GENDER DIFFERENCES IN OBESITY AND PHYSICAL ACTIVITY AMONG SECONDARY SCHOOL STUDENTS

Perbedaan Gender Dalam Masalah Obesitas dan Aktifitas Fisik Pada Siswa SMP

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Abstrak

Latar belakang:*Obesitas menjadi masalah gizi di Indonesia dan dunia. Berdasarkan data Riset Kesehatan Dasar (Riskesdas) 2010, prevalensi obesitas anak-anak umur 13-15 tahun di Propinsi Banten sebesar 3,4 persen yang artinya lebih besar daripada prevalensi obesitas nasional anak-anak umur yang sama, yaitu 2,5 persen.*
Tujuan: *Menentukan adanya perbedaan gender dalam masalah obesitas di siswa sekolah menengah pertama (SMP)*
Metode:*Penelitian ini menggunakan desain potong lintang dan pengumpulan data yang dilakukan dengan mengukur antropometri, wawancara tatap muka dengan menggunakan kuesioner serta ingatan diet 2 x 24 jam. Sebanyak 134 siswa SMP Pembangunan Jaya Bintaro menjadi sampel penelitian.*
Hasil: *Hasil analisis univariat menunjukkan siswa yang obesitas sebanyak 14,9 persen. Hasil analisis bivariat menunjukkan ada perbedaan gender yang signifikan antara obesitas dan aktivitas fisik. Hasil penelitian menunjukkan konsistensi dengan penelitian sebelumnya yaitu laki-laki lebih banyak mengkonsumsi kalori daripada perempuan, sementara perempuan hanya melakukan aktivitas fisik ringan dibandingkan laki-laki.*
Kesimpulan: *Gender berbeda secara signifikan dalam obesitas dan aktivitas fisik. Baik siswa laki-laki dan perempuan mengkonsumsi diet tidak seimbang yaitu kurang konsumsi serat sementara konsumsi lemak dan protein berlebih.*

Kata kunci:*Gender, obesitas, remaja, aktivitas fisik, gizi*

Abstract

Background: Obesity is a nutritional problem worldwide, including in Indonesia. Data from the 2010 Basic Health Research showed that the prevalence of obesity in adolescents aged 13-15 years in Banten Province was 3.4percent, greater than the national prevalence of obesity for adolescents at the same age (2.5%).
Objective: To determine gender differences in the obesity amongst junior high school students.
Methods: Using a cross sectional design, this study included anthropometric measurement, questionnaire, and 2 x 24 hours food recall method. This study involved 134 junior high school students of Pembangunan Jaya Secondary School Bintaro.
Results: The results of the univariate analysis showed that 14.9% of students were obese. The results of bivariate analysis showed a significant difference between sex for obesity and physical activity. These results were consistent with the previous research showing more consumption of calories in men than women. However, women only conducted milder physical activities than men.
Conclusions: There was a significant difference in obesity and physical activity across different sexes. Both men and women had unbalanced diet, low consumption of fibre, yet excessive consumption of fat and protein.

Key words: Gender, obesity, adolescense, physical activity, nutrition

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BACKGROUND

In 2002, obesity prevalence among U.S. adults and adolescents was 25 percent , not only in developed country like U.S., obesity also present in developing countries such as Thailand; there is an increased prevalence of obesity among Thai children from 12,2 percentto 15,6 percentwithin two years[1]. Somewhat, obesity prevalence in Beijing was 7,1 percentand 8,3 percentin Shanghai in 2000. The number was double than the prevalence of obesity in 1960s.[2].

Obesity number in Indonesia has been elevating based on several data sources including Household Health Survey (SKRT) in 2001 which there was 3,3 percentage 5-14 and 13,5 percentage ≥ 15 obese; in 2004, the number increased to 8,1 percentage 5-17 and 18,8 percentage ≥ 18. In 2010, obese prevalence among 13-15 year children in Banten Province was 3.4 percent. The number was larger than the national obese prevalence which was 2,5 percent[3.] . Strong female bias in obesity in many countries is associated with high total fertility rate[4]. However gender differences in adolescents obesity rates are particularly poorly understood. The term 'gender' is used, since the majority of differences are unlikely to have solely biological origins.

