

Average BMI of Male and Female of LNU-MSU Students and Its Implications

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I. INTRODUCTION

BMI stands for Body Mass Index. It equals to a person's weight in kilograms divided by the square of his or her height in meters. BMI is a scientific way to measure a person's weight level. Besides, BMI is vital to a person's health state. It is a useful tool which can help people to improve their health. In this reason, BMI is widely used in many countries to test people's health conditions.

In nowadays society, most young people don't form healthy life styles and they neglect their body condition. Especially for college students who just no longer under parents' daily care. They don't pay enough attention to exercise and their food intakes. As a result, they have no idea about how their health states are. Moreover, obesity and underweight are getting more and more common among the college students. It is necessary to analyze college students' BMIs and their eating and exercising habits.

However, the study has some limitations. All the participants were LNU-MSU students, and most of them were freshmen. Only fifty students, twenty-five males and twenty-five females, participated in the study. Besides, some participants wrote down their approximate heights and weights. These can cause the inaccurate result. The researchers analyzed the participants' average BMI, and found the relationship between LNU-MSU students' BMIs and their eating and exercise habits.

II. REVIEW OF LITERATURE

Eunkyung Park specifies on the connection between overestimation and underestimation and the BMI of teenager in his 2011 survey. The data was collected from a paper and pencil survey in the classroom in a public high school in Minnesota. The final analyses were based on the data from 87,418 high school students who were asked about their height and weight. He concludes that weight perception and the BMI based weight status are strongly and positively correlated (57). However, 27.6% of the students have discordant weight perception (58). Underestimation is more common than overestimation (61). Girls are more likely to overestimate; black and Hispanic females are more likely to underestimate their weight; Asia/ Pacific males are more likely to overestimate (59).

V.A. George, S.D. Shacter, and P.M.Johnson did a survey which has two categories. One collecting the BMI of students with ID attending schools participating in the Best Buddies Program; one collecting the attitudes and acts with nutritious and physical activity of the parents (1055). Finally, they conclude in their 2011 study that most families are overweight or obese. 1476 Surveys were sent out to 79 high schools in 5 school districts in the state of Florida in the fall of 2007 and

278 (19%) are returned, 61 surveys (14%) are used in the statically analysis (1056, 1057). They figure out through their survey that approximately 45 percent of the adolescents were overweight or obese and over two-thirds of the parents were either overweight or obese. In addition, there is a significant connection between BMI for both the parents and the kids and frequency of fast foods purchased. Children whose BMIs are lower have parents who use significant ways to keep them fit (1058).

Kammi K. Schmeer studies *Union Transitions and Changes in BMI among Adults in Mexico* in 2012. He collects BMI data from 8,440 households in 150 communities in Mexico in 2002 and 2005. He separated people in seven categories: entered a union, dissolved a union (divorced or separated), stable single (never in union), stable married, stable cohabiting, stable divorced/separated, and stable widowed (266, 267). He finds that age and gender control the aging influences and differences in male and female BMI growth and gender norms (268). The people who entered a union, are stable married, are stable cohabiting, and are stable divorced/separated gain more BMI than other categories. When entering a new union, people gain the most BMI. Baseline weight status and total number of children in the household are related to the changes in BMI. Schmeer claims that controlling the baseline weight status is important, because it is related to the short-time BMI change and it affects union transitions (269).

Caroline W. Hohensee and MHA Mary A. Nies analyze the relationship between the amount of physical activity and BMI among middle and high school children in 2012. They used a large, nationally representative sample of the United States with 1306 substantial minority representation (554). The physical activity categories in this study are defined as follows: low physical activity (<30 mins/day or 1-209 mins/week); standard physical activity (>=30 mins/day or 210+ mins/ week). They also divided the data into age, activity and gender, but the categories were removed from the final models because they had no statistical significance (555). The tables show that children who participate in 30 minutes or more of physical activity per day have the least common rate of obesity (20.4%) versus those who have less than 30 minutes per day (24.8%) or none (26.4%). The categories also show that more African-American children were obese (28.7% VS. 19.3%) and overweight (18.5% VS. 14.4%) than non-Hispanic white children (557). The study suggests that the accumulation of 30 minutes or more of daily physical activity may be effectively decreasing obesity rate among the youth.

