



Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/8750  
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/8750>



### RESEARCH ARTICLE

#### IMPORTANCE OF BODY MASS INDEX (BMI) IN SCHOOL CHILDREN.

**Dr J. Thavamani MBBS, DGO, MBA, Medical Director, Sai Kiran, Ms.Baby Rajendran and Mohamed Fazl.**  
 Own High School Team, Al Warqa'a, Dubai.

#### Manuscript Info

##### Manuscript History

Received: 19 January 2019

Final Accepted: 21 February 2019

Published: March 2019

#### Abstract

**Introduction:** Obesity is increasing at an alarming rate throughout the world. By creating awareness on obesity and its effects on health to students, we not only prevent many medical conditions like diabetes, high blood pressure, cardiovascular disease, but motivate the students to improve their overall health, which has an impact on their performance, personality development and self-confidence.

**Purpose:** This study was conducted to create awareness and preventive health measures among students on Body Mass Index, and preventive measure for obesity through counseling students on healthy nutrition and the importance of physical activities.

**Methodology:** BMI was done for all the students from grade 1 to grade 12(4,736 students from 5 to 18 years. 100 students volunteered to do the Healthy weight watch Programme with the consent of the parents.  $BMI = \text{weight in kg} / (\text{Height in meters})^2$ .

**Results:** Children enjoyed participating in the Health Awareness programme. 81 students have reduced weight by participating in the programme most of them feel it is due to increased physical activity, and change in food habits. Parental involvement was 64%. Students enjoy sports and other physical activity. Television watching and use of other gadgets is the other cause of sedentary lifestyle. Focusing on reducing time spent watching television and increasing time spent in physical activity may be successful means of preventing obesity.

**Conclusion:** By conducting the BMI for all the students in the schools every year, we will know to which group of students we should concentrate the health awareness programmes. A holistic approach for effective weight management and prevention of chronic diseases is important.

*Copy Right, IJAR, 2019,. All rights reserved.*

#### Introduction:-

Obesity is a national epidemic, causing higher medical costs and a lower quality of life (Adolescent and School, 2011). Obesity is increasing at an alarming rate throughout the world. Today, it is estimated that there are more than 300 million obese people worldwide. It is defined as a condition of excess body fat and is associated with a large number of debilitating and life-threatening disorders. In addition, obesity is a serious medical condition that affects not only children but adolescents as well. It occurs when a child is well above the normal weight for his or her age and height. Obesity is particularly troubling because the extra pounds often put children on the path to health

problems that were once confined to adults, such as diabetes, high blood pressure, and high cholesterol. This can also lead to poor self-esteem and depression.

Therefore, I selected to do my action research project on the students of Our Own High School and on the importance of Body Mass Index (BMI) in school children. The aim of my research is to create awareness on preventive measures of obesity. As a result of this, students will be motivated to improve their health. This will have an impact on their performance, personality development and self-confidence.

#### **Our Own High School, Al Warqa'a, Dubai Context**

Our Own High School (OOHS), Al Warqa'a, is a GEMS school created in 2005 as a single shift facility for boys of Our Own English High School, Dubai, which was established in Bastakiya in 1968. The school now has 4,700 students (boys). The school is well-known for the quality of its academic achievements and the service it provides to students and parents. The school's educational priorities are based on current trends that affect education globally, and on the shared leadership and management agent that is consciously emerging across GEMS schools. The Dubai School Inspections Bureau (DSIB) recognized these priorities in daily school life and has awarded the school an overall "Good" for four consecutive years, and "Outstanding" for health for three consecutive years.

Since obesity is the major challenge in the world, I decided to focus my research on this issue, the importance of BMI in OOHS students, which could improve the overall health of the student and his self esteem and hence his quality of education will improve.