METHOD

Data Collection

This is a quantitative study. We applied cross sectional design to conduct this study. Dependent variable in this study is obesity and independent variables are gender, physical activity, energy, carbohydrate, protein, fat, and dietary fibre intake. A validated and reliable questionnaire was used to interview respondents. Anthropometry of respondents were measured by using calibrated bathroomscale andmicrotoise. Nutrient intake data were obtained from 2 x 24 hourfood recall.

The population of study was all of students in Pembangunan Jaya Bintaro secondary school. Sample size was calculated for 134respondents. Samples were taken from 7th, 8thand 9th gradeby using proportional random sampling.

Data Analysis

Univariate and bivariate analyses were employed to analyze data in this study. Kruskal-Wallis test was used for identifying comparison on gender and obesity, physical activity, energy, carbohydrate, protein, fat, and dietary fibre intake.

RESULTS

Respondent Characteristics

The respondents were almost balance between male (53%) and female (47%). Most of them were non obese (85.1%) but there were 14.9 percent obese.

Nutrient Intake and Physical Activity

About 57,5 percentof students did not eat adequate amount of carbohydrate but 61,2 percent and 85.1 percent had excessive intake of protein and fat, respectively. In addition, 50 percent of students consumed adequate dietary fibre. While 67 percent of students only did light physical activity. Non balanced diet and light physical activity as practiced by students cause increasing risk to be obese.

Table 1. Risk Factors of Obesity among Students

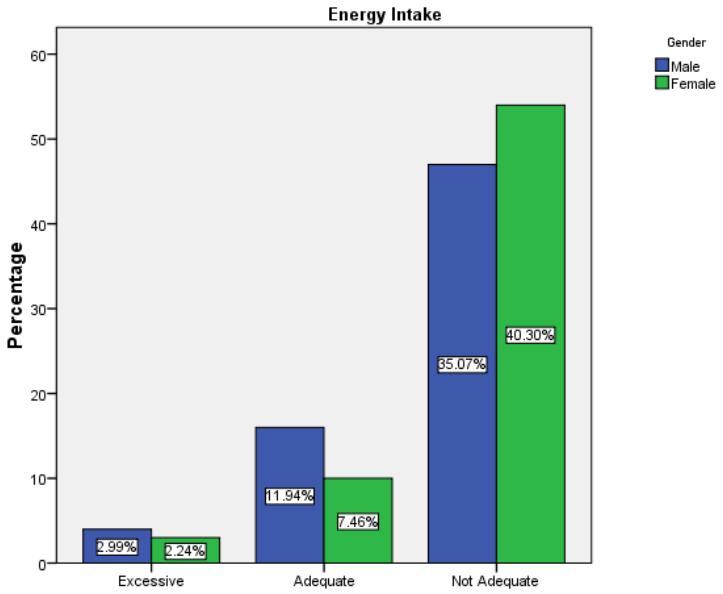
Variable	Students (n=134)	Percentage (%)
Energy		
Excessive	7	5.2
Adequate	26	19.4
Not adequate	101	75.4
Carbohydrate		
Excessive	19	14.2
Adequate	38	28.4
Not adequate	77	57.5
Protein		
Excessive	82	61.2
Adequate	49	36.6
Not adequate	3	2.2
Fat		
Excessive	114	85.1
Adequate	19	14.2
Not adequate	1	0.7
Dietary Fibre		
Not adequate	67	50
Adequate	67	50
Physical Activity		
Light	67	50
Medium	0	0
Heavy	67	50

Bivariate Analysis

Crosstab of bivariate analysis in table 2 showed more males were obese (11.2%) than females (3.7%).Of 75.4 percent students did not consume adequate energy, 40.30 percent were females and 35.07percent were males. Graph 2a. Shows the comparison chart of energy intake by gender.

