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RESEARCH ARTICLE

Fast Food, Snacking and Health-Related Quality of Life Among Overweight and Obese Primary School Children of Mybff@School Intervention Program

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ABSTRACT

This study aimed to elucidate the relationship between fast foods and snack consumption with the health-related quality of life among overweight and obese children of 'My Body is Fit and Fabulous' at school intervention program. The subject were 1138 overweight and obese primary school children with a mean age of 9.9 and standard deviation (0.9) years old. Data were collected at baseline in which the frequency of fast food consumption and snacks in the past week was measured using a pre-tested nutritional knowledge, attitude and practice questionnaire whereas the health-related quality of life was measured using the KINDLR questionnaire. Spearman's rank-order correlation found a significant negative association between fast food consumption and emotional well-being (r_s=-0.066, $p<.05$). Significant negative associations were also observed between the snacking frequency with physical well-being (r_s=-0.071, $p<.05$) and emotional well-being (r_s=-0.073, $p<.05$). The findings from this study suggest that the physical well-being and emotional well-being of overweight and obese children could be attributed to the fats food consumption and snacking. Therefore, these types of foods should not be encouraged to be included in children's diets.

INTRODUCTION

Trans fatty acids are recommended to be taken in as low quantity as possible due to their effects on plasma lipids and cardiovascular disease (Aranceta and Pérez-Rodrigo, 2012). In addition, it can increase the level of low-density lipoprotein cholesterol, lower high-density lipoprotein cholesterol level and also increases risk of depression as well as various cancers (Hu et al., 2011; Mensink and Katan, 1990; Sánchez-Villegas et al., 2011). Therefore, consuming fast food could bring adverse health effects as a study has found that fast food from popular fast food restaurants in 20 countries contain a high level of industrially produced trans fatty acid (Steen Stender et al., 2006). Moreover, the large portion size of fast foods that are generally densely packed with high amount of energy would cause overconsumption of daily calories needed which often leads to many health issues (Steen Stender et al., 2007). Hence, consuming fast foods should be avoided especially when they are also found to be potentially addictive (Garber and Lustig, 2011).

High snacking frequency is associated with greater risk of being overweight and developing abdominal obesity in children (Murakami and Livingstone, 2016). A study among 9131 children

and adolescents in Canada found that 63% of them consumed after-school snack in which the most frequently consumed snacks might have high density of energy and poor nutritional value such as cookies and sweets (Gilbert et al., 2012). Moreover, children in US were also found to snack more frequently than in the past with 27% of daily energy intake coming from the snacks (Piernas and Popkin, 2010). In addition, apart from fast food, snacks such as bread, cakes, French fries, candies and crackers also contain a wide range of trans fatty acid (Elias and Innis, 2002). These foods, in addition to ice cream, chocolate and sweet snacks are all classified as ultra-processed foods which are lacking in micronutrients as they were made from processed foods as ingredients together with salt, preservatives and also additives (Monteiro, 2009). Thus, the increase in snacking frequency among children is a cause for concern as it could bring detrimental effects to the children.

Prospective studies usually focus on investigating the direct effects of frequent snacking and fast food consumption on the physical health. Impairment of the physical health could also affect health-related quality of life. However, studies on their association with health-related quality of life (HRQoL) are limited especially in obese children. The major purpose of this study is to investigate the association of HRQoL with frequency of fast food consumption and snacking frequency among overweight and obese children. Shedding light on this association could be crucial in public health as obese children were found to be having difficulties in resisting foods (Nederkoorn et al., 2006).

MATERIALS AND METHODS

This was a baseline study for a school-based cluster randomised controlled trial with a proportionate stratified random sampling. Overweight and obese children from 23 primary schools in Kuala Lumpur, Selangor and Negeri Sembilan were recruited to participate in this study. There were 16 schools in the control group and 7 schools in the intervention group where all schools have not implemented any obesity intervention program prior to this study. Schools in the control group followed the usual school program and the national standard curriculum and co-curriculum whereas the schools in the intervention group carried out the 'My Body is Fit and Fabulous' at school (MyBFF@school) program, a school-based obesity intervention program. The program incorporates three components namely small-sided games, nutrition and psychology component which were conducted for six months from February 2016 until August 2016 by trained personnel stationed at each school.