Heather H. McClure, J. Mark Eddy, Jean M. Kjellstrand, J. Josh Snodgrass, and Charles R. Martinez Jr in their 2012 study which investigates the factors leading to the rapid risen rate of obesity. They analyzed the trials that a national institute has done since 1991(839). They find out that childhood and adolescent problems may influence BMI through direct impacts on adolescent overweight, a condition which then persists into adulthood. Depression, lower family income and lack of affection may significantly raise the incident of being overweight in adolescents (847). So the adults in a family should give more care and inspirations to their kids to promote their health.

Ahmed H.Youssef Agha, , David K. Lohrmann, and Wasantha P. Jayawardene study *Use of Data Mining To Reveal Body Mass Index (BMI): Patterns Among Pennsylvania Schoolchildren, Pre-K To Grade 12* in 2013. They collected 657,068 students' health record information in 1156 schools. Their participants are all students in 1156 Pre-K to grade 12 schools, located in 49 of 67 Pennsylvania counties. They separated students into five categories: age, sex, race, school type, and school location. They find four categories of BMI, which are underweight, normal weight, overweight, and obese. Students in overweight and obese are provided by middle school level and by sex. The highest obesity rate happens in middle school students, and the girls' BMI are a little higher than the boys' BMI. Youssef Agha, Lohrmann, and

Jayawardene argue that 80 percent students in normal weight and obese categories are still in the same category two years later. Almost half of the students in the overweight category move to another category (85-91).

Daniel J. Keefer, Jennifer L. Caputo, and Wayland Tseh in study *Waist-To-Height Ratio And Body Mass Index As Indicators Of Cardiovascular Risk In Youth* in 2013. They collected data which regards the sex and racial/ethnic backgrounds of 2300 participants. They were 6 to 11 years old children and 12 to 17 years old adolescents (806). They find higher risk levels of TC and SBP are related to either a high risk value of WHTR or BMI. Keefer, Caputo, and Tseh suggest that cardiovascular health risk is related to both WHTR and BMI in the entire children youth and in the older age groups. The younger children groups do not show the link between cardiovascular health risk and WHTR or BMI (808).

Caroline H. Guinn studies *The Positive Relationship Between Fourth-Grade Children's Body Mass Index And Energy Intake At School-Provided Meals (Breakfast And Lunch)* in 2013. Her participants were 465 fourth-grade children from Columbia. She observed the participants eating school-provided breakfast and lunch on 1 to 4 days per child (330). She finds 7 outcome variables by BMI quartile. BMI is related to 3 outcome variables: the amounts eaten of standardized school meal portions, the percentage of energy intake from flavored milk, and the percentage of energy intake received in trades (331). Guinn suggests that children with greater BMI eat more school meals, have larger percentages of energy intake from flavored milk at school meals, and had smaller percentages of energy intake received in trades at school meals (333).

III. RESEARCH QUESTIONS

This study was conducted to answer these questions: 1) What is the average BMI of male and female of LNU-MSU students? 2) How do eating and exercise habits affect students' BMIs? 3) How do LNU-MSU students estimate their weight? 4) Whether or not the LNU-MSU student can estimate their weight correctly.

IV. THE STUDY

1. Participants:

Fifty-two LNU-MSU students were asked to respond to the questionnaire. Fifty students agreed to participate in the survey, twenty-five males and twenty-five females. The participants' ages were between nineteen and twenty-one, including forty-five freshman, three sophomores, one junior, and one international student. Except for the international student, the other participants were all Chinese. All the participants took KIN 100 class before, so all of them should have basic knowledge about BMI.

