 239 out of the 1140 have desirable body mass index, 878 are underweight, and 23 are overweight. Using the test questionnaire, the computed mean scores were 36.599, 36.045 and 36.583 for normal, underweight and overweight categories respectively. Using Pearson's Correlation Test and Spearman's Correlation Coefficient Test, the study showed positive correlation (p value of 0.047 and 0.004 respectively) between BMI and Self-esteem scores which implied that the higher the BMI, the higher the self-esteem of the participants. However, ANOVA done showed no sufficient evidence that the three groups have different self-esteem scores.

Keywords: Body Mass Index; Correlation; Self-esteem; ANOVA

The Problem and its Background

Introduction

Scientific Significance

Malnutrition is one of the growing health problems affecting the world at present. Malnourished children are not only at risk for significant health problems, but are also faced with many psychological and social consequences, including low self-esteem. The FNRI, (Food and Nutrition Research Foundation), recently published a study stating that 27 out of 100 Filipinos aged 20 and above are overweight

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

146

(23.9%), 2 out of 10 children aged 5 years old and below are overweight (1.4%), while 2 out of every 100 children aged 6 to 10 are overweight as well (1.3%). The nutritional study, found that the prevalence of obesity has been increasing since 1998 and of more practical value was the clear observation that the rates of co-morbidities (diabetes, hypertension, elevated serum total cholesterol, LDL-cholesterol and triglycerides) rose with increasing BMI. Another study conducted by Dr. Richard S. Strauss of the University of Medicine and Dentistry of New Jersey in New Brunswick studied 1,520 children from the National Longitudinal Survey of Youth. He looked at their weight and a variety of other factors at ages 9 to 10, and again at ages 13 to 14. The results showed that there is a significant relationship between obesity and changes in self-esteem during early adolescence, noting the increased feelings of sadness, loneliness, and nervousness among those whose self-esteem decreased.

The objective of the study is to determine the effects of different body mass indexes (underweight, normal, overweight) on the level of confidence of children 9 - 12 years of age. A standardized validated questionnaire was given to the selected participants in order to determine the level of their self-esteem. Their corresponding BMI was measured and computed by the researchers.

Statement of the Problem

Is there a significant difference on the level of self-esteem among Filipino children ages 9 - 12 years old with abnormal body mass index (BMI) classification and children with normal BMI?

Research Goals and Objectives

General Objective

The general objective is to determine if there is a significant difference on the level of self-esteem among Filipino children ages 9 - 12 years old with abnormal body mass index (BMI) classification and children with normal BMI.
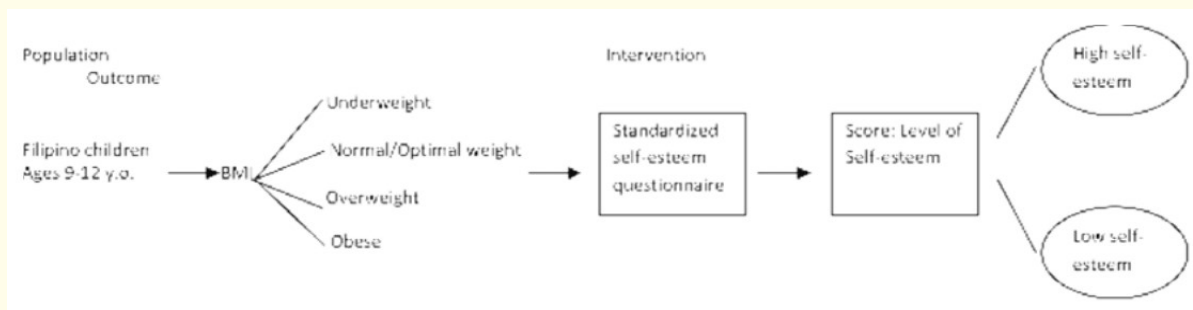
Specific Objectives

To determine the body mass index (BMI) of Filipino children ages 9 - 12 years old in a public elementary school in Makati and correlate their level of self-esteem based on the validated Hare self-esteem questionnaire.

Research Hypothesis

Ho: There is no significant difference between the level of self-esteem of Filipino children ages 9 - 12 years old with abnormal body mass index (BMI) classification and children with normal BMI.

Ha: There is a significant difference between the level of self-esteem of Filipino children ages 9 - 12 years old with abnormal body mass index (BMI) classification and children with normal BMI.

Conceptual Framework

Figure 1: Conceptual Framework.

