

ORIGINAL ARTICLE

Food Choices and Diet Quality in the School Food Environment: A Qualitative Insight from the Perspective of Adolescents

Suhaila Abdul Ghaffar, Ruzita Abdul Talib, Norimah A Karim

Nutritional Science Programme, Faculty of Health Science, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.

ABSTRACT

Introduction: Overweight and obesity among adolescents are not caused by a single factor, and evidence indicates that the food environment is one of the driving forces behind the current escalating obesity epidemic. Therefore, it is imperative to explore any perceived factors related to food choices and quality of food in the school food environment among adolescents. **Methods:** A qualitative study based on the Socio-Ecological Model (SEM) was conducted on a purposive, multi-ethnic sample of 51 adolescents from different localities. The semi-structured and in-depth interviews were fully transcribed and analyzed qualitatively using Atlas.Ti. The transcribed texts were coded into similar and related themes such as food choices, quality of food, social-peers' influence, cost of food and self-awareness. **Results:** The findings revealed that there is a clustering of barriers to practising a healthy dietary intake within the school food environment. Accessibility to low cost snacks and fried foods, influence by parents and peers, as well as the autonomous character of informants in making their own purchases are the contributing factors to healthy eating practice among adolescents. **Conclusions:** The study highlights that the barriers to practicing healthy eating considerably outweighs the enabling factors. Therefore, the findings will help facilitate the construction of policy-driven environmental changes as well as strategies in designing effective and multilevel interventions that raise awareness in helping adolescents navigate healthy food in their school's compound.

Keywords: Qualitative study, Adolescents, Obesity, School food environment, Malaysia

Corresponding Author:

Norimah A. Karim, PhD

Email: norimahkarim@ukm.edu.my

Tel: +603-92897622

INTRODUCTION

Food intake during adolescence is important for growth and development, and for current and long-term health consequences that can also develop lifelong eating behaviours. During this period, the energy and nutrient requirements needed are higher compared with any other part of the lifecycle (1). However, numerous studies have consistently shown that the quality of diet declines from childhood to adolescence with a diet that has a high intake of fat, salt and sugar but is low in fruit, vegetables, whole grains and dairy foods (2) (3). The quality of adolescents' diet is poor and falls short of the recommended dietary guidelines as mentioned in a study carried out in the United Kingdom (4).

Over the last decade Malaysia has witnessed an incremental rise in the prevalence of overweight and obesity among children and adolescents. The findings from the Malaysia School Based Nutrition Survey revealed that 26.7% of adolescents were overweight or obese (5). This means that one in every four adolescents is

estimated to be obese. Overweight adolescents are more likely to become overweight adults and have a greater risk for obesity-related health outcomes. Meanwhile, overweight children or adolescents are more likely to experience lower self-esteem, be depressed, have body dissatisfaction, and suffer discrimination and social marginalization (6).

A number of studies that have examined adolescents' eating patterns suggest that the school food environment has a significant impact on obesity. The school food environment is defined as the accessibility to food and beverages within or outside the school compound that can be accessed within 500 metres of the school (7) (8). The food sources in the school food environment may come from the school canteen, hawkers or grocery stores within the school parameters (9). Vending machines are also accessible in certain schools and have to adhere to guidelines set by the Ministry of Education which prohibits the sale of processed food, junk food as well as energy and isotonic drink (10). These sources can influence food choices, which subsequently influence their eating behaviours. Therefore, food accessibility within or outside the school compound is a key determinant in food choices and the quality of diet among adolescents as they spend more time at school (11). In fact, adolescents spend about five to seven

hours daily at school, and they are required to make various food choices while at school (12). Adolescents will consume at least one meal at school or near the school they attend (13); this meal tends to significantly contribute around 35% to 40% of the adolescents' total daily calories (14).

Cullen et al. (2000) and Kubik et al. (2003) found that schools in Texas and Minneapolis, which enabled greater autonomy to their students through their a la carte programmes, were linked with lower intakes of fruit and vegetables and higher intakes of total and saturated fats (15) (16). They also discovered that the presence of snack vending machines was associated with lower fruit intake, suggesting that students may be choosing alternative snack foods from the vending machines rather than fruit. Therefore, there is growing evidence that reveals that a lack of access to healthy foods is hindering adolescents in developing healthy eating habits (17)(18).