2. Instrumentation:

Fifty LNU-MSU students, including twenty-five males and twenty-five females, participated in the survey. They were given a questionnaire which included six questions: 1) What is your height? 2) What is your weight? 3) Have you heard of BMI before? 4) What category do you think you belong to (underweight, normal weight, overweight, obese)? 5) Do you pay attention to what you eat every day? 6) Do you have the habit of doing exercise or sports? If you do, how often? Participants answer these questions based on their own personal life style. Researchers asked question (1) and (2) in order to find the average BMI of male and female in LNU-MSU. Question (3) aims to find out if the participants are aware of BMI or not. Question (4) is to find whether they can estimate their weight correctly. Question (5) and (6) aim to find how

LNU-MSU students' BMIs are related to their eating and exercise habits.

3. Data Collection and Analysis:

Data was collected from fifty questionnaires. According to participants' height and weight, researchers calculated their BMIs. Then, the researchers analyzed how many participants had accurate awareness about their weight. Next, researchers analyzed how many participants pay attention to what they eat every day, and how many of them have the habit of exercise. According to the statistics, researchers analyzed how the participants' BMIs related to their eating and exercising. Finally, researchers summarized the information they obtained in tables and charts.

V. RESULTS

1. Participants' BMI were calculated and divided into four groups: underweight (15-18.5), normal weight (18.5-25), overweight (25-30), obese (30-40). Table (1) below shows how many males and females belong to each BMI group and the average BMI of males and females.

Table (1) participants' BMI group and the average BMI

	Male	Female
Underweight	0	4
Normal weight	22	19
Overweight	2	1
Obese	1	1
Average BMI	22.1	20

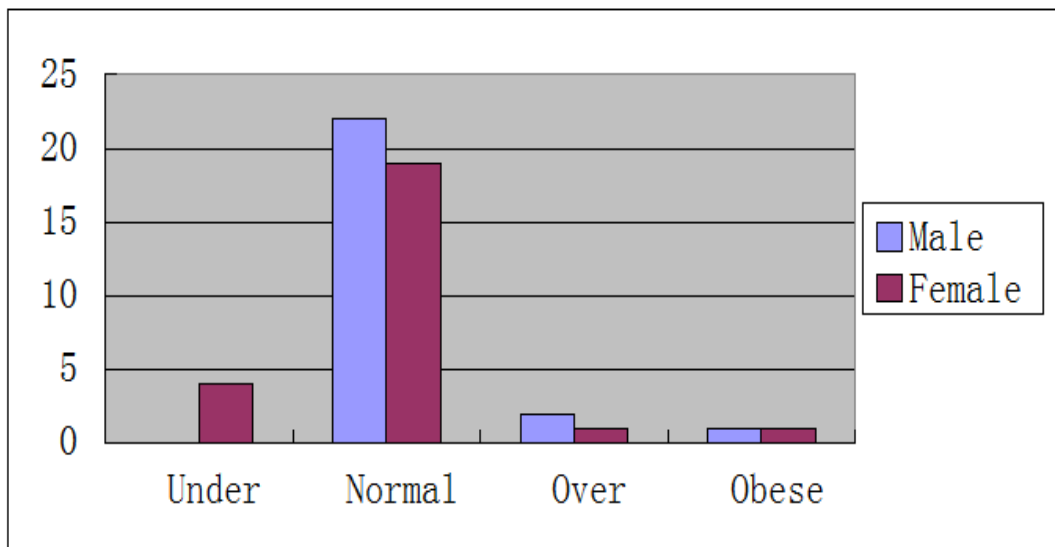


Chart (1) participants' BMI group

2. The researchers asked participants to estimate their weight before they know their accurate BMIs. The researchers counted how many students estimate right, and how many students estimate wrong. The participants' estimate results show in in table (2) and table (3). Table (2) shows the every participants' estimation result. Table (3) shows the total number of right and wrong estimation of males and females. T stands for True, and F stands for False.

