Research Article

COMPARISON OF MEAN BODY MASS INDEX AMONG VARIOUS GROUPS OF BREAKFAST CONSUMPTION IN STUDENTS OF A MEDICAL COLLEGE

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A R T I C L E   I N F O

A B S T R A C T

Objective: To compare the mean differences of body mass index among various groups of breakfast consumption in medical students of Karachi.

Materials and methods: A total of 182 healthy medical students, both male and female between the age of 19-21 years were selected by convenience sampling technique from Liaquat National Medical College. After approval from the ethical review board and written informed consent, information regarding the breakfast was gathered through a proforma filled by each student and accordingly the participants were divided into breakfast (taking breakfast daily), intermittent (taking breakfast irregularly i.e; 1-6 days per week) and non-breakfast (never taking breakfast) groups . Measurements of height and weight for each individual were done through stadiometer and body mass index was calculated using the standard formula.

Results: Descriptive statistics showed a mean age of 20.23 ± 1.77 and mean BMI of all the three groups were analyzed and compared. Lowest mean BMI of 19.88 ± 2.58 kg/m^2 was reported in subjects having regular breakfast compared to the no-breakfast group with the highest mean body mass index of 25.49 ± 4.10 kg/m^2. Significant differences were found among the three groups with p-value < 0.05 when compared for their mean body mass index using analysis of variance.

Conclusion: In conclusion, significant mean differences of body mass index were found among the three groups of breakfast consumption in young medical students.

INTRODUCTION

Breakfast is an important meal of the day ensuring the good health and wellbeing of an individual. Breakfast proves to be beneficial in the hormonal and neural signal alterations which, in turn, are responsible for appetite and food intake regulation. Yet, it has been observed as a depreciated and skipped meal particularly among adolescents. The rationales behind the skipping breakfast are many such as the dearth of time, in appetence, and concerns about weight gain[1]. Breakfast skipping is common in many countries including the United States and Europe (10-30%), reportedly being a more common occurrence in the children and adolescents [2.] The perturbation about increase body weight is the major reason for skipping breakfast which is actually invariance with the research findings. It has been proved through many researches that breakfast skipping is associated with increased prevalence of obesity rather than weight loss. Still, many people perceive and practice skipping breakfast for weight loss, [3-7].

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Various studies have been conducted in Sweden[8], Canada[9], the enKid study in Spain[10],Saudi Arabia[11],Fiji[12] and several other countries which report high prevalence of obesity in breakfast skippers[13.]The World Health Organization (WHO) has described obesity as the most neglected public health problem nowadays. According to WHO, Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight [14]. The hazards of breakfast skipping are numerous, among them obesity is prominent. The Protective effects of breakfast on obesity (PEBO) have corroborative evidence from different countries[15]. Studies have shown that children who eat breakfast perform at a higher level in school and are more physically active than those who skip breakfast[16].

Early in the morning, multiple hormones are secreted which in turn increase the blood cortisol levels. Eventually, increased cortisol levels are directly associated with numerous medical

conditions such as hypertension, type-2 diabetes, etc. Therefore, eating a larger breakfast will reduce the blood cortisol levels. Similarly, it has a significant effect on cognitive functions during the day[17-19].

The aim of this study is to compare the mean differences of body mass index among different groups of breakfast consumption in students of a local medical college.

MATERIALS AND METHODS

This cross-sectional study was conducted at Liaquat National Medical College, Karachi. A total of 182 healthy medical students, both male and female with an age range of 19-21 years were selected by convenience sampling technique after approval from the ethical review board of Liaquat National Hospital & Medical College. The sample size was estimated using the open epi sample size software with the prevalence of breakfast skippers reported as 20% and confidence interval taken at 95%. After taking written informed consent, information regarding the breakfast was gathered through a semi-structured questionnaire filled by each student. Height and weight of each participant was measured using the stadiometer and body mass index was calculated using the standard formula.

Statistical Analysis

It was done by using the software SPSS 21. Mean age, height, weight and BMI were calculated by descriptive statistics. On the basis of information gathered through the questionnaire, students were divided into three groups, regular breakfast group (taking breakfast daily), intermittent (taking breakfast irregularly i.e; 1-6 days per week) and non-breakfast group (never taking breakfast). Mean BMI of the three groups was compared using One-way ANOVA with P value < 0.05 taken as statistically significant.