In Malaysia, a study carried out by Nik Rosmawati et al. (2017) highlighted that minimal choice of food and vegetables served in school canteens may lead to deprivation in vitamins and mineral intake amongst adolescents. The study also revealed that almost one third of fried processed food and food not allowed to be sold in schools were available within the school food environment (19). In addition, the accessibility to junk food sold near the school compound triggers unhealthy food practices (11) such as snacking between meals and skipping main meals (20). To our knowledge, no qualitative studies have been carried out on factors related to food choices and quality of food among adolescents.

Therefore, the aim of this study was to qualitatively explore factors related to food choices and quality of food in school food environments among adolescents. The in-depth interviews were used for data collection; this is known to be an effective method for seeking information and generating ideas through personal perspectives. In addition, Gill et al. (2008) stated that the interview method is the most suitable approach for qualitative study in seeking insightful understanding (21). Therefore, to investigate eating behaviour qualitatively, the Socio-Ecological Model (SEM) as a framework has been used in this study to illustrate multiple levels of influence; these include individual, social and environmental factors that contribute to individual behaviour (22) (23). This model can provide guidance for developing appropriate intervention in order to improve adolescents' eating behaviour and health in general.

MATERIALS AND METHODS

Study Design, Study Population and Sampling Method

This was a qualitative study using face-to-face interviews, guided by semi-structured questions known

as a research guide. This method allows for more in-depth data collection as the interviewer can probe for explanations of responses (24) (25).

The study was conducted in Kedah, Terengganu, Johor and Selangor. These states were randomly selected from the four regions across West Malaysia to ensure that the data collected represents a broad range of population in the country. A simple random sampling was conducted to select schools in urban and rural areas based on current classification by the Ministry of Education. A total of eight schools participated in the study: four schools were from urban areas and another four schools represented rural areas. The study population were selected through a purposive sampling method. With regards to unpredictable adolescents' behaviours, and in order to reach saturation of data, we asked the teachers to randomly nominate 10-15 students from each school based on pre-set criteria for potential informants. The informants were aged between 13 to 16 years old, and were from non-boarding government schools.

All informants were interviewed individually, and underwent a face-to-face in-depth interview. The inclusion criteria were Malaysian citizen, aged between 13 to 16 years old, attending school during data collection days, and able to communicate either in English or Bahasa Melayu. The exclusion criterion was adolescents who were absent from school. With regards to the number of informants, the interviewing process was conducted until it reached a saturation point whereby no new themes could be generated from the interview sessions (21).

Instrument

Prior to the data collection process, the research guide was developed to suit the objective of the study. The research guide consisted of a list of questions with useful prompts to encourage informants to respond and be able to provide an in-depth perspective during the interview session. A semi-structured research guide was developed consisting of primary and sub-questions. It provided a consistent structure to the questions posed during the interviews so that the research objectives were met. The research guide is a mechanism for steering the discussion and enhancing the consistency of data collection (26). The development of the research guide was based on the study specification and relevant literature search, the researcher's own experiences and guidance from the supervisors. All questions were arranged from easy and general to more specific and comprehensive. The research guide was used during all the interview sessions to ensure consistency in questions asked to all informants. Table I shows a list of primary questions from the research guide.

Study procedure

A pre-test on the research guide was conducted on eight adolescents between 13 and 16 years of age residing

Table I: Research Guide: Overview of Primary Topics and Questions

Topic	Primary Questions
Introduction/warm up	Could you please tell me your personal background and family info?
Knowledge	What do you understand about healthy eating?
Food Environment	What do you think about your school food environment?
Food Choice	How do you find the selection of food choices at your school? What do you think about the price, quality and healthy food at school? How about snack intake at school? How about your fruit and vegetables intake at school?
Peers' Influences	What do you think about peer influences?
Parents' Influences	What is your parents' role in food selection at school?
Barriers/ Facilitators	What challenges do you face in practicing healthy food intakes? Do you have any specific facilitators in practicing healthy eating?