Table (2) participants' weight estimation results compared to their BMI

	Male		Female	
	BMI	Estimation	BMI	Estimation
1	Normal	T	Normal	T
2	Normal	T	Normal	T
3	Normal	T	Normal	F Over
4	Normal	T	Normal	T
5	Normal	F Over	Normal	T
6	Normal	T	Normal	T
7	Normal	T	Normal	T
8	Normal	T	Normal	F Over
9	Normal	T	Normal	F Over
10	Normal	T	Over	T
11	Overweight	F Normal	Normal	T
12	Normal	T	Under	F Normal
13	Normal	F Over	Obese	T
14	Normal	F Over	Normal	T
15	Obese	T	Under	T
16	Normal	F Under	Normal	F Over
17	Normal	T	Normal	T
18	Normal	T	Normal	T
19	Normal	T	Normal	T
20	Normal	T	Under	T
21	Normal	T	Under	F Normal
22	Normal	T	Normal	T
23	Normal	T	Normal	T
24	Overweight	T	Normal	T
25	Normal	T	Normal	T

Table (3) the number of right and wrong estimations

	Male	Female
Right	20	19
Wrong	5	6

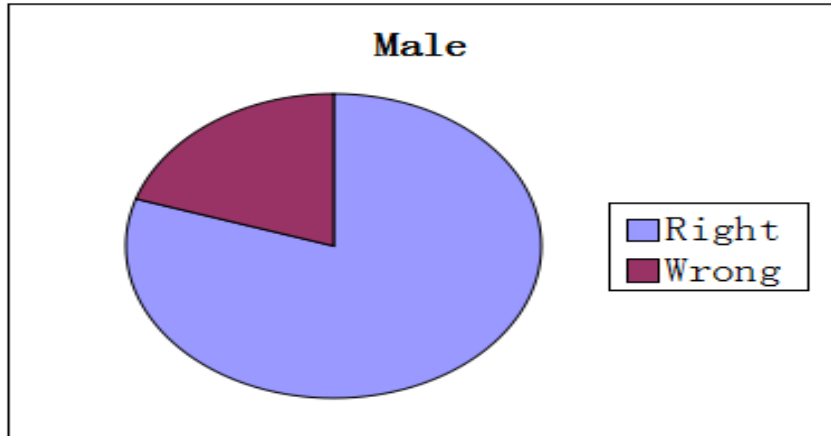


Chart (2) the number of right and wrong estimations for male

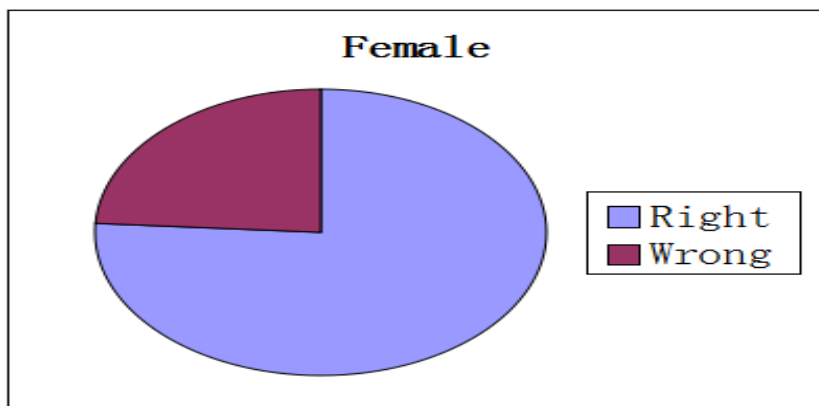
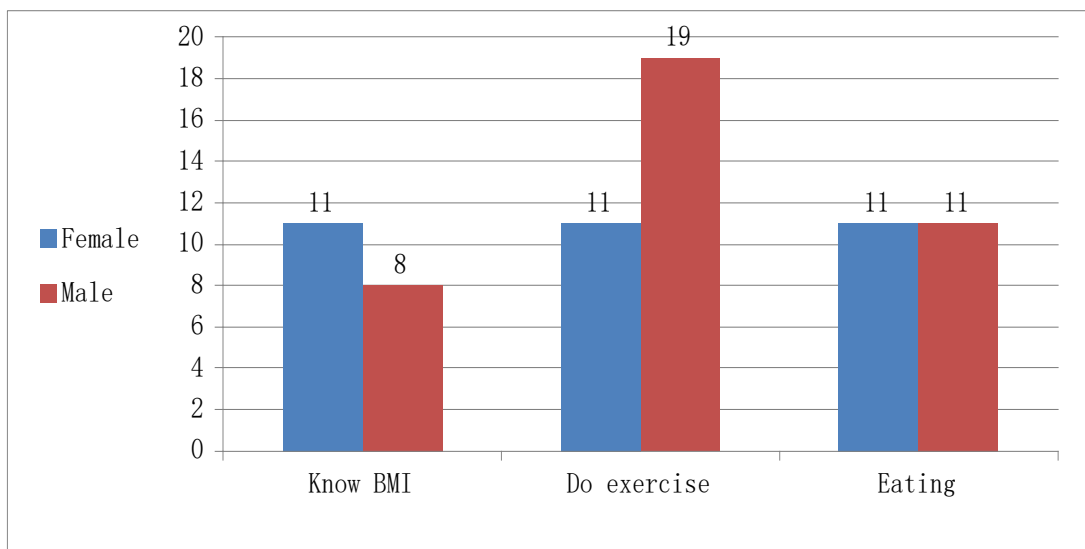


