Assessment of Eating Behaviours Patterns among School Aged Child groups (6-12) Years in Slemani City

Tavgah A. Merzia[1], Attallah O. Kasem[2], Burhan A. Hama Hussein[3]

[1] Department of Community Health Nursing / College of Nursing / University of Sulaimani

[2] Department of Community Health / Sulaimani Technical Institutes / Sulaimani polytechnic university

[3] Department of Nursing / High health vocation institute in Kirkuk / Ministry of Health

ABSTRACT

Objectives: To assess Eating Behaviour and determine the result among school age group child (6-12) years in Slemani city. However, investigate the psychometric measures of eating behaviour are associated with obesity in school-aged children in the city of Slemani.

Method: The study utilized the method of cross-sectional survey of School age in Slemani children's eating manner and their relationship to obesity using groups of children aged 6–12 years. Eating behavior was using the Child Eating Behavior Questionnaire (CEBQ) and body composition was estimated using body mass index (BMIs). This information was given by the parents on behalf of their children randomly. The parents were approached by researcher at the market and asked if they would participate in the survey. The statistical analysis used is based on multiple regression analysis with the dependent or predicted variable being BMI and the independent or predictor variables being food responsiveness and exercise.

Findings: It was found that exercise was significant at 5% and negatively associated with BMI, which means that when exercise increases, then BMI deceases. The behavioural characteristics derived from the CEBQ, food responsiveness. Was significant at 1% and positively associated with BMI, meaning that when food responsiveness increases so does BMI.

Conclusion:

The present study results of the psychometric measures of children's eating styles obtained from the Child Eating Behavior Questionnaire showed that. Exercise is negatively associated, at 5% level, with BMI; that is, children who were rated as having more exercise were more likely to have a lower BMI. Food Responsiveness is significantly positively associated at 1% level, with BMI, which means that children who score highly on these psychometric measure also tend to have a higher BMI. We conclude that assessment of, exercise; food responsiveness could be used as indicators of susceptibility to weight gain. But, the age group associated negatively with BMI, but not significant. These results for exercise and food responsiveness are in agreement with the results of other researchers.

Introduction

Obesity is a main health problem for people living in the Slemani, and it presently affects many children. Accurate causes for this are unclear, but poor diet coupled with lack of sport seem important. Obesity is now known as a universal epidemic (WHO, 2003) and has been predicted to become the largest drain on health service resources in the Slemani in the near future

In the UK, there are approximately one million obese individuals who are less than 16 years of age (Educari, 2004). Butriss (1995) showed through A survey in the UK a similar picture, with 75% of children aged 10-11 exceeding the recommended target level for percentage of energy derived from fat (Butriss, 1995). Therefore, both of Wardle (1995) and Currie et al., (1997) were have been reported a comparable results. Also, the Health Survey for England (HSE) illustrated the prevalence of obesity doubled between 1984 and 1994 among 4- 12 year olds in England, rising from 0.6% to 1.7% in boys and from 1.3 to 2.6% in girls. The most recent estimates propose that by 2001, some 8.5% of 6 year olds and 15% of 15 year olds were obese. While, in 2004; the Health Survey for England illustrated an overall increase in obesity amongst the number of children aged 2-10 who are obese from 9.9% in 1995 to 13.4% in 2004 (House of Commons Committee of Public Accounts, 2007).

A previous survey by Cameron and colleague (2006) showed that the consequences of childhood obesity in developed countries have extended into the most widespread nutritional disease (Cameron et al., 2006). Severely obese children generally experience a range of

sleep connected breathing disorders such as sleep apnoea. Studies have revealed sleep related disorders to have a clinically significant negative effect on learning and memory function in addition to the physical risks they present to the person's health (International Obesity Task Force, 2004).