in Kuala Lumpur. The test was carried out to assess the clarity of language, vocabulary, the flow of questions, the estimation for each session, and to identify any practical problems with implementation. The final version of the research guide used in this study was based on the feedback given by the informants during the pre-test. Prior to that, the study protocol was approved by the institutional review boards from Universiti Kebangsaan Malaysia, and permission to carry out the study at the secondary schools was approved by the Ministry of Education. Additionally, all selected adolescents were given a set of forms including the Informed Consent Form (ICF) and Subject Information Sheet (SIS), which were to be signed before commencement of the study; they were obtained from all informants as well as their parents.

Data Collection

The data collection was carried out one-to-one with the informants, known as an in-depth interview. The pre-tested research guide was used by the interviewer as a guide throughout all the sessions held. All informants were given a short introduction explaining the confidentiality of the study, that they were free to give any ideas, and encouraged to provide feedback of the study; all information would be treated in a confidential manner. They were informed that an audio of each in-depth interview session would be recorded for the purpose of analysis. The data collection took place from February until July 2016.

Data Analysis

As part of the data analysis, all audio recordings were transcribed in verbatim format by a researcher, word for word to ensure systematic analysis of all sessions (27). The transcribed texts were then analysed qualitatively using the inductive thematic analysis approach using Atlas.Ti. The transcribed texts were coded via an open coding process and separated into similar and related

themes (28). The subthemes, themes and main domains were identified. To assure content validity within specific themes, inter-rater reliability tests were assessed and found to be acceptable with a Kappa score of 0.80.

RESULTS

Informant Characteristics

A total of 51 adolescents agreed to participate in this study. The majority of informants were Malay, followed by Chinese and Indian with different socio-economic statuses. The informants were aged between 13 and 16 years old, with 54% of the informants being girls. Meanwhile, based on locality, the informants were equally distributed between urban and rural areas. Table II shows the characteristics of the informants.

Table II: Characteristics of the Informants

Characteristics	n	%
Age (years)		
13 years old	9	17
14 years old	13	25
16 years old	29	57
Sex		
Male	24	47
Female	27	53
Race		
Malay	36	71
Chinese	7	14
Indian	8	16
Locality		
Urban	23	45
Rural	28	55

Factors Influencing Food Choices at School

The main factors consistently cited as a major influence on the food choice of informants were availability, accessibility, self-awareness and cost of food. These factors appeared to be crucial when making decisions on food choices. Other factors, such as peer and parental influences, also played a role in the food choices of the informants.

From the in-depth interview sessions, five individual themes emerged, identified as food choices, school food environment, peer influence, family influence, and self-awareness. These themes are addressed below in detail.

Availability of Food

The majority of the adolescents revealed that the availability of food and beverages at school influenced their daily food consumption. However, it was the excessive exposure to unhealthy foods that enticed them as these foods were easily accessible.

Here, (they) rarely sell healthy food like those

(Informant 07, Girl, 16)
For example, the school canteen serves a lot of food that is fried (Informant 05, Girl, 16)
Erm..the canteen... it's like too many oily foods (Informant 08, Girl, 16)

In addition, half of the informants expressed serious concern over the limited types of food and beverages sold at the school canteen. The limited food choices have been identified as a barrier for most of the informants.

Hmm...there is limited choice. There 'are drinks, chicken rice, rice with anchovies, and then...burger and nuggets. That's all. (Informant 41, Girl, 16)
Limited food lah at school because sometimes, only two types (of foods). (Informant 17, Girl, 14)
I don't prefer (to eat at school) because (the food is) too oily and the menu is the same every day, so it's boring. (Informant 04, Girl, 14)

Many informants also talked about consuming more unhealthy food during school. They defined this less healthy food sold at the school canteen as being too oily as well as high in sugar and salt content.

And then, the food is oily...if (served) rice, they won't put the veggies, (which) don't follow err...balance diet. (Informant 09, Girl, 16)
Also sells instant noodles. And burgers. There are oilier foods than healthy one. (Informant 08, Girl, 16)

In addition, the majority of the informants revealed that fruit is not sold in school.