Table 2. Obesity by Gender

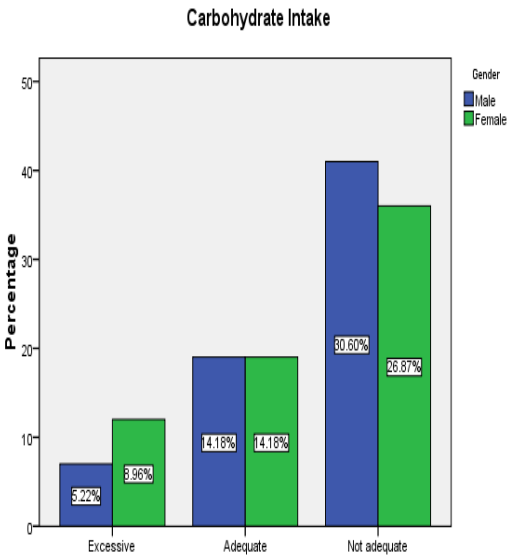
		Gender	
		Male	Female
Obese	N	15	5
	%	11.2%	3.7%
Non obese	N	52	62
	%	38.8%	46.3%



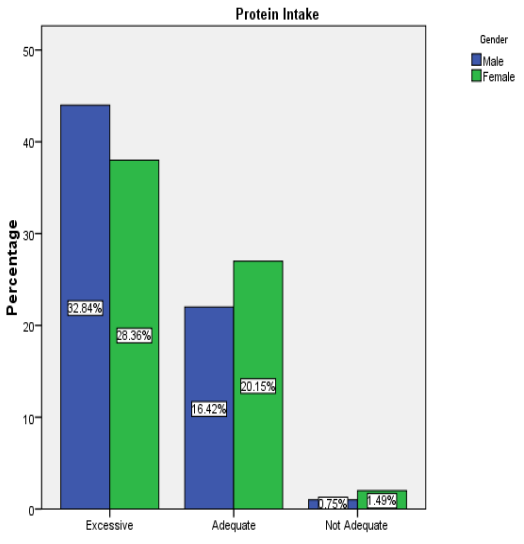
Graph 2a. Energy Intake by Gender

Graph 2b. shows more students did not eat adequate carbohydrate intake, including 30.60percentmales and 26.87percentfemales.

In contrary, more students had excessive protein intake, including 32.84% males and 28.36% females as shown in graph 2c.