Many studies have presented evidence indicating that dietary habits acquired in childhood often continue during adulthood (e.g. Kelder, et al., 1994; Nicklas, 1995; Steptoe et al., 1995). Indeed, because the severity of childhood obesity increases the risk of obesity throughout the growing age of the child, the persistence of childhood obesity into adulthood is the most significant concern (NICE, 2006).The risk factor of a number of chronic diseases in adult life such as heart disease, osteoarthritis, and some cancers are linked to childhood obesity (British Medical Association, 2005). Likewise, psychological problems such as rejection, shame, depression and stress are also more likely to occur in obese children than non-obese children (Reilly, 2003). The problem of childhood obesity will persist unless there is improved consideration of key factors operative during early childhood and identification of effective interventions (Department of Health, 2005).

The UK Government has reacted to increasing childhood obesity with a Public Service Agreement goal to stop the year-on-year increase in obesity among children below the age of 11 by 2010 (Department of Health, 2007). Nowadays the present measure is aimed at primary school children in the reception year (ages 4–5 years) and year 6 (ages 10–11 years) by Primary Care Trusts (PCTs) (Department of Health, 2007). PCTs are local organisations responsible for managing health services in the community. Therefore, they are responsible for the integration of health and social care, ensuring that local health organisations work together with local authorities (The Care Directory, 2003).

Literature review

The BMI is calculated as weight (kg) divided by height squared (m^2). Adults who have a body mass index (BMI) of over 30 are considered obese (Parry-Langdon and Roberts, 2002). Being overweight (or pre-obese) is similarly defined as having a BMI of over 25. Many studies have shown that inequalities of food intake and low energy expenditure lead to a person becoming overweight. Excess food intake, and decreased levels of movement as well as bad eating behaviours all contribute to the development of obesity (Ech, et al., 1992; Hill and Peters, 1998).

Childhood obesity is a developing problem in the developed countries. In children overweight is calculated by BMI at the 85th and below 95th percentiles, while obesity is calculated by BMI at or above 95th percentile (Gavin, 2009). But for adults, overweight and obesity ranges are determined by using weight and height to calculate a number called the "body mass index" (BMI). Therefore, BMI over 25 kg/m^2 is defined as overweight and a BMI of over 30 kg /m2 as obese in an adult (Wnag and Lostein, 2006). In 2003–2004, Ogden et al. (2002) showed that the Nutrition Examination Survey and the National Health Survey revealed that 17.1% of US children and adolescents are overweight. While, Wang and Lostein (2006) showed that the prevalence of overweight and obese children has increased dramatically over the past years by about 20-30% in the United States and Western Europe (Wang and Lobstein, 2006). A study by Wang and Lostein (2006) showed that In America, the Eastern Mediterranean region, the Eastern European region(which comprises the countries of the former Soviet Union), the Western Pacific region and South East Asia that over 46%, 41%, 38%, 27%, 22% respectively of school-age children will be overweight by 2010. In the Netherlands, the percentage of preschool-aged children who are overweight is 9% and 3% are obese (National Nutrition Survey, 1997). The prevalence rates for school age children in the UK have increased up to 16% for overweight and up to 7% for obesity (Kurth and Schaffath-Rosario, 2007). The probability of being obese in adulthood is very high for children who are already obese by the time they reach school age (Whitaker et al., 1997).

During the previous study showed that the behavioral correlates of obesity has recognized a different of eating behavior features in obese children and adults (Carnell and Wardle, 2008, Blundell et al., 2005). In the children literature, behavioral studies have been revealed that obese children have minor sensitive to inner satiety signs (Fisher et al., 2007, Moens and Braet, 2007), eat faster during the course of a meal (Barkeling et al., 1992, Agras et al., 1987) and are more responsiveness to outer food signals (Jansen et al., 2003) more than healthy weight children.

Positive food responses pleasure, responsiveness to deliciousness are assumed to stimulate food consume. In environments with many opportunities to intake very edible, heavy energy foods, these appetitive traits will have moderate effect of the risk of weight increase (Webber et al., 2009).

The study was showed that children of obese families achieved higher on food responsiveness (Wardle, et al., 2002).Therefore, the author has examined the relationship between eating behaviours and weight status in this age group.

Aetiology of Obesity

Obesity appears to arise from a combination of factors, none of which would appear to cause the condition, except in rare cases. An imbalance between energy input and expenditure is the cause of weight gain (Kipping et al., 2008). Many factors are considered contributors to this trend. These factors include **medical condition**, **diet**, **exercise**, **environmental**, **sedentary**, and **stress**.

