Awareness levels, nutrition practices and female students' opinions regarding public school canteens in Jeddah, Saudi Arabia

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Abstract: The aims of this study were to compare the awareness levels and nutrition practices of female intermediate and high school students regarding healthy lifestyle habits and to investigate these students' opinions toward food purchases in public school canteens. **Methods:** A cross-sectional study was conducted of female intermediate and high school students in Jeddah. Two hundred students were selected at random from four public schools and study was conducted between January and March 2015. A self-reported questionnaire with 71 questions was designed. **Results:** Most students (49.5%) fell within a normal weight range (BMI 19–24.9), while 34.5% were overweight (BMI 25–29.9). Of the students surveyed, 66% purchased food once a day from school canteens, while 14% purchased food twice per day; 38% thought that the school canteen sold unhealthy foods, while 34.5% thought that the offerings lacked variety. Most of the students possessed a high level of awareness: 45% and 42% for high school and intermediate school students, respectively. Most students reported fair food habits (40% and 29.5% of intermediate and high school students, respectively). **Conclusion**: To improve students' health and reduce the incidence of obesity, continued changes to the school food environment and practices are essential. Foods rich in saturated fats should be moderated, and sugary beverages and snacks should be replaced with healthier choices to reduce the intake of empty calories.

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Key words: awareness level, healthy lifestyle habits, school canteen, BMI.

1. Introduction

The importance of nutrition for a healthy lifestyle and a healthy diet has increased (Stampfer, *et al.,* 2000). There are strong links between unhealthy lifestyle habits, such as deleterious dietary choices, sedentary lifestyle, excessive caffeine and tobacco intake, and improper sleeping habits and diseases (Eyre *et al.,* 2004; Ignaro *et al.,* 2007). Epidemiological evidence indicates that a decline in healthy lifestyle habits over recent years has increased the incidence of major diseases, including cardiovascular disease, osteoporosis, high blood pressure, cancer and obesity; a change in nutrition habits is critical for combating this trend (Harvey-Berino *et al.,* 1997). Unhealthy food choices have increased among adolescents, who tend to consume diets high in saturated fats and sugars and low in fiber (van der Host *et al.,* 2008).

Students spend a large portion of their time in school, which is also the critical environment in which they consume breakfast, long considered an important daily meal (Mensink *et al.,* 2012).

In Saudi Arabia, one company provides the breakfast meals sold to all female students by public school canteens at the three education levels (i.e., primary, intermediate and high school). They follow specific terms and instructions set by the Ministry of Education and meet quality standards for foods, beverages and snacks. Nevertheless, strict standards for worker hygiene must be established for school canteens to guarantee a safe and healthy environment for students (Ministry of Education, 2013). No reviews of KSA female public school students' attitudes toward school canteens have been published since the Ministry of Education selected a company to supply breakfast meals. It is necessary to assess and review students' opinions to guarantee that the food, beverages and snacks purchased from the school canteen are acceptable and of appropriate quality.

A previous study indicated that most students do not put much thought into nutrition or into making healthy food choices (Tacken *et al.,* 2010). Moreover, school breaks – when students socialize and eat meals and snacks – are important periods. Therefore, it is expected that most students' food choices are made impulsively. As a result, if a school makes unhealthy food items, soft drinks and large portion sizes available, students' eating behaviors will be affected accordingly (Leger, 2001). Eating habits are formed early in life and are difficult to change once established (Verplanken & Aarts, 1999). For this reason, adopting healthy habits from a young age is more effective than trying to change unhealthy habits later in life. Schools can help promote the adoption of healthy lifestyles by creating healthy environments for their students (Nadoo & Wills, 2000).

The main goal of nutritional planners is to ensure that all members of a community receive the necessary nutrition to stay healthy. To achieve this goal, the

knowledge and attitudes of members of the community should be considered. Students are more likely to make positive changes if they are provided with a proper education (Bazegari *et al.,* 2011), and schools are important in educating students about healthy habits (Leger, 2001). Health attitudes and knowledge are associated with both individuals and populations; thus, teaching students to be more healthful will benefit the community at large.

There have been no studies reviewing female students' opinions regarding public school canteens in KSA since the Ministry of Education contracted a company to supply breakfast meals.

The aims of this study were to compare the awareness levels and practices of female intermediate and high school students and to investigate students' opinions toward food purchases in public school canteens.

2. Methods

A cross-sectional study was conducted among intermediate and high school female students in Jeddah, a city in a western province of Saudi Arabia. The study was conducted between January and March 2015. Two hundred intermediate and high school students were selected randomly from four public schools (two for each level). Permission to conduct this study was obtained from the Ministry of Education.