There are no fruits... (Informant 41, Girl, 16)
Fruits not available. And then, this school don't sell fruits. (Informant 09, Girl, 16)

Moreover, informants shared the availability of many different snacks such as "keropok" and processed meat products such as sausages and meat patties that are high in fat.

'Keropok' and after that, hot dog like those sold outside of school which is oily, instant noodles and burgers as well. (Informant 08, Girl, 16)

Accessibility of Food

Informants have access to various food sources at the school compound. In this study, the school canteen is considered as an on-site and main food provider, followed by school cooperative shops and finally vending machines as a quick food provider, with sugary drinks as the main beverages sold in the machine.

Sometimes, I will buy food from school cooperative shop, sometimes from hawkers outside of school. (Informant 11, Boy, 13)
Normally on Wednesdays, we have co-curriculum.

I will go buy food at the hawkers outside of school. (Informant 24, Boy, 16)
If too thirsty, I will get from vending machine beside the main block. (Informant 37, Boy, 16)

Another response received was the accessibility to the school cooperative shop. The school cooperative shop is another place where students can buy stationery as well as snacks during school time.

Haa, Maggi cup is also available. (Informant 08, Girl, 16)
For example, at the school cooperative shop, when they are selling bread, 'keropok', sweets and all, so I'll just buy. (Informant 31, Boy, 16)

As noted by the informants, one of the factors influencing the accessibility of food at school is the conducive atmosphere of the school canteen. The findings from the adolescents' perspective showed that some of the canteens are less conducive as they are full of students and the foods served are not suited to their taste.

Food environment at school...I don't usually go to the canteen because the situation at the canteen, sometimes I feel it is too stuffy to be in the canteen. (Informant 40, Boy, 16)

From the in-depth interview sessions, some informants claimed that they can get food outside of school. There are hawkers selling food outside of school, which can be accessed by the students.

If I want to buy some food outside (of school), I will come to school a bit earlier than usual to buy food outside of school. (Informant 46, Girl, 16)

However, some informants reported asking their friends to purchase food for them outside of school because they are not keen on the food provided at the school canteen. In fact, some students go as far as running their own business by selling junk food to their friends.

Sometimes, I will eat at school canteen... sometimes my friend will sell 'nasi' at school. (Informant 17, Girl, 14)
I will buy Ramen from my friend, even though it's a bit pricey 'lah'. (Informant 48, Girl, 16)

Alternatively, a few informants mentioned that their parents prepared lunch boxes for them to bring to school.

I will bring one bottle of Milo. Aaa...my mum will give me bread or anything (as lunch box.) (Informant 12, Boy, 14)
Ya. I always bring bread. (Informant 15, Boy, 14)
The food is very spicy so I ask my mother to prepare a set of lunch box for me to eat. (Informant 39, Boy, 16)

In contrast, some of the informants wished to be able to bring lunch boxes to school, but their parents are usually busy in the morning and are unable to provide lunch boxes, or even to prepare breakfast for them. The majority of the 'informants' parents work, and therefore have no time to prepare food.

My mum busy with her work...she has to go out so early. (Informant 29, Boy, 16)

And then...I don't know...mom don't have time prepare food for me. (Informant 16, Boy, 14)

The issue becomes increasingly problematic as adolescents are given more autonomy in their food choices at school. Furthermore, the pocket money given by their parents contributes to the increasing amount of freedom to purchase any type of food from within or outside of the school compound.

My parents never care about that so I have a free style to eat. (Informant 37, Boy, 16)

I will buy anything I want as my parents don't ask how I spend my money. (Informant 39, Boy, 16)

Affordability/Cost of Food

Informants described the cost of food as something that is evaluated heavily before making their purchasing decisions. The following responses displayed some of the concerns related to the cost of food at the school canteen.

Rice with chicken is quite expensive. Then, I would rather buy something cheaper. (Informant 23, Boy, 16)

Alternatively, some informants had mentioned that they bought food from their friend; this was cheaper and suited their taste preferences.