The above literature review suggests that obesity levels among UK children are high, and that obesity, if not a disease in it, damages health. It also suggests that the causes of obesity are various, but that poor diets, and low levels of exercise, are especially important. The results suggested food responsiveness is positively associated with obesity.

Methodology

Sample size

The researcher able to provide information on a total of 140 children from parents that been contact directly with researcher in the city of Slemani. A total of 140 participants, as indicated, have been viewed. It was necessary to determine not only which the CEBQ components were predictors of BMI but also the differences according to age. The response rate from parents was poor. The participants were the parents of the 140 children aged 6–12 years old take the questionnaires, which were recruited in city of Slemani. Their gender was 69 boys and 71 girls, and that the majority of participants were ethnically white. The researcher gave the questionnaires to parents in the city of Slemani randomly. These were distributed to parents of all children aged 6–12 years old. The data obtained comprised the CEBQ results on local children's eating behaviours and the children's BMI derived from the information given by the parents.

Measures

Two measures were used: the Children's Eating Behaviour Questionnaire (CEBQ) (Wardle, et al., 2001a) and the child's BMI. The CEBQ consists of 35 items and another item added by the researcher to make 36 items divided into seven subscales. Some of the questions CEBQ comprises of are "My child undertakes physical exercise"; "Given the choice, my child would eat most of the time"; and "My child leaves food on his/her plate at the end of a meal" questions which are answered by ticking one of the following five options (never, rarely, sometimes, often, always, numbered 0 to 4 respectively). The questions provide information on seven behavioural components (satiety/slowness in eating, fussiness, food responsiveness, enjoyment of food, drinking, emotional under-eating and over-eating). And a question on exercise was added to the questionnaire. Therefore, questions were randomised according to components, and some are "reversed" i.e., they go in the opposite direction from those of other measures of the same component.

Data analysis

The main analysis was in two stages, by using multiple regressions, which means, a statistical technique that allows us to predict someone's score on one variable on the basis of their scores on several other variables. **Or** by stepwise regressions method

Results

Table 1 show the biographical data of the 140 pupils who took part, of whom 69 were males and 71 were females. The heights of the children ranged from 11.2627 cm to 31.2529 cm, and their weights ranged from 11.87 kg to 31.25 kg as indicated in Table 1 below. While table 2 shows use of the Enter Method for regression analysis to show the relationship between the dependent variable BMI and the ten independent variables: Exercise, Food responsiveness, ,Gender and the aged groups (6-12=1) years, as illustrated in table 1.

It is the general regression model given by: $Y = \beta_0+\beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4+ \mathcal{E}$,

Where Y is the dependent variable BMI, and X_1, X_2, X_3, and X_4, are the four independent variables comprising of, food responsiveness, exercise, gender and two age groups

From Table 3 shows above, R=0.45, so the correlation between BMI and the four predictors: Exercise, Food responsiveness, gender and two age groups, is positive and has a moderate value, indicating a reasonable positive association between the dependent and the independent variables.

R^2 equals 0.20, which indicates that only 20% of the variability in BMI is explained by the ten independent variables.

In table 4 shows the F-ratio = 2.072, has 2 degrees of freedom (df) k-1=11-1 = 10 and n – k = 140 -11 =129, where k is the number of parameters in the model and n is the sample size.

F is highly significant at 0.001 levels. So the regression model as a whole is highly significant, which indicates that the combined effect of the independent variables is associated with the dependent variable BMI is highly significant.

Table 5 gives the statistics and the significance of the coefficients. From the table, we find that the only independent variables that have significant or near significant effects on the dependent variable BMI at 5% level are, exercise and food responsiveness. The coefficient of the variable food responsiveness is positive which indicates that as this variable increases BMI will also increase. While exercise has a negative coefficient which means that as exercise level increases BMI decreases. The stepwise regression Criteria used was Probability-of F- to enter <=0.05 and Probability F- to- remove >=0.1

Table 6 above shows that the F-ratio equals 8. 681, which has p-value < 0.001, which is similar to the result obtained from the original full model. So here the regression model is highly significant which means that the 2 independent variables have a combined significant association with BMI.