RESULTS

This study included 182 participants with 76 males and 106 females. Descriptive statistics showed a mean age of 20.23±1.77. According to the proforma filled by each candidate, approximately 30.2% of them had regular breakfast and amongst them, 24% preferred milk and egg, 32% opted for parathas, 13% for cereals and the rest 31% had mixed varieties for their breakfast. Intermittent group also had almost the same percentage of options they consumed for breakfast as mentioned in Table-I.

Table I Percentage of Breakfast characteristics according to the questionnaire filled by each participant

Groups	What do you usually eat for breakfast?	How does eating breakfast help you??
Regular breakfast (30.2%) & Intermittent breakfast group (35.7%)	24% -milk and egg 32% -parathas 13% - cereals 31% -mixed varieties for their breakfast	20% -it helps to give them energy 30% -it kept them attentive and active in the classrooms 25% - it was healthy taking breakfast 25% - helped them to get good grades
Group	Why you do not eat breakfast?	How do you feel when you don't eat breakfast?
No-breakfast group (34.1%)	40%- because they were short of time 18%- answered that they were not hungry 16% -were weight conscious 26% - due to family trend set	23%- feel tired 30%-trouble paying attention in class 27%- bad mood 20%- increased binge eating

Almost 40% of the no-breakfast group candidates reported that they did not have breakfast because they were short of time, 18% answered that they were not hungry, 16% were weight

conscious and 26% informed that it was their family trend set. Another question asked by the students that how eating breakfast helps you was very well answered by them. Approximately, 20% of them answered that it helps to give them energy, 30% answered that it kept them attentive and active in the classrooms, 25% knew that it was healthy taking breakfast and 25% helped them to get good grades. However, the highest percentage of the candidates was reported in the intermittent group (35.7%) with mean BMI of 21.52±2.22 kg/m^2. The no-breakfast (34.1%) group had the highest mean body mass index (25.49±4.10) as in Table-II. Significant differences were found among the three groups with p-value < 0.05 when compared for their mean body mass index using analysis of variance shown in Table-II.

Table II ANOVA between regular, intermittent & no-breakfast groups.

Groups	N (182)	Mean± SD BMI (kg/m^2)	p-value
Regular breakfast group	55 (30.2%)	19.88±2.58	
Intermittent	65 (35.71%)	21.52±2.22	0.001**
No-breakfast group	62 (34.06)	25.49±4.10	

**P value is significant at < 0.05

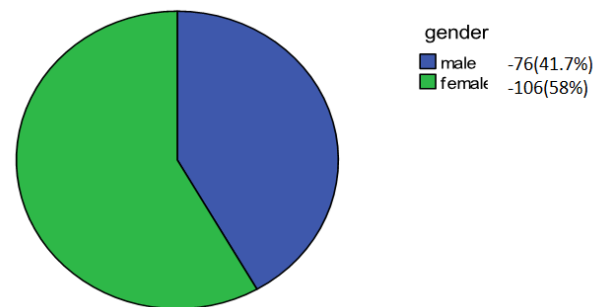

Figure I Gender distribution

gender
- male   -76(41.7%)
- female -106(58%)

DISCUSSION

This study was designed to compare mean BMI levels among the three groups of the medical students. Results of our study were consistent with Timlin *et al* reporting highest percentage of students included in the intermittent breakfast group compared with the lowest for no-breakfast group.[19]

According to a recent study conducted by Faizi N *et al*, adolescents who had decreased frequency of breakfast had been associated with overweight and obesity[15]. In a study conducted by Sjoberg *et al* found that Swedish adolescents who had meal pattern with omission of breakfast were related to the negative lifestyle factors.[8] Moreover, a study conducted in Spain by Serra-Majem *et al* reported that young children who had regular breakfast were less likely to develop obesity.[10]

Another study in concordance with our study showed that Fijian adolescent girls who had greater episodes of frequent breakfast skipping were associated with greater odds ratio of overweight and obesity (Odds Ratio=1.15, p<0.01) and Odds Ratio=1.18, p<0.01 respectively). [12]

Keski-Rahkonen A*et al* investigated that adolescents breakfast-skipping was significantly associated with health compromising behaviors such as smoking, less exercise and increased body mass index.[20]

There are certain limitations in this study. A large cross-sectional survey should be designed with increased number of

study participants and importance of other meal patterns should also be included. Association with other dietary lifestyle factors needs to be addressed.