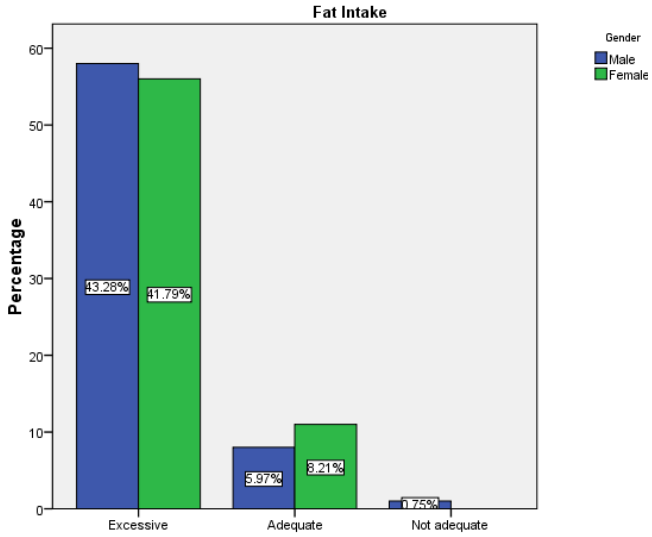


Graph 2b. Carbohydrate Intake by Gender

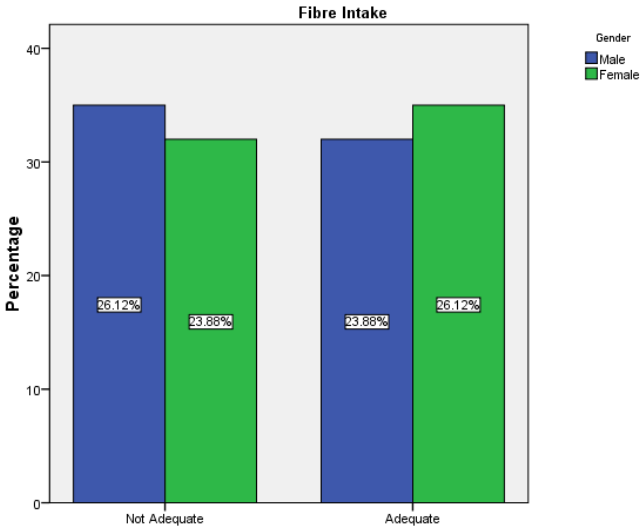


Graph 2c. Protein Intake by Gender

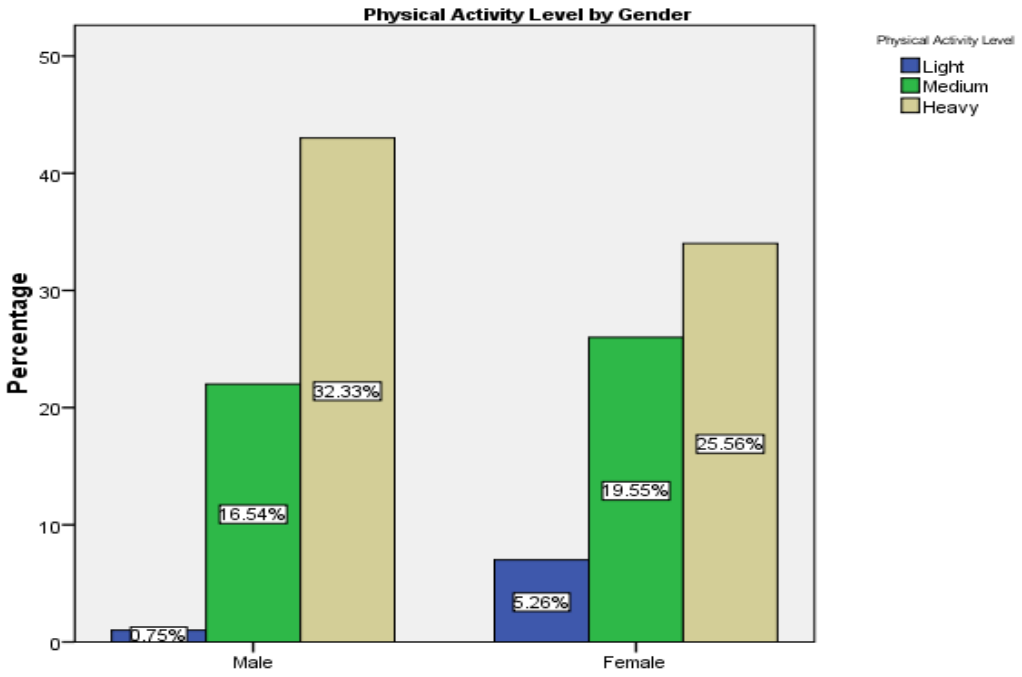
More males (43.28%) had excessive fat intake than females (41.79%) as shown in graph 2d. While graph 2e. shows non adequate dietary fibre intake was also practiced by more males (26.12%) than females (23.88%).Graph 3 shows the percentage of physical activity level including light, medium, and heavy by gender. More females did light physical activity (5.26%) and less males did (0.75%).



Graph 2d. Fat intake by Gender



Graph 2e. Dietary Fibre Intake by Gender



Graph 3. Physical Activity Level by Gender

Gender is significantly different on obesity and physical activity, p=0.016 and p=0.048, respectively as shown in table 3.

Table 3.Gender Differences on Obesity, Nutrient Intake and Physical Activity

Variable (n = 134)	Category	P value
Obesity	Obese Non Obese	0.016
Energy	Excess Adequate Not adequate	0.172
Carbohydrate	Excess Adequate Not adequate	0.280
Protein	Excess Adequate Not adequate	0.273
Fat	Excess Adequate Not adequate	0.658
Dietary Fibre	Not adequate Adequate	0.606
Physical Activity	Light Medium Heavy	0.048

DISCUSSION

Obesity by Gender

This study consistent to the result of other studies that men consume more calories than women, and sex differences in eating styles indicate that women have been socialized to eat in a more feminine manner. Women experience more food-related conflict than men in that they like fattening foods but perceive that they should not eat them. Pressures to be thin are present in early adolescence, as noted by dieting behavior in young girls. Women are more dissatisfied with their body weight and shape than men[5].The increase in overweight was greater in boys (6.2PP, 95% CI 4.7—7.6) than in girls (1.9PP, 95% CI 0.4—3.5), while the sex difference in increased obesity was smaller (boys 2.8PP, 95% CI 2.1—3.4, girls 2.0PP, 95% CI 1.3—2.6). [6] The FTO variant rs9939609 showed association with obesity and BMI among girls ($P = 0.006$ and 0.004, respectively) but not among boys. This study suggests that FTO may have an important role for gender specific development of severe obesity[7]. Close examination of studies revealed that gender differences were common, both before and during puberty. Boys and girls differ in body composition, patterns of weight gain, hormone biology, and the susceptibility to certain social, ethnic, genetic, and environmental factors[8].