Table 7 shows the general regression model is: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \mathcal{E}$,

Where Y is the dependent variable BMI, X_1, and X_2, are the 2 independent variables food responsiveness, and exercise respectively, and $\mathcal{E}$ is the error component. The estimated model is: BMI = 16.283+0.823 food responsiveness − 0.351 exercise**.** Here all 2 independent variables in the model are more significant compared with the corresponding results of the full model. And so the effects of these 2 independent variables on BMI are significant with

positive and negative coefficients, as before. Gender and the two age groups have completely disappeared through using Stepwise regression method, 2 independent variables are evaluated as having significant importance in the model. These were food responsiveness, and exercise, e.g. an increase in exercise was associated with reduced BMI.

DISCUSSION

In the present research, the effects of the ten independent variables on BMI show that only 2 variables, food responsiveness and exercise have significant or near significant effects on BMI. The other variables had no significant effects. On the other hand Webber et al. (2009), found that six independent variables had significant effects on BMI including food responsiveness and effect and exercise was not included in his model. The ANOVA table 6 shows that the model 2. As a whole is highly significant, where the p-value is less than 0.001.This means that the combined effect of all ten independent variables on BMI is highly significant. R^2 given in the Model Summary in table 3 is equals 0.20. This means that the percentage of variability in BMI explained by the independent variables is 20%, which is rather small.

Noticeably, according to the current study results, there appears to be a significant positive relationship between food responsiveness, which is a behavioral characteristics derived from the CEBQ and BMI, which means that when food responsiveness increases, then BMI also increases and conversely. Technically, it means that people with higher amounts of food responsiveness also tend to have higher BMIs. This finding supports Webber et al. (2009) result, which showed that there is a positive significant relationship between food responsiveness and obesity. Epstein et al. (2007) showed that obese children were prepared to try comparatively harder to obtain more food than normal-weight children. These results are supported by the findings of our research.

The present study showed a negative significant relationship between the predictor variable Exercise and BMI. So when exercise increases, then BMI decreases. This result agrees with many other studies which have shown that BMI increased significantly when physical activity per day decreased (Marty et al., 2006, Patrick et al., 2004). Hill and others (1995) demonstrated that decreasing levels of physical activity would possibly reduce energy

spending, and, if not coordinated with reduced food consumption, may produce significant energy imbalance and weight gain. Whereas Bell et al. (2004) and Hill and Commerfod (1996) identified that a decrease in physical activity would lead to an obvious restriction in the energy expended and may lead to body weight gain. Also other studies, suggest that moderate to high levels of physical activity prevents weight gain and obesity (Di Pietro, et al., 2004; French, et al., 1994).

Many writers have studied food intake, exercise and obesity, revealing that the effect of physical activity on energy balance is to reduce the probability that significant energy imbalance and weight gain will occur (Hill and Wyatt, 2005; Horton and Hill, 1998). Generally, all the above results agree with our findings.

CONCLUSION

Obesity is a major problem for the populations of developed countries. Although obesity is not yet considered a disease by DSM-IV criteria (Wardle, 2009), recent studies show that the number of obese children has increased medically. Childhood obesity is an epidemic that continues to dramatically increase resulting in a large percentage of children developing diabetes, and parents cannot recognise when their own children overweight. This study used data from primary schools in (Slemani city) to test the effect of eating behaviour on BMI by using a CEBQ questionnaire on child eating behaviours. The study used multiple regressions for assessing the relation between child eating behaviour and obesity. Previous observations demonstrated the influence of age differences, but their sample focuses on a continuum of ages from 6 to 12 years. However, this focus may have masked differences between older and younger children (Webber et al., 2009). Therefore, a comparison of younger children's eating behaviour with older children regarding the CEBQ and obesity would be useful. Our findings reveal that food responsiveness is positively associated with BMI, while exercise is negatively related with BMI. Therefore, there is a critical need for future research to explore the relationship between these factors and BMI. In particular, data are essential to clarify how eating behaviour influences may contribute to subsequent childhood obesity to determine whether this holds true of children in age 6–12 years. A further study should be undertaken to further detect and quantify the effect of sport and exercise on child's eating behaviour and obesity.