Participants recruitment were done by measuring their weight and height and calculating their BMI to determine their body-weight category. Children with BMI-for-age more than +1SD and less than or equal to +2SD were classified as overweight while children with BMI-for-age more than +2SD were classified as obese which are based on the WHO 2007 Growth Reference ("WHO | BMI-for-age (5-19 years)," n.d.). Children who have mental or physical disability, have medical condition affecting physical activity, have comorbidities that could affect the study and children who were on medication were excluded from the study. Trained personnel measured the BMI of 11950 children from the 23 schools where 3516 children were found to have met the criteria to join the program. All of them were approached to gain consent from their parents or guardians and 1397 (39.7%) children have submitted informed written consent before the commencement of the study. Baseline data was collected through socio-demographic characteristics questionnaire completed by their parents as well as through two self-report questionnaires namely the nutrition knowledge, attitude and practice (KAP) questionnaire and the KINDL^R questionnaire.

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia and Educational Planning and Research Division (EPRD), Ministry of Education Malaysia (ethical code: NMRR-13-439-16563). Written informed consent was obtained from the parents or guardian of all subjects and written informed assent was obtained from all subjects.

Data for the nutrition component were collected via a pre-tested nutrition KAP questionnaire prepared in Malay Language. The children were asked on the frequency of fast food and snacks

that they have consumed in the past seven days. Fast foods in this study are foods purchased from fast food restaurant such as burger, pizza, fried chicken and French fries whereas snacks refer to food that were consumed in between traditional mealtimes such as breakfast, lunch and dinner. Examples of snacks are candy, chocolates, crackers and pickels. The children were also asked to specify the types of snacks that they eat most often.

On the other hand, KINDL^R Questionnaire was used to gather data on HRQoL. It was first developed in German language by Bullinger et al. (Bullinger, 1994) and then revised by Ravens-Sieberer and Bullinger in 1998. This instrument was developed specifically to assess HRQoL among children and adolescents (Wille et al., 2008). With scores ranging from 4 to 20, it

comprises 24 Likert-scaled items and 6 subscales which are physical well-being, emotional well-being, self-esteem, friend, family and school functioning. A good HRQoL is signified by greater score on the instrument (Ravens-Sieberer and Bullinger, 1998).

The KINDL^R questionnaire had been translated from English to Malay language by a team of professional translator through a back-to-back translation process. It was then pretested and revised accordingly. The value of Cronbach alpha when tested in a pilot study conducted in schools at Putrajaya in 2015 was 0.70. Meanwhile, the value of Cronbach alpha in this study is .78 which proves the reliability of the instrument (Hinton et al., 2004).

All statistical tests were conducted at 5% significance level. Chi-square test of homogeneity was used to determine the distribution of the children across their socio-demographic characteristics. Spearman's rank order correlation was run to determine the association of fast food consumption and snacking with the HRQoL of the children. The Spearman's rank order correlation was used because the HRQoL of the children is an ordinal variable computed from Likers-scaled items. All data analyses were run using IBM Statistical Package for Social Sciences (SPSS) version 20 (SPSS Inc., Chicago,IL., USA).

RESULTS

From the 1397 overweight and obese children who have received parental consent, 1036 children with a mean (SD) age of 9.88 (0.893) years old answered the nutrition KAP questionnaire and the KINDL^R questionnaire. Chi-square test shows a significant difference in the ethnicity of the children, $X^2(3) = 82.284$, $p<0.01$. There is unequal distribution of the children across their ethnicity as most of them are Malay but there are not many Chinese and Indian. The distribution of the children other socio-demographic characteristics is the same as

Chi-square test shows no significant differences. Table 1 depicts the socio-demographic characteristics of the children in the intervention group and the control group.

Table 1. Socio-demographic characteristics of participants

Characteristic of respondents	**Control**	**Intervention**	**Chi-square**	**p value**
Sex, n (%)	251 (52.7)	295 (52.7)	0	0.987
Boys				
Girls	225 (47.3)	265 (47.3)		
Location, n (%)	292 (61.3)	322 (57.5)	1.575	0.209
Urban				
Rural	184 (38.7)	238 (42.5)		
Age groups, n (%)	24 (5.0)	44 (7.9)	3.533	0.316

8 years				
9 years	132 (27.7)	149 (26.6)		
10 years	183 (38.4)	216 (38.6)		
11 years	137 (28.8)	151 (27.0)		
Ethnicity, n (%)	424 (89.1)	423 (75.5)	82.284	< 0.001*
Malay				
Chinese	1 (0.2)	91 (16.2)		
Indian	46 (9.7)	40 (7.1)		
Others	5 (1.1)	6 (1.1)		
Body weight groups, n (%)		220 (39.3)	0.389	0.533
Overweight 178 (37.4)				
Obese 298 (62.6)		340 (60.7)		