A cross-sectional study on a stratified sample of 1,249 adolescent boys and 620 adolescent girls, was conducted in southwestern Saudi Arabia.The prevalence of obesity and overweight in the present study amounted to 23.2 percent among boys and 29.4 percent among girls. The following significant risk factors were identified; being a female [adjusted odds ratio (aOR) =1.372, 95% confidence interval (CI) =1.099-1.753] and lack of class physical exercise (aOR =1.452, 95% CI =1.149-2.117)[9]. The impact of obesity on reproduction starts at a young age. Obese girls frequently experience the onset of puberty at a younger age than their normal-weight peers. Between the late 1960s and 1990, during a time of increasing prevalence of childhood obesity, the median age of menarche decreased by approximately 3 months in white girls and 5.5 months in black girls in the United States[10]. Obese women are at higher risk for multiple cancers, including endometrial cancer, cervical cancer, breast cancer, and perhaps ovarian cancer[11].

Based on data 2003 Behavioral Risk Factor Surveillance System (BRFSS) for the state of Texas, Borders and Rohrers revealed gender disparities among adult obese. Males were found to have increased crude (OR = 1.27, 95% CI = 1.07, 1.50) and adjusted odds (OR = 1.63, CI = 1.36, 1.96) of obesity as compared to females.[12]

Nutrient Intake

The female students appeared to be significantly more restrained in their eating behaviour than the males and this might explain the higher prevalence of underweight among the females (24.4%) than the males (15.6%).[13]The energy density of food is also important as different macronutrients (such as fat, protein and carbohydrates) contribute different amounts to energy intake. Also, fat, in particular, is stored more readily as fat in the body than other macronutrients[14].

Male students eat all visible fat and female students remove all visible fat ($p < 0.0001$).

Female students choose low fat milk than full cream milk but male students choose low fat milk (p 0.007) [15].

An examination of sex differences in relation to the eating habits and nutrient intakes of university students showed male students (n = 172) consumed higher energy content from fat, larger amount of fiber, and more fruits and vegetables, and engaged less often in various healthful eating habits (eg, reading food labels, having breakfast) than female students (n = 316). However, interactions between sex and eating habits were nonsignificant. [16]. These studies are coherent to the result of our study.

Physical Activity

Boys reported significantly greater participation in vigorous (≥ 6 METs) and in moderate to vigorous (≥4 METs). Relative to girls, boys demonstrated higher levels of physical fitness, greater self-efficacy in overcoming barriers to physical activity, greater amounts of television watching, and higher levels of participation in community sports and physical activity organizations[17]. From 102 published papers, 54 studies of children were reviewed. The papers of child activity were published between 1976 and 1999, with 76 percent of the studies published in the 1990s. Sample sizes ranged from 20 to 1681, with a mean of 321 (SD ±5367). A cross-sectional design was used by 76%. Between one and 31 variables were tested in each study, with a mean of 5.9 (SD ±5 6.1) variables. About 60 percent of reported associations were statistically significant. Results were reportedfor combined genders by 65 percent, separately by gender for 28 percent, and for female subjects only by 7 percent. 81 percent of comparisons, boys were more active than girls[18].

There is a significant gender difference between the amount of time children spend on chores**.** Compared time boys and girls spent on the following activities :

1) Sports
2) Homework
3) Chores[19]
4) Helping father with his job
5) Helping mother with herjob

Females were significantly ($p < 0.05$) more sedentary, much less physically active[20]. Our study shows consistency to previous studies.

CONCLUSION AND RECOMMENDATION

Conclusion

Our study shows more male students were obese and more female did light physical activity. Gender is significantly difference with obesity and physical activity. Nutrient intakealso shows difference between male and female but the chances are large. Both male and female had unbalanced diet that they did not consume adequate fibre and excessive fat and protein intake.

Recommendation

Promotion for better diet and physical activity practice should be done. Health school unit also need to conduct gender specific program which will be more cost efficient.