Chart (3) the number of right and wrong estimations for female

3. The questions which researchers asked about whether they care about their body health. Table (4) the numbers of students have heard of BMI before; the students who have habit of doing exercise; and the students who pay attention to what they eat. Chart 4 and chart 5 show the participants' weekly frequency of exercising.

Table (4) the numbers of students who have heard of BMI before; the students who have habit of doing exercise; and the students who pay attention to what they eat.



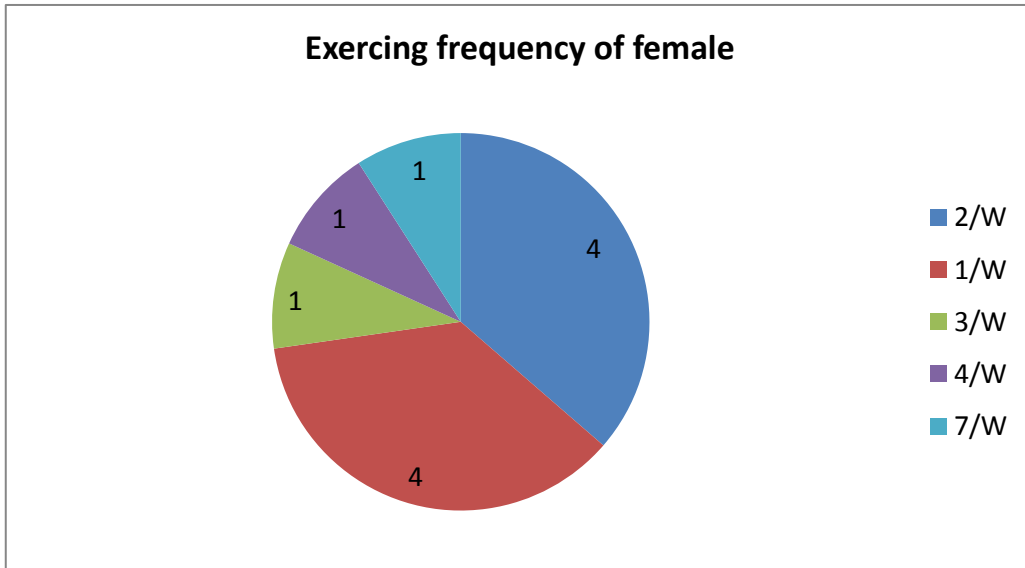


Chart4: the weekly frequency of female students who have exercising habit.