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

147

Scope of the Study

The study focused on children ages 9 - 12 years old of Cembo elementary school as the study population, Standardized self-esteem questionnaire as the intervention, and self-esteem scores as outcome.

Definition of Terms

Body Mass Index (BMI): It is defined as the individual's body weight divided by the square of the height. It does not actually measure the percentage of body fat, but is used to estimate a healthy body weight based on a person's height.

Self-Esteem: Stable sense of personal worth or worthiness that is closely related to the discrepancy between your self-image and your ideal self.

Review of Related Literature

Morris Rosenberg, a social-learning theorists, defined self-esteem in terms of a stable sense of personal worth or worthiness that is closely related to the discrepancy between your self-image (how you see yourself) and your ideal self (how you would ideally like to be). The bigger the gap, the less confident you are. Children who are obese or undernourished face an increased risk of emotional problems lasting well into adulthood. Factors such as peer rejection, weight-related teasing, and internalized social standards play a major role in diminishing a child's self-esteem. Self-esteem affects numerous aspects of health and behavior including social adjustment, activity engagement, goal direction and the presence of anxiety. Overweight youngsters are frequently teased by their peers and adults as individuals who are less desirable to have as friends. Jokes poking fun at overweight people are common in our society. While growing up, these children are forced to run a gamut of psychological barbs and social discriminations. As a result, they suffer low self-esteem, feel inadequate and are looked upon as the source of their own problem.

The Philippine Association of the Study of Overweight and Obesity, PASOO, recognized the growing problem of obesity even among the young, as evidenced from the results of national nutrition surveys of the Food and Nutrition Research Institute (FNRI) which showed a significant increase in overweight and obesity among both preschool and school children. The nutritional study, conducted in 2003, found that the prevalence of obesity has been increasing since 1998. The FNRI study found that 27 out of 100 Filipinos aged 20 and above are overweight (23.9%), 2 out of 10 children aged 5 years old and below are overweight (1.4%), while 2 out of every 100 children aged 6 to 10 are overweight as well (1.3%). When assessed in terms of waist circumference (WC) and waist-hip ratio (WHR) results showed a general increase in the rate of co-morbidities (diabetes, hypertension, elevated serum total cholesterol, LDL-cholesterol and triglycerides) with increase in BMI, WC and WHR.

According to the World Health Organization, the body mass index (BMI), or Quetelet index, is a statistical measure, which compares a person's weight and height. Though it does not actually measure the percentage of body fat, it is used to estimate a healthy body weight based on a person's height. Due to its ease of measurement and calculation, it is the most widely used diagnostic tool to identify weight problems within a population, usually whether individuals are underweight (BMI lower than 18.5), overweight (BMI above 25) or obese (BMI greater than 30) and optimal weight (BMI of 18.5 to 25). Body mass index is defined as the individual's body weight divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of kg/m^2.

BMI is used differently for children. It is calculated the same way as for adults, but then compared to typical values for other children of the same age. Instead of set thresholds for underweight and overweight, then, the BMI percentile allows comparison with children of the same sex and age. A BMI that is less than the 5th percentile is considered underweight and above the 95th percentile is considered obese. Children with a BMI between the 85th and 95th percentile are considered to be overweight.

A study conducted by Dr. Richard S. Strauss of the University of Medicine and Dentistry of New Jersey in New Brunswick studied 1,520 children from the National Longitudinal Survey of Youth. He looked at their weight and a variety of other factors at ages 9 to 10, and again at ages 13 to 14. The results showed that there is a significant relationship between obesity and changes in self-esteem during

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

148

early adolescence, noting the increased feelings of sadness, loneliness, and nervousness among those whose self-esteem decreased. According to Dr. Daniel Kirschenbaum, Clinical Director of Wellspring and a Professor at Northwestern University Medical School, the way in which being classified as overweight affects youngsters depends a largely on the children's parents and their parents' views and perceptions, and on the society or environment in which children take shape. Some parents and societies are more accommodating of a wider range of weights than others. He also stated that certain research findings proposed key conclusions on the issue of BMI classification and affectation of young children. One of the key concepts or research findings is that many children classified as overweight have lower self-esteem than non-overweight children. However, the level of lowered self-esteem is within the normal range for children classified as. Therefore, his conclusion is that overweight children have fairly lower self-esteem than non-overweight children, but this does not make them extremely depressed nor emotionally disturbed or affected. He also added that children classified as overweight based on body mass index who tend to have lowest self-esteem also have parents who tease or embarrass or sometimes make fun of them about their weight problems, figure or appearance and the fact that they are overweight or fat. According to him, observed amount of overweight (appearance of being fat or overweight) is actually a better predictor of self-esteem than actual body weight. This means that those children and teenagers who view themselves as overweight are more likely to be unhappy or embarrassed about their weight condition. Some of those children may be quite overweight and others may be just a few pounds overweight, but the latter group could think of themselves as having a serious problem. He also concluded that the degree of association between weight or body mass index classification and level of self-esteem is greater for girls than it is for boys. In other words, girls are more dramatically affected by weight and perceived weight problems than are boys. He was also surprised on a recent study of overweight to very obese 5 - 10 year old African American children (117 participants) showed that overweight was associated with low self-esteem in children who were eight years old and older, not in the younger children.