Acknowledgments

The authors are thankful and gratefully to all parents and children who collaborated in this study and show approval to fill the questioners that contain instruction about child eating style.

References

Agras, W., Kraemer, H., Berkowitz, R., Korner, A. and Hammer, L. (1987). Does a vigorous feeding style influence early development of adiposity?. *The Journal of Pediatrics*, 110(5), pp.799-804.

Bell, C., Day, D.S., Jones, P.P., Charistou, D.D.; Petitt, D.S., Osterberge, K. Melby, C.L. and Seals, D.R. (2004). High energy flux mediates the tonically augmented–adrenergic support of resting metabolic rate in habitually exercising older adults. *J Clin Endocrinol Metab,* (89), pp. 3573–3578.

British Medical Association, (2005). Preventing Child Obesity. *Printed by the BMA publications unit,* pp. 1-74.

Blundell, J.E., Stubbs, R.J., Golding, C., Croden, F., Alam, R. and Whybrow, S. (2005). Resistance and susceptibility to weight gain: Individual variability in response to a high-fat diet. *Physiol Behav,* (86), pp. 614–622.

Butriss, J. (*1995*) Nutrition in General Practice, 1st edn, vol. 2. Promoting Health and Preventing Disease. Royal College of General Practitioners, London

Currie, C., Todd, J. and Thompson, C. (1997). Health Behaviours of Scottish School Children: Report 5: Comparisons of National Patterns in 1990 and 1994. Research Unit in Health and Behavioural Change and Health Education Board for Scotland, Edinburgh.

Care directory, (2003). The Role of NHS Trusts & Primary Care Trusts. Available from http://www.nursing-home-directory.co.uk/role-of-nhs-trusts.htm [Accessed 28 September].

Cameron, N., Norgan, N.G., and Ellison, T.H. (2006). *Childhood obesity: contemporary issues*. Boca Raton: CRC Press; Taylor & Francis Group.

Carnell, S. and Wardle, J. (2008). Appetite and adiposity in children: Evidence for behavioral susceptibility theoryof obesity. *Amer J Clin Nutr*, (88), pp. 22–29.

Department of Health, (2007a). Spending review PSAs. Available from http://www.hm-treasury.gov.uk/media/70320/sr04_psa_ch3.pdf [Accessed 20 August 2010].

Department of Health, (2007b). Supporting healthy lifestyles: the National Child Measurement Programme Guidance for 2006â€“07 school years. Available from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_073786 [Accessed 22 August 2010].

Department of Health, (2005a). National Service Framework documents. Available from http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocial

CareTopics/ChildrenServices/ChildrenServicesInformation/ChildrenServicesInformationArticle/fs/en?CONTENT_ID=4089111&chk=U8Ecln [Accessed 28 August 2010].

Di Pietro, L., Dziura, J., and Blair, S.N. (2004). Estimated change in physical activity levels (PAL) and prediction of 5-year weight change in men: the aerobics centre longitudinal study. *Int J Obes Relat Metab Disord*, (28), pp. 1541–1547.

Ech, L.H., Klesges, R.C., Hanson, C.L., and Slawson, D. (1992). Children at familial risk for obesity: an examination of dietary intake, physical activity and weight status. Int J Obes Relat Metab Disord, (16), pp. 71–78.

Educari, (2004). Children, young people and health related decisions: a review of the research literature and discussion of the implications for health education of children and young people. Roehampton: University of Surrey.

Epstein, H. L., Leddy, J.J., Temple, L.J.,and Faith, S.M. (2007). Food Reinforcement and Eating: A Multilevel Analysis. Psychol Bull, 133, (5), pp. 884-906.

French, S.A., Jeffery, R.W., Forster, J.L., Mcgovern, P.G., Kelder, S.H. and Baxter, J.E. (1994). Predictors of weight change over two years among a population of working adults: the Healthy Worker Project. Int J Obes Relat Metab Disord, (18), pp. 145-154.