#### **My Research Question and Its Impact on Students**

Childhood obesity has reached epidemic proportions in the United Arab Emirates (UAE) with an increased risk of Type 2 diabetes and a host of obesity-related medical conditions. With nearly a third of children either obese or overweight, government or local hospitals are shoring up efforts to tackle the obesity rate. The UAE was listed seventh on the Global Fat Scale among 177 countries, calculated using UN data on population size and estimates of global weight from the World Health Organization (WHO). Last year's figures from a nationwide survey of Emirati and expatriate schoolchildren done by the Ministry of Health (MoH) stated that 15.5% are obese, 39.2% are overweight and a worrying 21% has fast food three times or more a day (C. D'Souza & Ponce de Leon.J,2012). The incidence of chronic medical conditions such as diabetes, hypertension, and chronic heart disease is increasing in the UAE. Physical inactivity and sedentary lifestyle is thought to be one of the reasons for this increase (Cameron & Neyland, 2005).

In the Medical Department we do BMI checkup for all the students in the school every year according to the directives of the Dubai Health Authority (DHA), School Health Services has many projects to reduce the obesity rate in school children. I am working as a school Medical Director and I feel the quality of education will improve once the students improve their quality of health. Various health awareness programmes are conducted in school to spread the awareness of following healthy habits from a young age. Health awareness and preventive measures on health among students at a young age will prevent many diseases in the future. My research topic, "Importance of Body Mass Index (BMI) in School Children," has the short-term goal of improving the health of the student by reducing his weight and a long-term goal: it prevents chronic medical conditions and hence increases the life expectancy of the child. It also improves the socio-economic condition of the country. The strategy formulated for the above objectives is to achieve healthy food habits and instill the importance of exercise among the students.

#### **Literature review**

The aim of this research is to create health awareness and preventive measures among students about the importance of BMI by creating awareness on BMI and counseling students on healthy nutrition and the importance of physical activities. Various research studies have shown that health is but one factor affecting learning outcomes. Key factors that have been found to determine whether people are healthy or unhealthy include income and social status, social support networks, education and literacy, employment/working conditions, social environments, physical environments, personal health practices and coping skills, healthy child development, biology and genetics, health care services, gender and culture (Ross, 2007).

Saberi (2012) reported that the UAE ranks as the fifth fattest nation in the world, according to a recent study published by the BMC Public Health Journal. Salty snacks and sugar laden fizzy drinks, coupled with a sedentary lifestyle, are a recipe for obesity. Saberi also stated that a senior doctor at the UAE Ministry of Health had warned

that more people are dying of non-communicable diseases such as heart disease. He said the alarming thing is that children are less physically active today which will make a large section of the population obese by the year 2015. D'Souza and Ponce de Leon (2012) stated that obesity has psychological effects. Obese children struggle with a range of negative psychological problems. Apart from being teased and bullied, the children also feel vulnerable and isolated. Overweight or obese children often suffer from poor image and low self-esteem, resulting in a host of emotions including depression. Dr Raymond H Hamden, clinical and forensic psychologist and director of the Human Relations Institute shared with Gulf News about the challenging mental issues facing obese and overweight children. He advised parents to take a proactive approach with children who have weight issues; they should assist their child or children with both medical supervision and psychological intervention. Everyone can participate in the remedial process to empower the child towards independence, responsibility, and respectability. Parent and sibling involvement will further give the sense of bonding, which enhances psychological strength.

Cleland (2013) reported that nearly a third of school children in Abu Dhabi are obese or overweight, but progress is being made in improving the eating and exercise habits of the young. Thirty percent of 6 to 18 years olds are either obese or overweight, according to the latest statistics from Health Authority, Abu Dhabi (HAAD). UAE school children are 1.8 times more obese than US children, studies conducted by the cardiology department at the Saif bin Ghubash Hospitals in Ras Al Khaimah concluded. Despite this, HAAD said its school-based "Eat Right, Get Active" programme, which aims to improve the health of pupils through healthy eating habits and physical activity, is achieving results. The programme was brought in because there are challenges in eating habits and physical activity in Abu Dhabi among children, said Dr Jennifer Moore, the section head for maternal and child health at HAAD. It is important for children to learn healthy behavior early on in their life about healthy eating and physical activity. The results produced by the schools were amazing with improvement in physical activity in the school, as well as the eating habits of the children.