In a review article entitled "Mental Health, Wellness, and Childhood Overweight/Obesity" from the Journal of Obesity Volume 2012 written by Shelly Russell-Mayhew, Gail McVey, Angela Bardick, and Alana Ireland, obesity is not a psychological disorder, but some researchers and clinicians argue that it should be considered a mental or behavioural issue. Although mental health professionals have been involved in the treatment and/or prevention of obesity, it is implicitly assumed that weight loss or the prevention of weight gain, respectively, will solve the psychological/emotional issues than may accompany excess weight which may not be the case. It should be noted that the treatment of pediatric obesity may vary with age particularly as approaches to childhood obesity migrate to a more integrated shared-responsibility model of service delivery.

According to the review article, having limited longitudinal data available, some studies find evidence that mental distress predicts overweight or weight gain, others find no associations between weight status and mental health, and one found that behavioural issues predicted becoming overweight Despite these associations, it is clear that not all overweight/obese children experience psychosocial issues. Also, the authors, based on several researches, suggest that concern about weight and shape (not actual weight) and/or being the victim of weight-based teasing may in fact account for any individual differences in psychosocial outcomes. Despite the inconsistencies and uncertainties arising from the current evidence base, there appears to be some consensus that obesity is a potential risk factor with regard to children's and adolescents' psychological and emotional well-being and that vigilance for potential difficulties is a responsible approach to take. Based on the journal's reviews, majority of studies find a prospective relationship between eating disturbances and depression. However, this relationship is not unidirectional; depression may be both a cause and a consequence of obesity Additionally, in a clinical sample of obese adolescents, a higher lifetime prevalence of anxiety disorders was reported compared to non-obese controls, although some studies demonstrate no significant relationship between increased BMI and increased anxiety symptoms. Thus, the relationship between obesity and anxiety may not be unidirectional and is certainly not conclusive.

Written in this article is a comparison of overweight/obese children with normal-weight children with regards to self-esteem have been mixed. Some studies find that obese children have lower self-esteem while others do not. There is some consensus in the literature that the global approach to self-esteem measurement with children who are overweight/obese is misleading as the physical and social