Normally I will ask my friend...he sells rice, tastes better and cheaper. He brings to school every morning. (Informant 26, Boy, 16)

Normally this student will sell. And then, many will buy because it's something new. (Informant 48, Girl, 16)

Some of the informants, particular from rural areas, tended to skip meals or find something at a cheaper price as they had a limited amount of money to spend on food.

I have RM7 every day, sometimes I wouldn't buy food during recess. I need to pay for bus ticket every day. (Informant 24, Boy, 16)

Peers Influence

It was noted that the adolescents' food choice at school was often reflective of their peers' food preferences. The relationship between peers and food choices of

adolescents is a complex interaction. Food choice can easily be influenced by their peers with some reasons and similarity. Here, adolescents identified peers as one of the main factors in their food consumption.

Whatever food my friend is eating, it looks so delicious (laughing), then we shared whatever food we have. Normally my friend and me will share our food. (Informant 48, Girl, 16)

Haa.. it seems that there are lots food like Ramen, maggi, just follow what my friend eat. (Informant 26, Boy, 16)

Parental Influence

Parents play an important role in shaping adolescents' eating habits, which can make a lasting impact on their health. Many of the informants explained how their parents have attempted to structure and control what they eat at school by constantly reminding them about their food choices. Some of the informants mentioned that their parents constantly advised them through verbal encouragement and negotiated with them which foods should be consumed at school.

Mum and dad asked me not to buy the food because it's unhealthy. (Informant 6, Girl, 13)

Sometimes, I really want (to buy) but my mom does not allow me, so what to do... (Informant 38, Girl, 16)

My mum tries to limit... (Informant 42, Boy, 16)

Self Awareness

Self-awareness plays an important role in controlling one's eating behaviour, particularly among adolescents. As part of self-awareness, knowledge on healthy food choices will be an asset to adolescents as they begin to have greater control over their own food choices.

Yes. I avoid eating nasi lemak at school because my school's food is very oily. (Informant 39, Boy, 16)

Yes...right. After recess it will be difficult to study. I can't focus. It's like we're too full. (Informant 42, Boy, 16)

DISCUSSION

This qualitative study explored adolescents' perspectives on food choices and quality of food in the school food environment. The findings also provided perspectives from adolescents on barriers and facilitators towards healthy eating practices. It shows that the school environment yielded a significant association with diet related behaviour (29).

The choices people make with regards to food are dictated by the available choices. Food availability, accessibility and cost of food are being recognized as important determinants of food choices (30) (31). From the current findings, most of the informants mentioned

that the school canteen is the main on-site food source. Therefore, school canteens should begin moving towards creating a healthy eating environment. Canteen operators should serve more healthy and nutritious food as recommended by the school canteen guidelines (32). This is in line with (33) who found that schools should increase the availability of healthier foods.

Furthermore, informants in the current study claimed that the food available in their canteens is unhealthy; it was described as too oily, sweet, spicy and salty. Numerous studies have indicated that a multiple range of foods, which are high in fat and sugar, can typically be found in school canteens (34); they are predominantly low nutrient but energy-dense (35) (36). This finding is also consistent with the study carried out by Penney et al. (37) in 2014, which revealed that food sources at school are energy dense and nutrient-poor foods. Furthermore, the findings showed that the perception of their very limited access to healthy options at school are in line with the study by Watts et al. (2015) in the USA (36). Meanwhile, another study carried out in Canada conducted by He et al. (38) in 2012 revealed that accessibility to unhealthy food sources at school has been perceived as one of the contributors towards less favourable dietary habits; this is consistent with the findings of this study. Some adolescents from the study mentioned that the increase in healthy food options in their school canteens might be a positive predictor of healthy food practices, which was also reported in the literature (39) (40).

In addition, the study's informants revealed that the consumption of fruit was low due to the difficulty in obtaining any type of fruit at school. This is supported by the findings from Terry-McElrath et al. (2009) that revealed that the frequency of offering both fruit and vegetables at school is positively and significantly associated with the adolescents' daily consumption (41). This scenario does not reflect the dietary recommendation guidelines on fruit availability at school and is consistent with previous findings (37).