A self-reported questionnaire was designed with 71 questions divided into four categories: demographic characteristics, anthropometric measurements, school canteen trends, and healthy lifestyle awareness and habits. Scoring systems were developed to compare the two study groups and enabled us to quantify knowledge about healthy dietary and lifestyle practices. Twenty-five statements regarding dietary habits were marked, and cumulative scores were determined. The maximum score attainable was 75, and the minimum was 3; scores were divided among three levels (high – fair – low). The knowledge score was based on thirty-five statements, with each statement given a score out of 3. The maximum overall score was 105 and the minimum was 3; scores were again divided into three levels (high – fair – low).

Statistical Analysis

The data were analyzed using SPSS version 22 (SPSS Inc., Chicago, IL, USA). Descriptive statistics are presented as the means ± standard deviations (SDs) or proportions. Differences between groups were tested separately for each of the intermediate and high school students using one-way ANOVA. The level of significance was set at $p<0.05$.

3. Results

The descriptive characteristics of the female students are shown in Table 1. Most of the students (50.5%) are in the 15–16 age group. Furthermore, 97.5% are single, and 74.5% have an average monthly income of more than 8,000.

Table 2 provides the anthropometric measurements of participating students. The mean height of students was 154.91 ± 5.86 cm, while the mean weight was 58.12 ± 12.09 kg. The average BMI was 24.26 ± 4.5 kg/m$^{2.}$ Approximately one-half of the students (49.5%) were of normal weight (BMI 19–24.9), while 34.5% were overweight (BMI 25–29.9).

The purchasing trends at school canteens are shown in Table 3. Two-thirds (66%) of the students surveyed purchase food once per day from canteens, while 14% purchase twice and 6.5% more than twice per day. Students provided opinions about the food sold at school canteens: 38% thought that the food was unhealthy, while 34.5% thought that it lacked variety.

A comparison of the awareness levels and food habits of intermediate and high school students was conducted, and the results are summarized in Table 4. Most of the students possessed a high level of awareness (45% and 42% for high school and intermediate students, respectively). For lifestyle and food habits, most of students scored at the fair level (40% and 29.5% for intermediate and high school students, respectively).

Figure 1 shows students' food consumption from school canteens. The majority of the students consumed cheese sandwiches (29%) or cheese pies (20%). Many students drank apple juice (48%), while a small portion (5%) drank milk. For snacks, 57% consumed a chocolate bar, while 28% prefer biscuits (more than one).

A one-way ANOVA between a student's education level and other parameters showed significant differences in healthy lifestyle habits, student opinions toward school canteens and number of daily purchases from the canteen ($P<0.001$). There were no significant differences in awareness level or BMI.

Table 1 Students' demographic characteristics (n= 200)

Parameter	Frequency	Percentage
Age group (years)		
13-14	58	29
15-16	101	50.5
17-18	41	20.5
Education level		
Intermediate	100	50
High	100	50
Marital status		
Single	195	97.5
Married	5	2.5
Monthly income		
1500-4000 SR	11	5.5
4000-8000 SR	40	20
>8000 SR	149	74.5

Table 2 Anthropometric measurements of the students (n= 200)

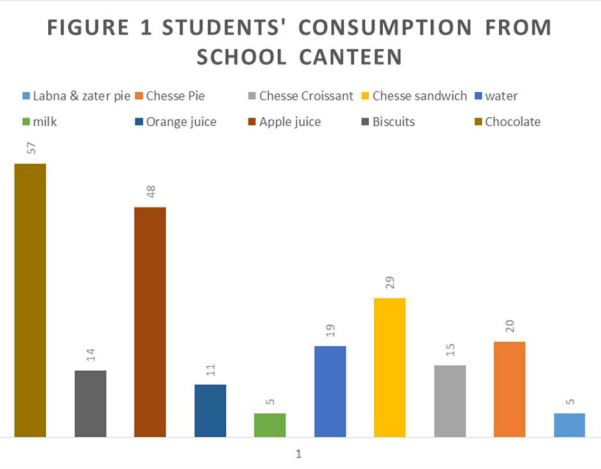
Parameter	**Mean ± SD**	
Height	154.91 ± 5.861	
Weight	58.12 ± 12.089	
BMI	24.26 ± 4.501	
BMI category	**Frequency**	**Percentage**
≤18.5	13	6.5
19 – 24.9	99	49.5
25 – 29.9	69	34.5
30 – 40	18	9.5

Table 3 The students trending toward school canteens (n= 200)