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

149

domains of self-esteem seem to be where these children are most vulnerable. The research article has consistently found that body satisfaction is higher in males than females at all ages. Gender differences may reflect the Westernized cultural ideals of beauty, in that, thinness are the only culturally defined ideal for females, while males are encouraged to be both lean and muscular. Thus, there is a linear relationship between body dissatisfaction and increasing BMI for girls; while for boys a U-shaped relationship suggests that boys unhealthy behaviours were reported by 12% girls and 5% of boys among 4,476 adolescents in public schools in Minnesota. The authors of the said review article proposed a theoretical model expanded and adapted from figures shown by Rebecca Puhl at the Canadian Obesity Network 1st Canadian Summit on Weight Bias and Discrimination). Main concepts in this model include psychological factors, mediating variables, and wellness factors. The model is seen below.
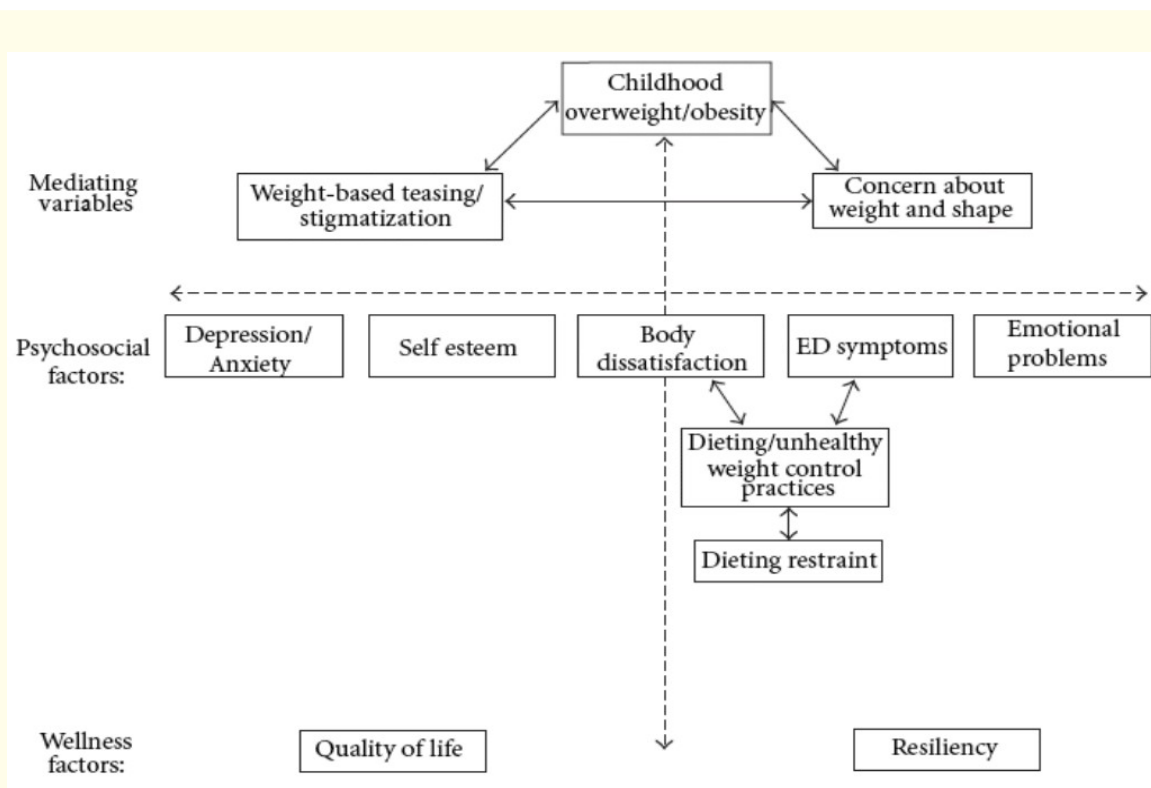

Figure 2: Proposed Theoretical model of physical and social domains of self-esteem.

Published in the study of Constadina Panagiotopoulos., *et al.* (2011), stated that in addition to developing serious medical co-morbidities (type 2 diabetes, hypertension, hyperlipidemia, nonalcoholic fatty liver disease, orthopedic complications and sleep apnea), overweight and obese children are also at a higher risk of experiencing psychological problems including mood and anxiety disorders. Furthermore, overweight children may suffer from early discrimination and an overall poorer quality of life. The current burden of childhood obesity on both medical and psychological well-being makes it important to develop effective interventions in this population.

On another article entitled Binge Eating and Weight-Related Quality of Life in Obese Adolescents published on March 2012 written by Lisa M Ranzenhofer., *et al.* girls, overall, reported poorer QOL than boys in activities of daily-living, mobility, self-esteem, and social/interpersonal functioning (ps < 0.05). Girls with binge eating reported the greatest impairments in activities of daily living, mobility, self-esteem, social/interpersonal functioning, and work/school QOL (ps < 0.05).

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

150

Methodology

Research Design

The research study design is cross-sectional. Participants' BMI was computed according to their weight and height, and they were asked to answer the standardized Hare's self-esteem questionnaire. The answer to the said questionnaire was properly evaluated according to its standardized scale.

Sample Population

The study population involved children ages 9 to 12 years old, male and female. The total population was categorized into Normal, Underweight, and Overweight, depending on their computed BMI using the formula: BMI= mass (kg)/height^2 (m^2)

Inclusion criteria are the following:

- Children ages 9 to 12 years old, Male or Female
- With parents that signed the Informed consent
- Ability to read and understand English/Filipino.

Exclusion criteria

Children who have deformities, physically and mentally challenged (e.g. children with ADHD syndrome, deaf, blind).

The sample population chosen for this study is composed of students from Cembo elementary school ages 9 - 12 years old.