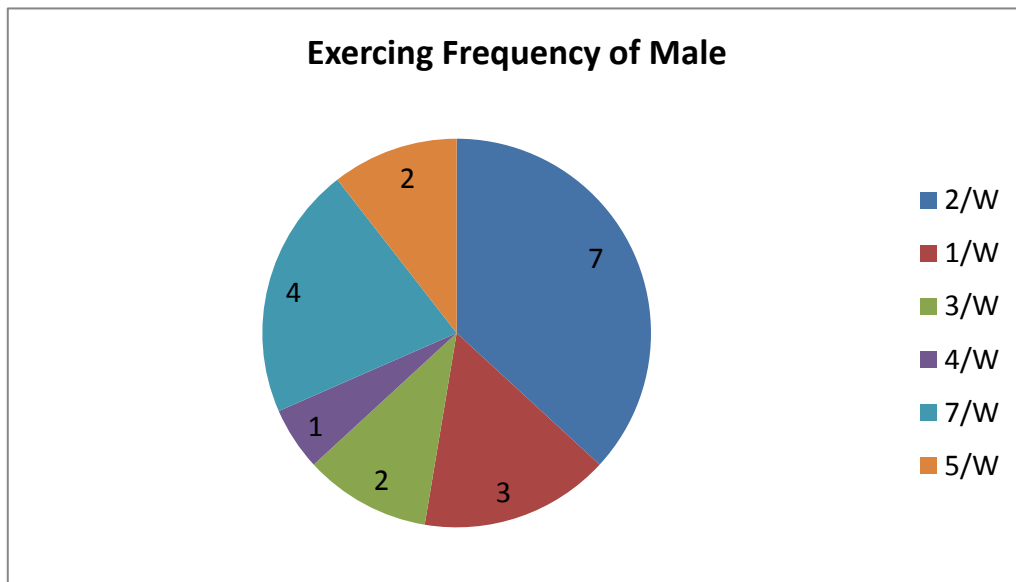


Chart5: the weekly frequency of male students who have exercising habit.

VI. DISCUSSION AND CONCLUSION

By analyzing the data, the researchers got a number of findings. The average BMIs of both male and female students in LNU-MSU are in the normal weight category. Male's average BMI is higher than female's average BMI. Female students have much higher chance to be underweight, and have less chance to be overweight than male students.

80% male students and 76% female students estimated their weight category correctly. Three out of five male students estimated their weight wrong. They estimated their weight higher than reality. However, all the six female students who had the wrong estimation, thought themselves heavier than their real weight.

According to the data, male students exercise more than female students. 76% of male students exercise at least once a week. 84% of them exercise at least twice a week, and 21% exercise every day. 44% of female students exercise, and only 27% of them exercise more than twice a week.

More female students knew BMI, and they pay more attention to their weight than male students. However, female students more tend to estimate their weight based on their own standard, and most of their standards are not scientific. Male students and female students pay attention to what they eat equally. Female students tend to eat less to control their weight. Male students tend to use exercise to control their weight.

Four in six students who estimate their weight level wrong and have a normal BMI overestimate their weight level. This conclusion is the same as Eunkyung Park's 2011 study; girls always overestimate their body status (58). Park also concludes that weight perception and the BMI based weight status are strongly and positively correlated. From our data analyzing, the percentage of students who estimate their weight level right is 78%, which strongly proves Park's conclusion. On the other hand, the percentage of underestimating the body weight is 27%. The result is not the same as Park's saying that underestimation is more common than overestimation (57). But there is another difference that most of our interviewees are Asian and all of Park's interviewees are American, this difference indicates that American teenagers are more confident about their figures than Asian teenagers.

In general, 83% of the students who have a habit of exercising are at normal BMI. 82% of the overweight students don't pay attention to outdoor activities. From the research of Caroline W. Hohensee and MHA Mary A. Nies we can see that there is a strong correlation between outdoor exercising and BMI status. The table of the two researchers' study shows children who participate in 30 minutes or more of physical activity per day have the least common rate of obesity (20.4%) versus those who have less than 30 minutes per day (24.8%) or none (26.4%).