In addition, Azeredo (2016) highlighted that schools are increasingly selling unhealthy foods inside their compounds, regardless of the established guidelines on food and beverages (42). Therefore, limiting the amount of less healthy food and beverages in school, from all sources, could benefit the younger generation. For example, the availability of junk food at school cooperatives, vending machines, hawkers outside school, and student-run businesses at school should instead be replaced by healthier food choices rather than exposing adolescents to various types of less healthy snacks.

The cost of food has also been linked to the adolescents' food choices. As noted by informants, unhealthy food in school canteens, such as nuggets, sausages and fries, are cheaper compared with other healthier choices.

Although these types of food are handy and practical to eat at school, they are low in quality and high in fat. In addition, some informants from rural areas revealed that cheaper food is preferred due to their limited pocket money. This finding is similar with the study carried out by Watts et al. (2015), which described the cost of food as a significant consideration by adolescents in order to maximize what they can get for their money (43).

In addition, some informants highlighted that a conducive environment in the school canteen is important. This could be because the conduciveness of an eating place will influence the mode of eating. This is in line with a study by Devi et al. (2010) that revealed that informants expressed dissatisfaction with the environment of the dining area at school (44).

Meanwhile, the majority of the informants mentioned that they preferred sweetened beverages prepared at the school canteen. The findings showed that sweet beverages can easily be accessed either at the school canteen, school cooperative or the vending machines. The findings are in line with environmental factors contributing to the daily intake of sugary beverages that may promote long-term weight gain in adolescents (29). Based on the adolescents in the present study, parents, peers and friends were seen to have major influences over their food choice at school. The informants mentioned that their parents constantly advised them through verbal encouragement and negotiating which foods should be consumed at school. Nevertheless, it is interesting to note that parental control seems to decrease with the increasing age of adolescents. At the same time, adolescents also experience an increased autonomy in their day-to-day decision making (45). In addition, peers also exerted a major influence on overall adolescent behaviour because they spend a substantial amount of time with friends, and eating is an important form of socialization and recreation (1). During this time, peers and friends may transfer eating behaviours that will be adopted by the adolescents (36). Therefore, the decline in parental influence and the subsequent increase in peer influence as the adolescents age highlight the significance of supporting healthy food socialization in peers (46).

The findings thus far highlight multiple factors across settings that might be influencing the success of dietary behaviour change through food choice. As noted above, several factors contribute to the perceived barriers in practicing healthy dietary intake at school. The availability of food that is oily, high in fat and sugar, combined with the difficulty of accessing fruit and vegetables are prevalent throughout this study. Limited food options and a large range of snacks have also restricted the adolescents' ability to practice healthy dietary options. In addition, the low cost of snacks and fried foods were linked to unhealthy food choices and poor dietary practices. This clustering of barriers, as

well as the autonomous character of the informants, are the contributing factors to the leading cause of obesity among adolescents.

CONCLUSION

The findings of this study contribute to a broader and a deeper layer of understanding about food choice and quality of food in the school food environment from an adolescents' perspective. It highlighted the potential approach to inculcate healthy eating among adolescents by improving the school food environment, enhancing healthy school policies, and engaging with parents and peers as role models at school. Ultimately, this is fundamental in shaping the food choices and quality of adolescents' food and preventing an overweight and obesity epidemic within this high risk food environment. In addition, the findings may facilitate the designing of effective and multilevel awareness-raising interventions in school settings to prevent obesity in Malaysia.

Our study has a number of strengths. To our knowledge, this study represented culturally diverse adolescents from multi-socioeconomic backgrounds, varying ethnic backgrounds and from multi-locations. Therefore, the findings will establish how adolescents from different backgrounds view their food choices and quality of food at school. Furthermore, in terms of methodology, this study has employed an in-depth interview approach that helps in making a useful and meaningful contribution.

The results of the present study must be interpreted in light of several limitations. First, the current study is solely dependent on self-reporting, which might not portray the actual situation or eating behaviours of adolescents at school. Therefore, further research should be carried out with a combination of triangulation approaches such as ethnography, coupled with focus group discussions among teachers, school administrators and hawkers around schools. This might help to develop a more complete overall picture of the school food environment and how it can contribute to healthy eating behaviour among adolescents.

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