CONCLUSION

In this study, breakfast consumption was found to have a highly significant and negative association with the body mass index in medical students of Karachi.

References

1. Affinita A, Catalani L, Cecchetto G, De Lorenzo G, Dilillo D, DoneganiG, *et al*. Breakfast: A multidisciplinary approach. *Ital J Pediatr* 2013; 39:44.
2. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc* 2005; 105:743-60.
3. Woodruff SJ, Hanning RM, Lambraki I, Storey KE, McCargar L. Healthy Eating Index-C is compromised among adolescents with body weight concerns, weight loss dieting, and meal skipping. *Body Image* 2008; 5:404-8.
4. Wong Y, Chen SL, Chan YC, Wang MF, Yamamoto S. Weight satisfaction and dieting practices among college males in Taiwan. *J Am Coll Nutr* 1999; 18:223-8.
5. Brugman E, Meulmeester JF, Van der S, Verloove-Vanhorick P. Breakfast skipping in children and young adolescents in the Netherlands. *Eur J Public Health* 1998; 8:325-8.
6. Bellisle F, Monneuse MO, Steptoe A, Wardle J. Weight concerns and eating patterns: A survey of university students in Europe. *Int J Obes Relat Metab Disord* 1995; 19:723-30.
7. Zullig K, Ubbes VA, Pyle J, Valois RF. Self-reported weight perceptions, dieting behavior, and breakfast eating among high school adolescents. *J Sch Health* 2006; 76:87-92.
8. Sjöberg A, Hallberg L, Höglund D, Hulthén L. Meal pattern, food choice, nutrient intake and lifestyle factors in The Göteborg Adolescence Study. *Eur J Clin Nutr* 2003; 57:1569-78.
9. Veugelers PJ, Fitzgerald AL. Prevalence of and risk factors for childhood overweight and obesity. *CMAJ* 2005; 173:607-13.
10. Serra-Majem L, Aranceta Bartrina J, Pérez-Rodrigo C, Ribas-Barba L, Delgado-Rubio A. Prevalence and deteminants of obesity in Spanish children and young people. *Br J Nutr* 2006; 96 Suppl 1:S67-72.
11. Amin TT, Al-Sultan AI, Ali A. Overweight and obesity and their relation to dietary habits and socio-demographic characteristics among male primary school children in Al-Hassa, Kingdom of Saudi Arabia. *Eur J Nutr*. 2008 Sep; 47(6):310-8.
12. Thompson-McCormick JJ, Thomas JJ, Bainivualiku A, Khan AN, BeckerAE. Breakfast skipping as a risk correlate of overweight and obesity in school-going ethnic Fijian adolescent girls. *Asia Pac J Clin Nutr*. 2010; 19(3):372-82.
13. Why Breakfast Is the Most Important Meal of the Day. John L Ivy, PhD University of Texas at Austin.
14. www.WHO.com
15. Faizi N, Khan IM, Amir A, Azmi SA, Ahmad A, Khalique N. Breakfast skipping and proposed effects of breakfast on obesity: A school based study in adolescents in Aligarh, India. *Ann Trop Med Public Health* 2014; 7:43-7.
16. Ma Y, bertone ER, Stank EJ3rd, *et al*. Association between eating patterns and obesity in a free-living US adult population. *Am J Epidemiol*.2003; 158:85-92.
17. Anagnostis P, Athyros VG, Tziomalos K, Karagiannis A, Mikhailidis DP. The pathogenetic role of cortisol in the metabolic syndrome: a hypothesis. *J clin Endcriol Metab* 2009; 94:2692-2701.
18. Deshmukh-taskar PR, nicklas TA, O'Neil CE, Keast DR, Radcliffe JD, Cho S. The relationship of breakfast skipping and type of breakfast consumption with nutrient intake and weight status in children and adolescents: the National Health and Nutrition Examination Survey 1999-2006. *J Am Diet Assoc* 2010; 110:869-78
19. Timlin M. Breakfast eating and weight change in a 5-year prospective analysis of adolescents: project EAT (eating among teens). *Pediatrics* 2008; 121(3):e638-45
20. Keski-Rahkonen A, Kaprio J, Rissanen A, Virkkunen M, Rose RJ. Breakfast skipping and health-compromising behaviors in adolescents and adults. *Eur J Clin Nutr*. 2003 Jul; 57(7):842-53.

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