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REFERENCES

1. WHO. Diet Nutrition and The Prevention of Chronic Disease: Report of a WHO Consultation.2003. Geneva: WHO Technical Resport.
2. WHO. Obesity: Preventing and Managing The Global Epidemic: Report of a WHO Consultation. 2000.Geneva: WHO Technical Resport.
3. BPS. Susenas:AnalisisAntropometriAnakTahun 2005. 2005. Jakarta: BadanPusatStatistik.
4. Robert Brooks, Alexei Maklakov. Sex Differences in Obesity Associated with Total Fertility Rate. *PLoS ONE,*2010; 5(5): e10587
5. Rolls, Barbara J.; Fedoroff, Ingrid C.; Guthrie, Joanne F. Gender differences in eating behavior and body weight regulation. *Health Psychology.*1991.Vol 10(2), 133-142
6. Sigrid Bjornelv.Sex differences in time trends for overweight and obesity in adolescents: The Young-HUNT study.*Scand* J Public Health, November2009;37(8):881-889
7. Josefin A. Jacobsson, Pernilla Danielsson, Victoria Svensson, Janis Klovins, Ulf Gyllensten, Claude Marcus, Helgi B. Schiöth, Robert Fredriksson. Major gender difference in association of FTO gene variant among severely obese children with obesity and obesity related phenotypes.Biochemical

and Biophysical Research Communications,11 April 2008; 368(3):476–482
8. Wisniewski AB, Chernausek SD. Gender in childhood obesity: family environment, hormones, and genes. Gender Medicine, 2009; 6(1):76-85
9. Ahmed A. Mahfouz, Abdullah S. Shatoor, Mohamed Y. Khan, Asim A. Daffalla, Osama A. Mostafa, and Mervat A. Hassanein. Nutrition, Physical Activity, and Gender Risks for Adolescent Obesity in Southwestern Saudi Arabia. Saudi J Gastroenterol,Sep-Oct 2011; 17(5):318-322.
10. Lash MM, Armstrong A. Impact of obesity on women's health. Fertil Steril,2009; 91:1712–6
11. Teresa Kulie, Andrew Slattengren,Jackie Redmer, Helen Counts, Anne Eglash, and Sarina Schrager. Obesity and Women's Health: An Evidence-Based Review. Journal Am. Board Fam. Med.,January-February 2011; 24(1):75-85
12. Tyrone F. Borders, James E. Rohrer, Kathryn M. Cardarelli. Gender-Specific Disparities in Obesity.J Community Health, 2006;31(1):57-68
13. Khor Geok Lin, Lynne Cobiacand Grace Skrzypiec.Gender Differences in Eating Behavior and Social Self Concept among Malaysian University Student. Mal J Nutr,2002;8(1):75-98
14. Davison KK, Birch LL. Childhood overweight: a contextual model and recommendations for future research.Obes Rev,2001;2(3):159-71
15. Lai Yeung, W.L. Gender Perspectives on Adolescents' Eating Behaviors: A Study on Eating Attitudes and Behaviors of Junior Secondary Students in Hongkong. J Nutr Educ Behav, Jul-Aug 2010; 42(4):250-8
16. Kin-Kit Li, Rebecca Y. Concepcion, Hyo Lee, Bradley J. Cardinal, Vicki Ebbeck, Erica Woekel, Tucker Readdy. Journal of Nutrition Education and Behavior,May 2012; 44(3):246-250
17. Trost, S. G., Pate, R. R., Dowda, M., Saunders, R., Ward, D. S. and Felton, G. Gender Differences in Physical Activity and Determinants of Physical Activity in Rural Fifth Grade Children. Journal of School Health,1996; 66:145–150
18. James F. Sallis, Judith J. Prochaska, and Wendell C. Taylor. A review of correlates of physical activity of children and adolescents.Medicine & Science In Sports & Exercise, 2000.
19. Singh,E. and Virginia J. Vitzthum. Gender differences in physical activity patterns, & the effects of time spent in school on total daily energy expenditure in Bolivian children. Poster Presentation.2003. Diunduh dari www.udel.edu/anthro/studentwork/Singh2012HBAPoster.pdf
20. Al-Hazzaa, H.M., Abahussain, N.A., Al-Sobayel, H.I., Qahwaji, D.M., and Musaiger, A.O.Physical activity, sedentary behaviors and dietary habits among Saudi adolescents relative to age, gender and region.Int J Behav Nutr Phys Act,2011; 8:140