*p<.01

There is a significant very weak negative correlation between frequency of fast food consumption in the past seven days with the emotional well-being of the children (r_s = -.066, p<.05). Apart from that, there are also very weak negative associations of snacking frequency in the past seven days with physical well-being (r_s = -.071, p<.05) and emotional well-being (r_s = -.073, p<.05). Both associations are also statistically significant. Other subscales show no significant associations with frequency of fast food consumption and frequency of snacking. Table 2 shows the Spearman's rank-order correlation between frequency of fast food consumption and frequency of snacking with all subscales of HRQoL. The differences in the total of samples (N) for each subscale are due to some items in the questionnaire have not been answered by children

Table 2 Spearman's rank-order correlation between fast food consumption, snacking and health-related quality of life

Fast Food Consumption				**Snacking Frequency**		
HRQoL	N	Correlation coefficient	*p* value	N	Correlation coefficient	*p* value
PWB	1031	-0.053	0.09	1021	-0.071*	0.02
EWB	1029	-0.066*	0.03	1018	-0.073*	0.02
SE	1014	0.032	0.30	1003	0.001	0.98
Family	1024	0.017	0.59	1014	0.060	0.06
Friends	1028	-0.055	0.08	1017	-0.041	0.19
School	1026	-0.024	0.45	1015	-0.028	0.38

*p<.05

PWB – physical well-being

EWB – emotional well-being

SE – self-esteem

DISCUSSION

The findings from this study show that there are significant weak negative association between frequency of fast food consumption with emotional well-being. There are also significant weak negative association between frequency of snacking with physical well-being and emotional well-

being. We hypothesize that the aforementioned significant associations are closely related to the gut-brain axis. Recent research has found a growing evidence on the relationship between the brain and the gut linking the emotional and cognitive function of the brain with the function of the intestines (Carabotti et al., 2015). The microbiota in the gut consists of bacterial community that colonize the gastrointestinal tract since birth as well as transient bacteria that were introduced by ingested foods (Bercik et al., 2012). This microbiota could produce neurotransmitters found in the brain thus affecting the neurochemistry of the brain as well as mood and behavior (Dinan and Cryan, 2017). A study has also found significant correlation between microbiota found in faeces and nutrient intake where different food groups correlate with different microbiota (Seura et al., 2017). The significant negative association found in our study between frequency of fast food consumption and frequency of snacking with emotional well-being of the children could be due to changes in the microbiota affecting the mood of the children. The fast foods and snacks consumed by the children could introduce transient bacteria to the microbiota in the gut which could change the brain chemistry.

The negative association could also be explained by a study that found unhealthy food could affect the mood negatively whereas sweet and fatty food could alleviate low mood due to production of dopamine in the brain (Gibson, 2006). This can be supported by another research that discovered self-reported stress may lead to ingesting more foods (Groesz et al., 2012). These findings could mean that the children were low in emotional well-being due to eating unhealthy food or the children could be snacking on sweet and fatty foods more frequently as they were in low mood. As such, this could lead to overeating, weight gain and obesity among the children thus affecting their physical well-being as well (Groesz et al., 2012; Gibson, 2006). The composition of the microbiota in the gut could also influence the development of disease such as inflammation and obesity that could affect the physical well-being of the children (Clemente et al., 2012; Cryan and Dinan, 2012).

Fast foods and snacks that are typically high in fats, sugars or both are highly palatable energy-dense foods that could lead to episodes of binge eating (Avena et al., 2009). Findings from a study using animal model suggest that overconsumption of fats could cause weight gain while excessive sugar consumption could produce behaviors similar to effects of addiction such as sugar dependence due to overproduction of dopamine. The effects also include symptom similar to withdrawal syndromes of drugs such as anxiety and somatic problem (Avena et al., 2009). Another study that also uses animal model found that consumption of trans fatty acid during growth and development could cause oxidative damage to the brain and frequent consumption could result in development of anxiety when exposed to daily stress (Pase et al., 2013). These effects could negatively affect both the physical well-being and emotional well-being of the children.