Fisher, J.O., Cai, G.W., Jaramillo, S.J., Cole, S.A., Comuzzie, A.G. and Butte, N.F. (2007). Heritability of hyperphagic eating behavior and appetite-related hormones among Hispanic children. *Obesity,* (15), pp. 1484–1495.

Field, A. (2005). Discovering statistics using SPSS. printed by the Alden Press, Oxford. pp. 283-303.

Gavin, L.M. (2009). Overweight and obesity. Available fromhttp://kidshealth.org/parent/general/body/overweight_obesity.html# [Accessed 29 September 2010].

Horton, T.J. and Hill, J.O. (1998). Exercise and obesity. *Proceedings of the Nutrition Society,* (57)*, pp.* 85-91.

House of Commons Committee of Public Accounts, (2007). Tackling Child Obesityâ€"First Steps. Available from http://www.publications.parliament.uk/pa/cm200607/cmselect/cmpubacc/157/157.pdf. [Accessed 29 September 2010].

Hill, J.O. and Commerford, R. (1996). Exercise, fat balance and energy balance. Int J Sports Nutr, (6), pp. 80-92.

Hill, J.O. and Wyatt, H.R. (2005). Role of physical activity in preventing and treating obesity. J Appl Phyisol, (99), pp. 765-770.

Hill, J.O. and Peters, J.O. (1998). Environmental contributions to the obesity epidemic. Science, (280), pp. 1371-1374

Hill, J.O., Melby, C., Johanson, S.L., and Peters, J.C. (1995). Physical activity and energy requirements. Am J Clin Nutr, (62), pp. 1059S-1066S.

International Obesity Taskforce, (2004a). Obesity in children and young people, a crisis in public health. Available from www.iotf.org [Accessed 15 August 2010].

Jansen, A., Theunissen, N., Slechten, K., Nederkoorn, C., Boon, B., Mulkens, S. and Roefs, A. (2003). Overweight children overeat after exposure to food cues. Eat Behav, (4), pp. 197-209.

Kelder, S. H., Perry, C. L., Klepp, K. I., and Lytle, L. L. (1994). Longitudinal Tracking of Adolescent Smoking, Physical-Activity, and Food Choice Behaviors. American Journal of Public Health, 84(7), pp. 1121-1126.

Kurth, B.M. and Schaffrath-Rosario, A. (2007). Die Verbreitung von Übergewicht und Adipositas bei Kindern und Jugendlichen in Deutschland. Ergebnisse des bundesweiten Kinder- und Jugendgesundheitssurveys (KIGGS). *Bundesgesundheitsbl Gesundheitsforsch Gesundheitsschutz*, (50), pp. 736–743.

Kipping, R.R., Jago, R., and Lawlor, D.A. (2008a). Obesity in children. Part 2: Prevention and management. BMJ, (22), pp. 337:a1848. Doi: 10.1136/bmj.a1848

Kipping, R.R., Jago, R. and Lawlor, D.A. (2008_b). Obesity in children; Part 1: Epidemiology, measurement, risk factors, and screening. *BMJ*, 15, pp. 337:a1824. Doi: 10.1136/bmj.a1824.

Marty, K. Wolff, C. and Morgan, I. (2006). Overweight, Diet, Physical Activity, and Hypertension in Low-Income School-Aged Children. Californian Journal of Health Promotion, (4), pp. 47-58.

Moens, E. and Braet, C. (2007). Predictors of disinhibited eating in children with and without overweight. *BehavRes Ther,* (45), pp. 1357–1368.

Nicklas, T.A., 1995. Dietary studies of children and young adults (1973–1988): the Bogalusa heart study. *American Journal of Medical Science*, (310), pp.101–108.

NICE, (2006). *Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children*. *NICE clinical guideline,* (43), pp.1-84.

National Nutrition Survey, (1997). The Burden of Overweight and Obesity in New Zealand Children. *International Standards for Obesity,* (11), pp. 1 – 8.

Patrick, K., Norman, G. J., Calfas, K. J., Sallis, J. F., Zabinski, M. F., Rupp, J., Cella, J. (2004). Diet, physical activity, and sedentary behaviors as risk factors for overweight in adolescence. *Archives of Pediatric and Adolescent Medicine*, (158), pp. 385-390.