Borders (2009) stated that unhealthy coping mechanisms become more widely available to young people during their teenage years. Students frequently choose these unhealthy activities as avenues for dealing with the stress of physical and social changes that confront them during adolescence. For this reason, a need exists for intervention programs that teach adolescents to work toward goals that promote healthy decision making. The health habits that young people establish during adolescence will follow them into their adult lives. Therefore, it is imperative that teens choose positive role models who inspire them to make healthy decisions. Health educators (teachers, administrators, parents, and community volunteers) are in an ideal position to support students as they set productive goals and make healthy decisions when obstacles arise. The purpose of the teaching technique is to communicate to students that good decision-making skills are necessary to reach constructive goals.

Freudenberg and Ruglis (2007) stated that good education predicts good health, and disparities in health and in educational achievements are closely linked. Despite these connections, public health professionals rarely make reducing the number of students who drop out of school a priority. It is summarized that knowledge on the health benefits of high school graduation and the pathways by which graduating from high school contributes to good health. They have examined strategies for reducing school dropout rates with a focus on interventions that improve school completion rates by improving students' health. Finally, they have recommended actions that health professionals can take to reform the school dropout rate as a public health issue and to improve school completion rates in the United States.

Jago (2005) conducted a study to investigate whether diet, physical activity, sedentary behavior or television (TV) viewing predicted BMI among 3-7 year-old children. "BMI from 3-6 years of age is predicted by TV viewing and physical activity, not diet" Jago, 2005). The result was that the interactions between minutes of TV viewing per hour and study year and minutes of physical activity per hour and study year were significant. There were also significant effects of TV viewing, physical activity and BMI from the beginning of the study. The model accounted for 65% of the variance in BMI across the three study years. Plotting the significant interactions demonstrated that physical activity was positively associated with BMI in year 1, and negatively associated in years 2 and 3 with a stronger negative relationship in year 3 than 2. TV viewing became positively associated with BMI during the third study year. They concluded that physical activity and TV viewing were the only significant predictors (other than baseline BMI) of BMI among a triethnic cohort of 3-4 year-old children followed for 3 years with both physical activity (negatively associated) and TV viewing (positively associated) becoming stronger predictors as the children aged. It appears that 6 or 7 years old is a critical age when TV viewing and physical activity may affect BMI. Therefore, focusing on reducing time spent watching television and increasing time spent in physical activity may be successful means of preventing obesity among this age group.

John and Narasimhan (2008) conducted a study to elicit information on the breakfast skipping habits of school children and its impact on their nutritional status, physical, cognitive and academic performance. Children who skipped breakfast tend to underperform and also have behavioural problems such as fighting, stealing and not listening to their teachers. Skipping breakfast also leads to impaired ability to concentrate, decreased ability to learn, increased stress hormones, emotional arousal, higher accident rate, fatigue and decreased performance. Children who eat breakfast early in the day also tend to be better off in terms of overall nutrition. Consuming breakfast has many other benefits, it boosts cognitive functions and school performance, improves behaviors and grades, controls weight, provides vitamin and improves physical strength and reduces risk of heart attack. Breakfast eaters also tend to be less stressed and feel calm.

Cawley et al (2012) stated that in response to the dramatic rise in childhood obesity, the Centers for Disease Control (CDC) and other organizations have advocated increasing the time that elementary school children spend in physical education (PE) classes. This study indicates that increased PE leads to greater overall participation by elementary school children in structured physical activity and more physical activity overall. Beyond its impact on youth weight, this is important because increased physical activity by youths is associated with cardiovascular benefits such as a reduction in low-density lipoproteins (bad cholesterol) and the prevention or delay of hypertension; musculoskeletal benefits such as increased bone-mineral density and increased strength and endurance, mental and emotional benefits such as reduced stress and anxiety, and prevention of chronic disease.

### Conclusions from the Literature Review

The main findings from the research suggest that obesity is increasing at an alarming rate in UAE. By creating awareness among the students this can be prevented. Good education predicts good health. Disparities in health and educational achievements are closely linked. Breakfast has an impact on student's nutritional status, physical, cognitive and academic performance. Diet, physical activity, prolonged sedentary behavior or television viewing has an effect on BMI. It is imperative that teens choose positive role models who inspire them to make healthy decisions. Health educators (teachers, administrators, parents, and community volunteers) are in an ideal position to support students as they set productive goals and make healthy decisions when obstacles arise. The purpose of the teaching technique is to communicate to students that good decision-making skills are necessary to reach constructive goals.