The findings from this study show that fast foods and snacking only significantly correlate with the physical and emotional well-being of the children. However, they do not correlate with their attitude toward other people and toward themselves which are proven from the lack of significance in their association with the subscales of friend functioning, school functioning, family functioning as well as self-esteem. These findings can be contended by a study among 945 adult men and women that reported strong significant association between consumption of trans-fatty acids with aggression (Golomb et al., 2012). The difference between the effects of trans fatty acids on children and adult might be due to the late development of the children's brains specifically the development of dorsolateral prefrontal cortex that control impulses, judgement and decision-making (Lenroot and Giedd, 2006). These particular functions are closely related in the social aspects of their life which could be the root cause of the non-significant association of fast foods and snacks with the social aspect of the HRQOL. Moreover, a randomized controlled trial among women participating in a low-fat, high-carbohydrate diet intervention for 5 years found no significant difference in social functioning between the intervention and control group (Hislop et al., 2006).

On the other hand, a study among school children in Kuwait found that self-esteem is positively associated with the frequency of sugar products such as chocolate, biscuits and cakes consumption (Honkala et al., 2006). The finding from this study is similar to our study even

though the correlation found in our study are not significant. However, the finding from the study in Kuwait can be contended by a low-carbohydrate diet intervention study that found improved self-esteem (measured using the Rosenberg Self-esteem Survey) among obese teens participating in the study after 2 months and 6 months of intervention (Siegel et al., 2009).

A limitation of this study is the possibility of recall bias by the children regarding the frequency of fast food consumption and snacking in the past seven days when completing the nutritional KAP questionnaire due to the differences in accuracy or completeness of recollections retrieved by the children. Another limitation is difficulties faced by children in understanding the items of the KINDL^R questionnaire to infer their HRQoL. This is due to the command of Malay Language.

Frequency of fast food consumption is negatively associated with emotional well-being while frequent of snacking is significantly associated with low physical well-being and emotional well-being. Therefore, children's diet should be closely monitored so that fast food and snacks could be minimized or even removed from their diet. Instead of including unhealthy food as part of their diet, a well-balanced diet cooked using fresh ingredients would be the best diet for their growth and also for their health-related quality of life.

Authors' contributions

ZI and LSF contributed to the content of this manuscript

ZI, LSF and FZcontributed to the format of this manuscript

ZI, LSF, RS, MYJ and AHM contributed to the data analysis of this manuscript

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REFERENCES

Aranceta J and Pérez-Rodrigo C, 2012. Recommended dietary reference intakes, nutritional goals and dietary guidelines for fat and fatty acids: a systematic review. British Journal of Nutrition, 107(S2), S8–S22.

Avena NM, Rada P and Hoebel BG, 2009. Sugar and Fat Bingeing Have Notable Differences in Addictive-like Behavior. The Journal of utrition, 139(3), 623–628.

Bercik P, Collins SM and Verdu EF, 2012. Microbes and the gut-brain axis.
Neurogastroenterology & Motility, 24(5), 405–413.

Bullinger M, 1994. KINDL — a questionnaire for health-related quality of life assessment in children. Zeitschrift Für Gesundheitspsychologie, 1, 64–77.

Carabotti M, Scirocco A, Maselli MA and Severi C, 2015. The gut-brain axis: interactions between enteric microbiota, central and enteric nervous systems. Annals of Gastroenterology: Quarterly Publication of the Hellenic Society of Gastroenterology, 28(2), 203–209.

Clemente JC, Ursell LK, Parfrey LW and Knight R, 2012. The Impact ofthe Gut Microbiota on Human Health: An Integrative View. Cell, 148(6), 1258–1270.

Cryan JF and Dinan TG, 2012. Mind-altering microorganisms: the impact of the gut microbiota on brain and behaviour. Nature Reviews Neuroscience, 13(10), 701–712.

Dinan TG and Cryan JF, 2017. The Microbiome-Gut-Brain Axis in Health and Disease.
Gastroenterology Clinics of North America, 46(1), 77–89.

Elias SL and Innis SM, 2002. Bakery foods are the major dietary source of trans-fatty acids among pregnant women with diets providing 30 percent energy from fat. Journal of the American Dietetic Association, 102(1), 46–51.

Garber and Lustig, 2011. Is Fast Food Addictive? Current Drug Abuse Reviews, 4(3), 146–162.

Gibson, 2006. Emotional influences on food choice: Sensory, physiological and psychological pathways. Physiology & Behavior, 89(1), 53–61.