Parry-Langdon, N. and Robert, C. (2002). *Physical activity, sedentary behaviour and obesity. Health Behaviour in School-aged Children (HBSC) survey*. HBSC Briefing Series: 1. Health Challenge. Wales .

Reilly, J.J., Methven, E., Mcdowell, C., Hacking, B., Alexander, D., Stewart, L. and Keelnar, C.J.H. (2003). Health consequences of obesity. *Archives of Disease in Childhood*, (88), pp. 748-752.

Steptoe, A., Pollard, T.M. and Wardle, J. (1995). Development of a measure of the motives underlying the selection of food: the food choice questionnaire. *Appetite*, (25), pp. 267–284.

Wang,.Y. and Lobstein, T. (2006). Worldwide trends in childhood overweight and obesity. *International Journal of Pediatric Obesity,* (1), pp. 11_25.

Wardle, J. (2009). Is obesity an eating disorder? *The European Health Psychologist*, *(11),* pp. 52–55.

Wardle, J., Guthrie, C. A., Sanderson, S., and Rapoport, L. (2001_a). Development of the Children's Eating Behaviour Questionnaire. *Journal of Child Psychology and Psychiatry,* (42), pp. 963–970.

Wardle, J., Sanderson, S., Guthrie, C. A., Rapoprt, L. and Plomin, R. (2002). Parental feeding style and the intergenerational transmission of obesity risk. *Obesity Research,* (10), pp. 453–462.

Wardle, J. and Gibson, E.L. (2002). Impact of stress on diet: processes and implications. In: Stansfeld, SA, Marmot M., eds. *Stress and the Heart*. London: BMJ Books.

Webber, L., Hill, C., Saxton, J., Van Jaarsveld, C. H. M. and Wardle, J. (2009). Eating behaviour and weight in children. *International Journal of Obesity,* (33), pp. 21–28.

World Health Organization, (2003). Diet, nutrition and the prevention of chronic diseases. WHO Technical report series, 911. Geneva, WHO.

Whitaker, R.C., Wright, J.A., Pepe, M.S., Seidel, K.D. and Dietz, W.H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. N *English J Med,* (337), pp. 869–873.

Table 1 shows the biographical data

N	Boys	Girls	Means of Height(cm^2) Ranged	Means of Weight(kg) Ranged
140	69	71	11.2627-31.2529cm	11.0870-31.2529 kg

Table 2 show multiple regression (Enter Method)

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Exercise, 6-12=1, Food responsiveness, male 1, female 2,	.	Enter

a. All requested variables entered.

b. Dependent Variable: BMI kg/m2

Table 3 show relationship between BMI and the 10 independent variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.450[a]	.202	.146	2.17997

a. Predictors: (Constant), Exercise, 6-12=1,, Food responsiveness, male 1, female 2

Table 4 show ANOVA for model 1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	150.538	11	15.072	2.072	.000[a]
	Residual	452.653	129	3.861		
	Total	623.630	140			

a. Predictors: (Constant), Exercise, 6-12=1 , Food responsiveness, male 1, female 2

b. Dependent Variable: BMI kg/m2

Table 5 show coefficient for model 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.477	2.310		7.566	.000
	male 1, female 2	-.410	.363	-.087	-1.128	.261
	6-12=1,	-.043	.377	-.009	-.114	.718
	Food responsiveness	.658	.357	.164	1.842	.068
	Exercise	-.507	.255	-.134	-1.875	.037

a. Dependent Variable: BMI kg/m2

Table 6 show ANOVA for model 2

ANOVA[d]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	134.223	3	42.502	8.681	.000[c]
Residual	607.578	137	3.5486		
Total	652.450	140			

a. Predictors: (Constant), Food responsiveness, Exercise

b. Dependent Variable: kg/m2

Table 7 show coefficients for model 2

Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	16.283	1.158	.	11.780	.000
Food responsiveness	.723	.172	.185	2.319	.001
Exercise	-.351	.187	-.157	-1.088	.031

a. Dependent Variable: BMI kg/m2