### My Project

BMI was done for all the students of the school from grade 1 to grade 12. 100 students volunteered to do the "Healthy Weight Watch Programme." Parents consent was taken from the 100 students.  $BMI = \text{weight in kg} / (\text{height in m})^2$ , this is plotted in the CDC chart for children.

In Phase 1, BMI was checked for all 100 students in the month of November. A workshop was conducted for all the participating students. They were enlightened about the importance of healthy food habits, the importance of physical activity and the change in lifestyle through workshop and personal counselling. In Phase 2, BMI was checked after 1 month. A counselling session was conducted on healthy food habits, the importance of physical activity and the change in life style. Children were made to record the physical activity being done in a worksheet. In Phase 3, BMI was checked again after 1 month and counseling done. In Phase 3, BMI was checked for all the students along with the counseling and an online survey was done for the students. I choose this because this is within the limitations of the Dubai Health Authority and the parents consent.

### Data Collection

Body Mass Index was done for all the students from grade 1 to 12

**Table 1:-BMI of the Students from grade 1 to grade 12 (4,736 students)**

Grade	Total sts	BMI done	Normal	Over weight	Obese	Under weight
Grade I	102	98	71	1	3	23
Grade II	114	112	83	6	2	21
Grade III	376	360	267	33	20	40
Grade IV	383	359	261	46	40	12
Grade V	576	557	341	96	91	29
Grade VI	597	594	302	113	143	36

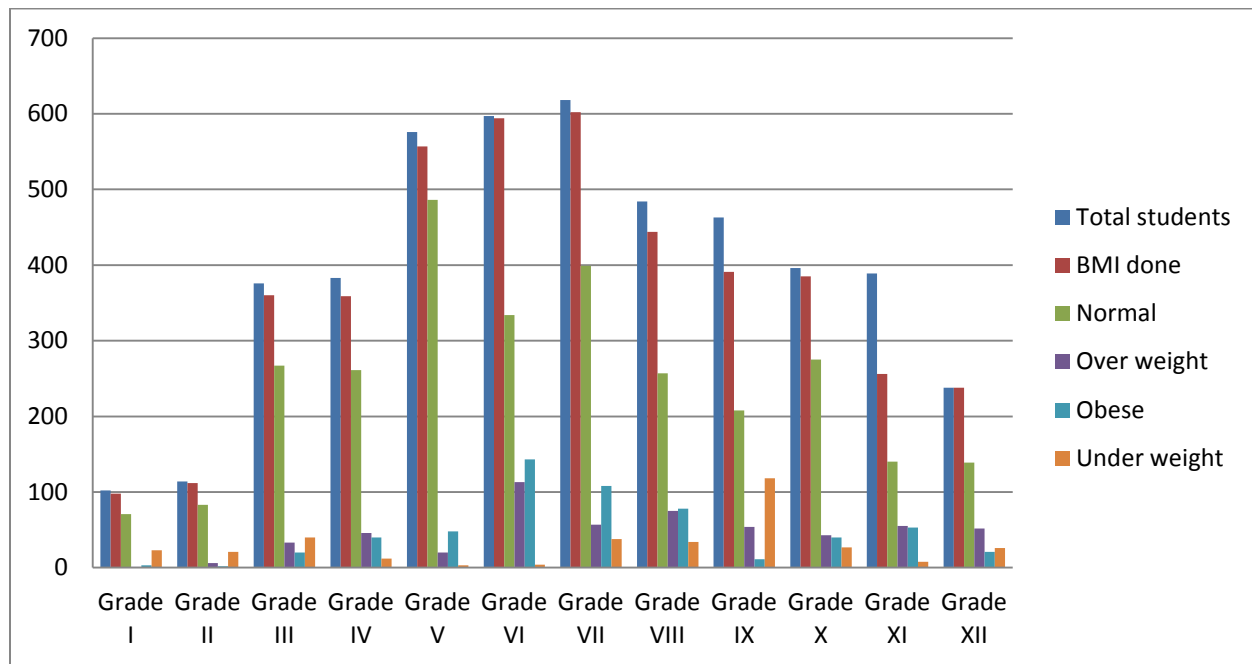
<b>Grade VII</b>	<b>618</b>	<b>602</b>	<b>399</b>	<b>57</b>	<b>108</b>	<b>38</b>
<b>Grade VIII</b>	<b>484</b>	<b>444</b>	<b>257</b>	<b>75</b>	<b>78</b>	<b>34</b>
<b>Grade IX</b>	<b>463</b>	<b>391</b>	<b>208</b>	<b>54</b>	<b>11</b>	<b>118</b>
<b>Grade X</b>	<b>396</b>	<b>385</b>	<b>275</b>	<b>43</b>	<b>40</b>	<b>27</b>
<b>Grade XI</b>	<b>389</b>	<b>256</b>	<b>140</b>	<b>55</b>	<b>53</b>	<b>8</b>
<b>Grade XII</b>	<b>238</b>	<b>238</b>	<b>139</b>	<b>52</b>	<b>21</b>	<b>26</b>