Testing Instrument

The testing instrument was a questionnaire that included items designed to elicit information regarding self-esteem. HARE SELF-ESTEEM SCALE (cited in Corcoran and Fischer 1987), which is specifically designed to measure self-esteem in school age children. The questionnaire was scored numerically using 1, 2 and 3:1 is the lowest indicator of self-esteem; 2 is the middle indicator; 3 is the highest indicator. Therefore, the lowest possible score is 15 and the highest possible score is 45. Baumeister (1993) [1] suggests that the mid-line of low and high self-esteem should be taken from the actual scores attained not the total range of possible scores.

Physical assessments included such as the height (in meters) and weight (in kilograms) measured on calibrated instruments.

Results and Discussion

A total of 1140 students with ages 9-12 years old from Cembo Elementary School (Public School) participated in the study. Based on the Body Mass Index Classification, 239 out of the 1140 participants have normal or optimal weight; 878 are underweight and 23 are overweight.
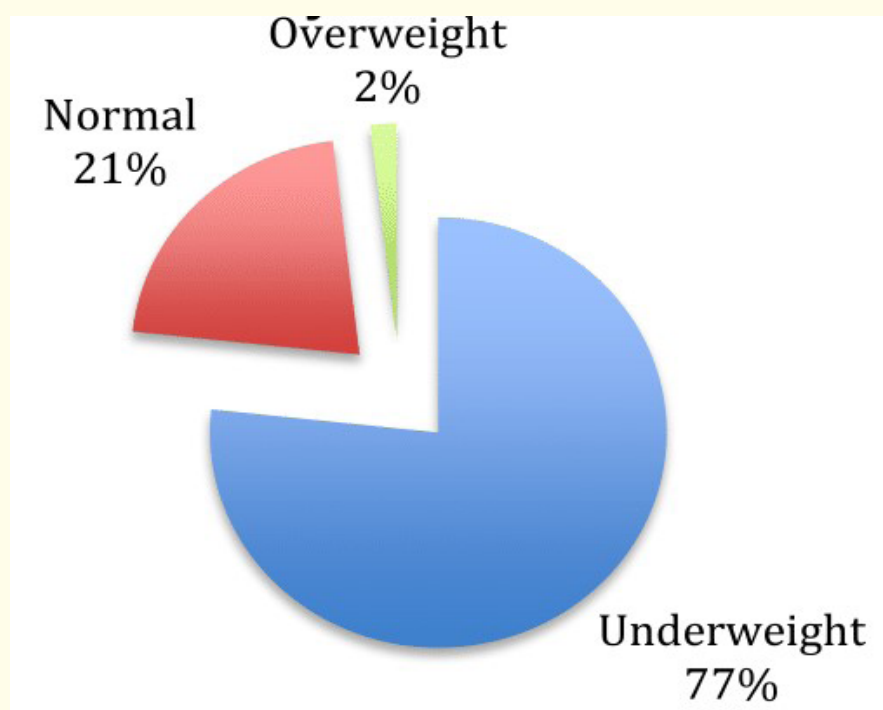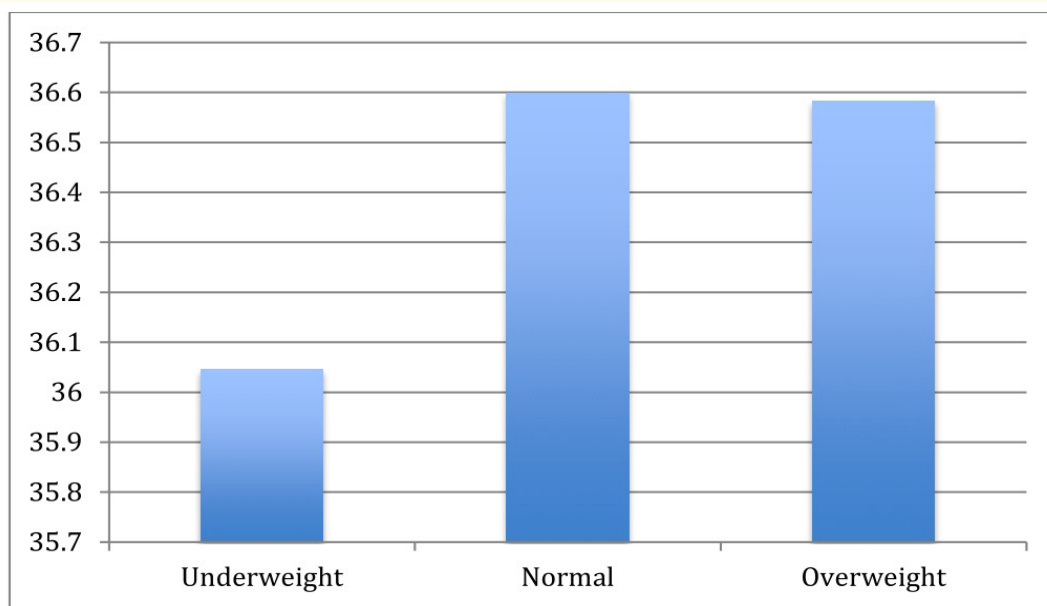