Students' daily purchases from the school canteen	**Frequency**	**Percentage**
Never	27	13.5
Once	132	66
Twice	28	14
More than once	13	6.5
Students' opinions of the food sold at the school canteen		
Unhealthy	76	38
Unvaried	69	34.5
Delicious	8	4
A&B	11	5.5
I don't know	36	18

Table 4 Awareness levels and health habits of students (n= 200)

	Intermediate School		**High School**	
Awareness	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Low	0	0	0	0
Fair	16	8	10	5
High	84	42	90	45
Lifestyle habits				
Low	0	0	0	0
Fair	80	40	59	29.5
High	20	10	41	20.5



4. Discussion

Anthropometric measurements are important indicators of health status. The World Health Organization (WHO) considers an individual to be obese when her BMI is over 30, while she is considered overweight if her BMI falls in the range of 25–29.9 (WHO, 2014). Our data showed that the majority of students (49.5%) were at a normal weight, and while the number of obese students was low (9.5%), the number of overweight students was high (34.5%). The prevalence of weight problems is similar to that reported by Farghaly *et al.* (2007) in Abha, KSA (overweight: 29%; obese: 15.9%). The prevalence of obesity is increasing in KSA, and the overall incidence is 35.5% (Al-Nozha *et al.,* 2005). Another study covering a large portion of the population of KSA suggests that the overall percentage of obesity is 15.9% (Al-Nuaim *et al.,* 1997). A new study revealed the percentage to be 28.7% for the population aged 15 and older (Memish *et al.,* 2014). In this study, the youngest participating students were 13, which is considered a transitional age from childhood to adolescence and youth. These students must consider both their food

habits and food environments to reduce the chances of overweight or obesity, especially given the high percentage of students who were already overweight and thus at risk for obesity.

One goal of this research was to identify the opinions of female students in public schools toward the food purchased from school canteens. Our results showed that students were unsatisfied with the food because it is unhealthy (34.5%) and unvaried (38%). Figure 1 shows the students' selections from school canteens, which reflect their personal opinions and what they actually purchased. All of the food items available in the school canteen were breads and pastries, which are high in carbohydrates and rich in saturated fats. The available beverages were juices and milk. However, the available juices were not fresh fruit juices; they were juice drinks or nectars, which contain less than 10% fruit juice and high amounts of sugar, citric acid and artificial flavors and colors. The available snacks were chocolate bars and biscuits (which are also high in carbohydrates). Our study showed that students purchased their food from the school canteen because it is the only option available to them. Moreover, 66% of students purchased from the school canteen once daily, although they have more than one opportunity to do so during the school day. In a study of the attitudes of adolescent students in New Zealand toward school canteen food, 58% of students bought their food and drinks from the canteen. Most of the food purchased in these canteens was high in calories, saturated fats and sugar (Utter *et al.,* 2007). Another study conducted in primary schools in Riyadh, KSA showed that 75% of students consumed cheese sandwiches and pizza, 63.2% ate chocolate wafers and 50% ate plain chocolate bars (Al-Hussyeen, 2004).

Unfortunately, the school day starts early in the morning in Saudi Arabia, which means that students have neither the time nor the appetite to have a healthy breakfast at home before going to school. One solution may be that students pack a healthy breakfast at night in a lunchbox so that it is ready to take to school in the early morning. The Ministry of Education should review the breakfast meal choices (including food, beverages and snacks) to confirm their quality. This meal should provide adequate macronutrients and micronutrients for the students' age. In addition to filling a student's needs, this practice will help them to acquire healthy lifestyle habits. Studies have indicated that breakfast is the most important meal of the day due to its effect on cognitive function and physical activity (Rampersaud *et al.,* 2005).

The other goal of this study was to compare the health knowledge and practices of female students in intermediate school and high school. Our data indicated that there was no difference between education level and awareness level. However, there was a significant difference between school levels regarding healthy food habits. In general, students' possess a breadth of knowledge and have good information regarding nutrition, but their practices are not healthy. Students might study nutrition courses as theoretical lessons and understand facts, but they do not practice what they have learned in their daily lives. Leger (2001) suggested that it is possible to achieve the changes that are needed in the school environment to improve students' education and health outcomes. Thus, the government should invest in three main areas: improving teacher education, studying school health and its effects, and expanding school health initiatives to a wider audience.

5. Conclusions

To improve students' health and to reduce the incidence of obesity, changes to the school food environment and practices are essential. Foods rich in saturated fats should be eliminated, and sugary beverages and snacks should be replaced with healthy options to reduce the consumption of empty calories.

The Ministry of Education should review the foods and beverages sold by school canteens to ensure quality standards; the Ministry should also consider surveying students to learn their thoughts and opinions.

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