An online questionnaire with 20 questions was giving to the 100 students who participated in the Healthy Weight Watch programme. All the students enjoyed participating in the Healthy Weight Watch programme.

Q. No.	Question	Answer
1	Did you enjoy Participating in the “Healthy Weight watch” Programme?	100
2	Did you reduce your weight in these 3 months of the programme?	81 students reduced weight, 17 did not, 2 increased by 1 kg
3	How many kgs did you reduce?	17- 0 kg, 36-1 kg, 20-2 kgs, 15-3 kgs, 10>4 kgs
4	Main cause of reducing weight	41-increased Physical activity, 20-due to change in food habits, 25-all of the above, 9 Health awareness programme, 5-change in lifestyle
5	Definition of BMI (Body Mass Index)	92-BMI, 5-Body measurement 3-Bone measurement
6	Did your parents involve in the programme?	64 said yes, 36 said no
7	Family history of diabetes	38 – Yes, 62-No
8	Family history of cardiovascular disease	15 – Yes, 85- No
9	Family history of obesity	40-Yes, 60-No
10	Frequency of walking	34-daily, 43-twice a week, 23-others
11	Sports	88-Yes, 12-No
12	Frequency of sports	42-daily, 28-twice a week, 30-others
13	Daily television watching	74 –Yes, 26 - No
14	Frequency of television watching daily	69- 1 hour, 20-2hrs, 3-3hrs, 7->3 hrs
15	Time spent for electronic gadgets	66-1hour, 25-2hrs, 4-3hrs, 5>5hrs
16	Daily sleeping hours	32-8 hours, 44-7 hrs, 16-6hrs, 8<6 hrs
17	Study hours	17-1hr, 55-2hrs, 15-3 hrs, 13>3hrs
18	Frequency of fast food	10-daily, 90-twice a week
19	Daily meditation	30-Yes, 70-No
20	Skipping breakfast daily	36-Yes, 65-No

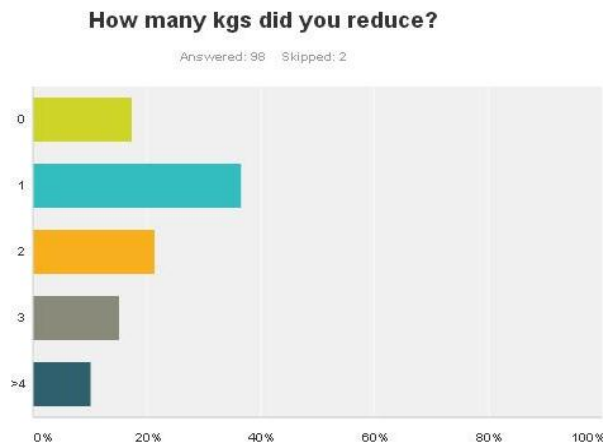
### My Findings

All the 100 students enjoyed participating in the Healthy Weight Watch programme. Out of the 100 students who participated in the programme, 81 students reduced their weight, and 17 of them did not reduce weight, 2 of them increased weight by 2 kgs and 1 kg.