Gilbert JA, Miller D, Olson S, and St-Pierre S, 2012. After-school Snack Intake Among Canadian Children and Adolescents. Canadian Journal of Public Health, 103(6), 448-452.

Golomb BA, Evans MA, White HL. and Dimsdale JE, 2012. Trans Fat Consumption and Aggression. PLOS ONE, 7(3), e32175.

Groesz LM, McCoy S, Carl J, Saslow L, Stewart J, Adler N, … and Epel E, 2012. What is eating you? Stress and the drive to eat. Appetite, 58(2), 717–721.

Hinton PR, Brownlow C, McMurray I and Cozens B, 2004. SPSS Explained. London, UK: Routledge.

Hislop TG, Bajdik CD, Balneaves, LG, Holmes A, Chan S, Wu E, … and Butler AL, 2006. Physical and emotional health effects and social consequences after participation in a low-fat, high-carbohydrate dietary trial for more than 5 years. Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology, 24(15), 2311–2317.

Honkala S, Honkala E, and Al-Sahli N, 2006. Consumption of sugar products and associated life- and school-satisfaction and self-esteem factors among school children in Kuwait. Acta Odontologica Scandinavica, 64(2), 79–88.

Hu J, La Vecchia C, de Groh M, Negri E, Morrison H, Mery L and Canadian Cancer Registries Epidemiology Research Group. (2011). Dietary transfatty acids and cancer risk. European Journal of Cancer Prevention, 20(6), 530-538.

Lenroot RK and Giedd JN, 2006. Brain development in children and adolescents: Insights from anatomical magnetic resonance imaging. Neuroscience & Biobehavioral Reviews, 30(6), 718–729.

Mensink RP and Katan MB, 1990. Effect of Dietary trans Fatty Acids on High-Density and Low-Density Lipoprotein Cholesterol Levels in Healthy Subjects. New England Journal of Medicine, 323(7), 439–445.

Monteiro CA. 2009. Nutrition and health. The issue is not food, nor nutrients, so much as processing. Public Health Nutrition, 12(5), 729–731.

Murakami K and Livingstone MBE, 2016. Associations between meal and snack frequency and overweight and abdominal obesity in US children and adolescents from National Health and Nutrition Examination Survey (NHANES) 2003–2012. British journal of nutrition, 115(10), 1819-1829.

Nederkoorn C, Braet C, Van Eijs Y, Tanghe A and Jansen A, 2006. Why obese children cannot resist food: the role of impulsivity. Eating behaviors, 7(4), 315-322.

Pase CS, Roversi K, Trevizol F, Roversi K, Kuhn, FT, Schuster AJ, ... and Bürger ME, 2013. Influence of perinatal transfat on behavioral responses and brain oxidative status of adolescent rats acutely exposed to stress. Neuroscience, 247, 242-252.

Piernas C and Popkin BM, 2010. Trends in snacking among US children. Health affairs, 29(3), 398-404.

Ravens-Sieberer U and Bullinger M, 1998. Assessing health-related quality of life in chronically ill children with the German KINDL: first psychometric and content analytical results. Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 7(5), 399–407.

Sánchez-Villegas A, Verberne L, De Irala J, Ruiz-Canela M, Toledo E, Serra-Majem L and Martínez-González MA, 2011. Dietary fat intake and the risk of depression: the SUN Project. PloS one, 6(1), e16268.

Seura T, Yoshino Y and Fukuwatari T, 2017. The relationship between habitual dietary intake and gut microbiota in young Japanese women. Journal of nutritional science and vitaminology, 63(6), 396-404.

Siegel RM, Rich W, Joseph EC, Linhardt J, Knight J, Khoury J and Daniels SR 2009. A 6-month, office-based, low-carbohydrate diet intervention in obese teens. Clinical pediatrics, 48(7), 745-749.

Stender S, Dyerberg J and Astrup A, 2007. Fast food: unfriendly and unhealthy. International Journal of Obesity, 31, 887.

Stender S, Dyerberg J and Astrup A, 2006. High levels of industrially produced transfat in popular fast foods. New England Journal of Medicine, 354(15), 1650-1652.

WHO BMI-for-age (5-19 years). (n.d.). http://www.who.int/growthref/who2007_bmi_for_age/en/

Wille N, Erhart M, Petersen C and Ravens-Sieberer U, 2008. The impact of overweight and obesity on health-related quality of life in childhood–results from an intervention study. BMC public health, 8, 1-9.