Figure 3: BMI Classification of Students Age 9 - 12 years old.

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

151

All the 1140 participants answered the standardized Hare's self-esteem questionnaire. The mean score of the standardized Hare's self-esteem questionnaire was computed based on the students' BMI Classification. The computed mean scores were 36.599, 36.045 and 36.583 for normal, underweight and overweight categories respectively.

Figure 4: *Mean scores of Students 9 - 12 years old in the Hare's self-esteem questionnaire according to BMI classification.*

Pearson's correlation coefficient test (parametric test)	
Observed value	0.078
Two-tailed p-value	0.047
Alpha	0.05
Conclusion: At the level of significance Alpha = 0.050 the decision is to reject the null hypothesis of absence of correlation.	
In other words, the correlation is significant.	
Spearman's correlation coefficient test (non-parametric test)	
Observed value	0.112
Two-tailed p-value	0.004
Alpha	0.05
Conclusion: At the level of significance Alpha = 0.050 the decision is to reject the null hypothesis of absence of correlation.	
In other words, the correlation is significant.	

Table 1: *Pearson's Correlation Test and Spearman's Correlation Coefficient Test on BMI and Self –esteem scores.*

The Correlation Between Body Mass Index and Self-Esteem among Children Ages 9 - 12 Years Old in a Public Elementary School in Makati City, Philippines

152

The study showed that there is a weak positive correlation between BMI and Self-esteem scores. This implies that the higher the BMI, the higher the self-esteem of the participants. Children who are underweight have a lower total mean score in the Hare's self-esteem questionnaire.

Tukey (HSD)/Analysis of the difference between group with a confidence range of 95.00%					
Categories	Difference	Standardized Difference	Critical Value	Pr. > Diff	Significant
2 ~ 1	0.554	1.453	2.349	0.314	No
2 ~ 3	0.015	0.013	2.349	1.000	No
3 ~ 1	0.539	0.467	2.349	0.887	No
Tukey's d critical value: 3.322					

***Table 2:** ANOVA and Post Hoc Analysis (Tukey's HSD) of Mean Scores Based on BMI Classification.*

However, when ANOVA was done to compare the Self-esteem scores of the different BMI classifications, there is no sufficient evidence that the three groups have different self-esteem scores [2-7].

Conclusion and Recommendations

This study showed that there is a weak positive correlation between BMI and Self-esteem scores. This denotes that the higher the BMI, the higher will be the self-esteem of the children. Children who are underweight have a lower total mean score in the Hare's self-esteem questionnaire. Nonetheless, when ANOVA was done to compare the Self-esteem scores of the different BMI classifications, there is no sufficient evidence that the three groups have different self-esteem scores.

The authors of this paper would like to recommend that further researches be done to investigate the relationship between the degree of malnutrition and the level of self-esteem. The same study may also be conducted in a private school setting and may include greater number of participants who are under the categories of overweight and obese. Comparison between males and females may also be performed. Results of the studies may also be used as a guide by the children's parents, psychologists or guidance counselors in the prevention of depression and other mental health problems triggered by poor self-esteem.

Bibliography

1. Baumeser RF. "Self-Esteem - The Puzzle of Low Self-Regard". Plenum Press, New York (1993).

2. Paxton HL. "The effects of childhood obesity on self-esteem". (Doctoral dissertation, The Graduate College of Marshall University) (2005).

3. Metapsychology Online Reviews. Obese Children At Increased Risk For Low Self-Esteem (2007).

4. Wikipedia. Self-Esteem (2010).

5. Wikipedia. "Body Mass Index" (2010).

6. Virtudazo MJC. "Dietary Management of Heart Disease, Diabetes Mellitus, and Arthritis". Clinical Dietitian Associate Diabetes (2009).

7. Florentino RF. "Obesity Alert. Philippine Association of the Study of Overweight and Obesity" (2009).