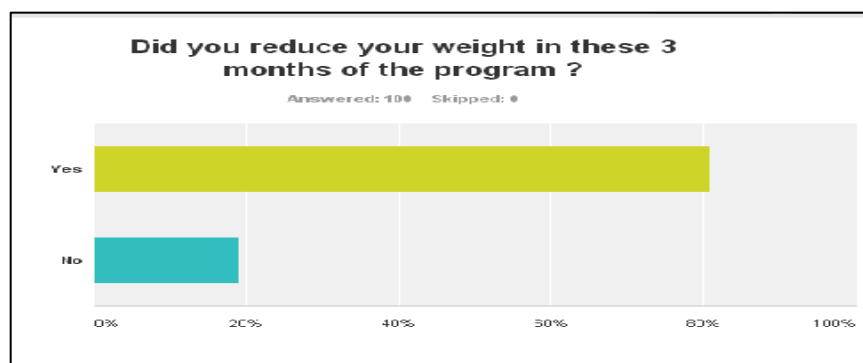


**Figure 1:-**Body Mass Index of the students from grade 1 to grade 12

We can see in the above graph that the students of grade 5, 6, and 7 need more attention in creating awareness on obesity and overweight.



**Figure 2:-**81 students answered that they reduced weight in the Healthy Weight Watch Programme; 17 of them did not reduce their weight.



**Figure 3:-**Weight reduction observed by the students

### Personal Reflections

Children enjoyed participating in the Health Awareness programme. 81 students have reduced weight by participating in the programme most of them feel it is due to increased physical activity, and change in food habits. Parental involvement was 64%. There is a family history of Diabetes (38%), Heart disease (15%) and Obesity (40%). Students enjoy sports and other physical activity. Television watching and use of other gadgets is the other cause of sedentary lifestyle. Focusing on reducing time spent watching television and increasing time spent in physical activity may be successful means of preventing obesity. Students sleeping pattern is quite good. Study habits are also good. 90% of the students eat fast food twice a week. 70% of the students said no to Meditation. Mental Health is also an important aspect of health. 36 % of the students skip their breakfast as there is no time or too early in the morning. Breakfast is an important meal for students as they spend the most important time for their studies in the morning.

Healthy Habits developed in childhood stay for life. With ever increasing incidence of Obesity, heart diseases, and cardiovascular disease, a drastic change in lifestyle, physical activity and eating habits is the need of the hour to tackle the alarming situation with a special focus on youth. Parents have odd working hours that lead to stress, not many of them have the privilege of eating home cooked meals...

Smoking, eating junk food and less physical exercise are the evils that are severely affecting our youth today. So the focus should be on how to educate youngsters to lead a healthy lifestyle. Efforts should be made to stop leading an

Number of students	Weight Lost
17	0 kg
36	1 Kg
20	2 Kgs
15	3 Kgs
10	>4 Kgs

unhealthy lifestyle which may lead to a cardiovascular disease later. The education and guidance should begin early. Physical exercise, avoiding junk and oily food and not smoking are some of the steps that must be adopted in early life. Stress is a part of life today, which can't be avoided, but how to handle stress, by half an hour of walk or exercise, meditation etc can be inculcated in children from a young age.

### My Experience of this Action Research Project

The vision of the Action Research Project is to apply our leadership and knowledge of education and technology to complete high impact action research projects that will have a significant impact on the students in GEMS Schools. Furthermore, not only was this project very interesting; it also strengthened the team work between Medical and Educational leaders in our school.

The most important issue is that all the 100 students are so satisfied and happy that they have done something to improve their health. They are so proud of their achievement. Some parents who participated along with the students in this programme also succeeded in reducing their weight. I was so touched by one student who had just lost his mother, and his father wanted to encourage him in some aspect and he put him in this project and the child was so

happy in doing this. Most of the children wanted to improve their health and reduce their weight. They also felt that prevention is better than cure.