However, our study shows the average BMI of girls is at a normal status of 20; the average BMI of boys is 22.1 which is higher than girls' status but still at normal level. This is totally different from the study of Ahmed H. Youssef Agha, David K. Lohrmann, and Wasantha P. Jayawardene that the girls' BMI are a little higher than the boys' BMI. One possibility of the difference may be because of the different life style of Chinese and American youngsters. The outdoor sports which consumes enormous amount of calories like soccer and football are popular among American male teenagers and the boys are crazy about the sports. However, Chinese male students are more likely to stay in front of the computer to play computer games. Meanwhile, some students will eat some drunk food and drink soft drinks which have bad influence on their health and BMI. In addition, being on diet is popular among Chinese female college students. These different life style directly leads to the difference between Chinese and American college students.

From the data collection, we figure out 86.4% of the students who pay attention to what they eat every day keep in a normal BMI status. This conclusion is correlated to Caroline H. Guinn's study in 2013. She suggests in her study that students should eat healthy food at school in order to intake more energy, in another saying is, for keeping in a normal body figure, students should pay attention to whether the meals they eat are healthy or not.

The researchers concluded that students' BMIs are closely connected to their exercise and eating habits. Participants who at least exercise twice a week and pay attention to their diet are more likely to have normal weight. Participants who only pay attention to exercise or only pay attention to their diet tend to neither close to underweight or close to overweight. However, this weight, exercise, and eating relationship doesn't suit for everyone. A few participants pay attention to both eating and exercise, but they are still underweight, overweight, and even obese. The researchers don't think that participants whether or not have heard of BMI before have strong connection to their BMI, eating habits, and exercise habits.

The researchers suggest that students should pay more attention to their eating and exercise habits. Only pay attention to eating or exercise is likely to cause underweight or overweight. Besides, students should use scientific standard like BMI to estimate their weigh. If their estimation only based on their own standard, they will easily underestimate or overestimate their weight and easily hurt their health.

REFERENCES

- [1] Eunkyung Park. "Overestimation and Underestimation: Adolescents' Weight Perception in Comparison to BMI-Based weight Status and How It varies Across Socio-Demographic Factors." *Journal of School Health*(2011). ERIC. web. 3 May 2015.
- [2] Guinn, Caroline H. "Explaining The Positive Relationship Between Fourth-Grade Children's Body Mass Index And Energy Intake At School-Provided Meals (Breakfast And Lunch)." *Journal Of School Health* 83.5 (2013): 328-334. ERIC. Web. 3 May, 2015.
- [3] Heather H. McClure, J. Mark Eddy, Jean M. Kjellstrand, J. Josh Snodgrass, and Charles R. "Child and Adolescent Affective and Behavioral Distress and Elevated Adult Body Mass Index." *Child Psychiatry Hum Dev* (2012) 43:837-854. ERIC. Web. 3 May 2015.
- [4] Hohensee Caroline W., Nies MHA Mary A. "Physical Activity and BMI: Evidence from the Panel Study of Income Dynamics Child Development Supplement" *Journal of School Health* (2012). ERIC. Web. 3 May 2015.
- [5] Keefer, Daniel J., Jennifer L. Caputo, and Wayland Tseh. "Waist-To-Height Ratio And Body Mass Index As Indicators Of Cardiovascular Risk In Youth." *Journal Of School Health* 83.11 (2013): 805-809. ERIC. Web. 3 May 2015.
- [6] Schmeer, Kammi K. "Union Transitions and Changes in BMI among Adults in Mexico." *Journal of Health and Social Behavior*, Vol. 53, No. 2 (JUNE 2012), 263-275. JSTOR. Web. 3 May, 2015.
- [7] V.A. George, S.D. Shacter, and P.M.Johnson. "BMI and Attitudes and Beliefs about Physical Activity and Nutrition of Parents of Adolescents with Intellectual Disabilities." *Journal of Intellectual Disability Research* (2011). ERIC. 3 May, 2015.
- [8] Youssef Agha, Ahmed H., David K. Lohrmann, and Wasantha P. Jayawardene. "Use Of Data Mining To Reveal Body Mass Index (BMI): Patterns Among Pennsylvania Schoolchildren, Pre-K To Grade 12." *Journal Of School Health* 83.2 (2013): 85-92. ERIC. Web. 3 May, 2015.