The World Health Organization recommends that in order to improve and maintain health, an individual must engage in at least 30 minutes of cumulative moderate physical activity every day. This level of activity can be reached through a broad range of appropriate physical activities, such as walking, climbing stairs, cycling, gardening, dancing, as well as a variety of leisure and recreational sports.

#### **Lessons Learned for other GEMS Schools.**

From the Literature review and my own experience with this research work, it is definitely going to help all the other GEMS school students, staffs and Parents to improve their health.

1. By conducting the BMI for all the students in the schools every year, we will know to which group of students we should concentrate the health awareness programmes. A holistic approach for effective weight management and prevention of chronic diseases is important.
2. By coming up with new projects which is interesting to them, like this Healthy Weight Watch programme, children, Parents as well as the school team, there is an opportunity to improve health of the community as a team. A healthy lifestyle with proper diet and regular exercise is required for maintaining optimum weight. Short term goal, it improves the health of the students.
3. Medical Team, Administrative team, Teaching team and the parents are able to help the children to create consciousness about their weight and hence work on to improve it, so that many prevent Non-communicable diseases like Diabetes and heart disease can be prevented.
4. There is a message for GEMS parents. The richest gift a parent can give to the child is good health. Prevention is better than cure. Parents are the child's first and most important teachers. Discipline involves protection, prevention and setting limits. These measures will keep children safe, help them to feel secure and teach them how to live with other people. Children benefit from having consistent standards and models to follow, although as parents, we all fall short of ideals from time to time.
5. Message for the Medical and Administrative Team of the GEMS: Better health Education, More PE and physical activity programs, Healthier school environments and better nutrition services in the school will make the students and staffs healthier. Health of the School children is a team work, major community service. Ministry of Education, Ministry of Health, parents and the school with a good leadership and team play a very important role to make this future generation into a healthy generation to face the challenges of life. It also helps to improve the socioeconomic development of the country.

#### **Limitation of the Study**

BMI is not the only indicator for Obesity, but at school level, within the limitation of the rules and regulations, this is the best we can do to prevent serious medical conditions of the students at young age and hence improve their quality of Education.

#### **Bibliography:-**

1. Adolescent and School Health. (2011). Retrieved from <http://www.cdc.gov/HealthyYouth/yrbs/index.htm>
2. Saberi.M. (2012 July 6th).UAE the fifth most obese country in the world, Gulf News, July 6<sup>th</sup> 2012
3. C. D'Souza & Ponce de Leon.J (2012 July 17) Obesity has psychological effects. Gulf News, July 17, 2012
4. Cleland.E. (2013 May 7th) UAE children more obese than US, with 30% in Abu Dhabi overweight. The National, May 7, 2013
5. Borders, M. Jane (2009) Project Hero: A Goal-setting and Healthy Decision-Making Program, Academic journal article from Journal of School Health, Vol.79, No.5, May 2009
6. Freudenberg N, Ruglis. J. (2007) Reframing school dropout as a public health issue. Prey Chronic Dis 2007; 4(4) [http://www.cdc.gov/pcd/issues/2007/oct/07\\_0063.htm](http://www.cdc.gov/pcd/issues/2007/oct/07_0063.htm).
7. Jago R, Baranowski T, Baranowski JC, Thompson D, Greaves KA (2005). BMI from 3-6 y of age is predicted by TV viewing and physical activity, not diet. Int J Obes (Lond).2005 Jun; 29 (6):557-64
8. John. S & Narasimhan.V (2008). Impact of Breakfast pattern on the nutrient intake, physical, cognitive and academic performance of school children, Ind.J.Nutr.Dietet. (2008), 45, pp.54-62
9. Cawley. J, Frisvold. D, Meyerhoefer. C (2012) The Impact of Physical Education on Obesity among Elementary School Children, IZA DP No. 6807, August 2012
10. Cameron.E, Neyland.C (2005) Feasibility for measurement of physical activity and fitness levels in Arab female university students in the UAE; A pilot study, Emirates Medical Journal, 2005, 23(1):21-26.