Psychosocial Factors Associated with Fruit and Vegetable Consumption among Saudi University Students

Hala Hazam AL-Otaibi

Department of Food Sciences and Nutrition, Community Nutrition, College of Agriculture and Food Science, King Faisal University, Al-Ahsa, Saudi Arabia

***Corresponding author:** Hala Hazam AL-Otaibi, Assistant Professor, Department of Food Sciences and Nutrition, Community Nutrition, College of Agriculture and Food Science, King Faisal University, Al-Ahsa, Saudi Arabia, E-mail: halaalotaibi5m@gmail.com, hhalotaibi@kfu.edu.sa

Abstract

Objectives: The current study aimed to assess the daily fruits and vegetable consumption and to identify the psychosocial factors as knowledge, barriers and self efficacy associated with fruit and vegetable consumption.

Design: A cross-sectional study utilizing a street-based survey method.

Setting: The study was carried out at King Faisal University in AL-Hasa, Saudi Arabia.

Subjects: Female students aged between 18-25 years (N=960).

Outcome measures: Daily fruit and vegetable consumption, anthropometric measurements, psychosocial factors (knowledge, barriers, and self efficacy).

Results: Twenty-two percent of the students reported eating five or more servings of fruit and vegetable a day. The total mean of knowledge and the total mean of self efficacy were significant differences between the groups (P= 0.000, P= 0.045; respectively). In a Linear Regression analysis, a greater level of self efficacy of daily fruit and vegetable consumption (β =0.303, SE=0.023, P= 0.000) was significantly predicted for recommended daily of fruit and vegetable consumption, whereas barriers of recommended daily consumption (β=0.055, SE=0.019, P=0.101) and knowledge of recommended daily consumption (β =0.028, SE=0.028, P=0.378) were not predicted to the recommended daily consumption of fruit and vegetable.

Conclusion: These findings suggest self efficacy as predict consumption for female students and that self-efficacy is an important variable to consider in dietary change programs for female students.

Keywords: Fruit vegetable; Female university students; Psychosocial factors

Introduction

Epidemiological studies support the relationship between high fruit and vegetable intake and reduced risk for many chronic diseases, including cardiovascular disease, stroke, a number of cancers, type 2 diabetes, also it helps to maintain a healthy body weight[1]. In Saudi Arabia, a number of dietary recommendations and guidelines have been developed by the Ministry of Health such as the Healthy Lifestyle (Food and Physical Activity)[2] and the Healthy Food Palm Saudi dietary guidelines[3], with the aim of encouraging the individuals to eat healthier, be more active and consume the proper amount of fruit and vegetable. Healthy Food Palm (Alnakhala Elgethaiya) recommend an individual to consuming three to five servings of vegetables and two to four servings of fruits per day. In Saudi Arabia several studies indicate that consumers in many age groups ingest an inadequate number of fruit and vegetable daily[4-6].

The transition from high school to university is known to be problematic stage in adult development. It is associated with unhealthy eating, skipping meals, high intake of fast food, minimal intake of dairy products, and low intake of fruits and vegetables [6,7], which can lead to diet-related disorders such as chronic diseases and obesity. Khalid et al.,[8] indicates that 20% of female university students in Pakistan consumed only two servings of fruit and vegetable daily. In Saudi Arabia AL-Qauhiz[5] reported only 17.2% from 799 female university students in cross sectional study consumed fruit and vegetable daily; also Aboul Azm and Elebiary [4] found that 30% of the Saudi female nursing student ate fruit and vegetable daily.

Dietary behavior including eating fruits and vegetables are determined by a myriad of environmental and individual factors. Some of the individual factors include psychosocial factors such as knowledge, barriers and self efficacy. Violet et al.,[9] found that knowledge of current recommendations for fruit and vegetable intake was significantly associated with daily fruit and vegetable consumption among university students; also Steptoe et al.,[10] found that taste, preparation effort, family and cost are the most important barriers on person's intake of vegetable and fruits. Chunga and Hoerr[11] conducted study among university students and Van Duyn et al.,[12] conducted a national survey, both studies conclude their results that a high self efficacy was significantly associated with fruits and vegetable consumption and strong predictors for the consumption.

Many studies conducted among Saudi university student to probe their dietary habits and lifestyle[4-6] but no investigation has been carried out to study the relationship between eating fruit and vegetable and the psychosocial factors among female university students in AL-Hasa. The current study aimed to assess the daily fruits and vegetable consumption and to identify the psychosocial factors as knowledge, barriers and self efficacy associated with fruit and vegetable consumption among female university students in AL-Hasa, Saudi Arabia.

Materials & Methods

Study Setting and Subjects

This cross sectional study was conducted utilizing a street based survey among 960 female students at King Faisal University in AL-Hasa, Saudi Arabia, while none of these female students is food and nutrition majors. The eligibility recruitment to participate in this study were; Saudi, disease free, and not pregnant.

Data Collection Procedure

Ten undergraduate female students in the food and nutrition majors volunteered to collect the data. The volunteers were trained to review and understand the survey. During the second semester starting from February to March 2013, volunteers were positioned at several locations at the female main campus for five days (not include the student weekend Thursday and Friday) weekly for a total of seven weeks.
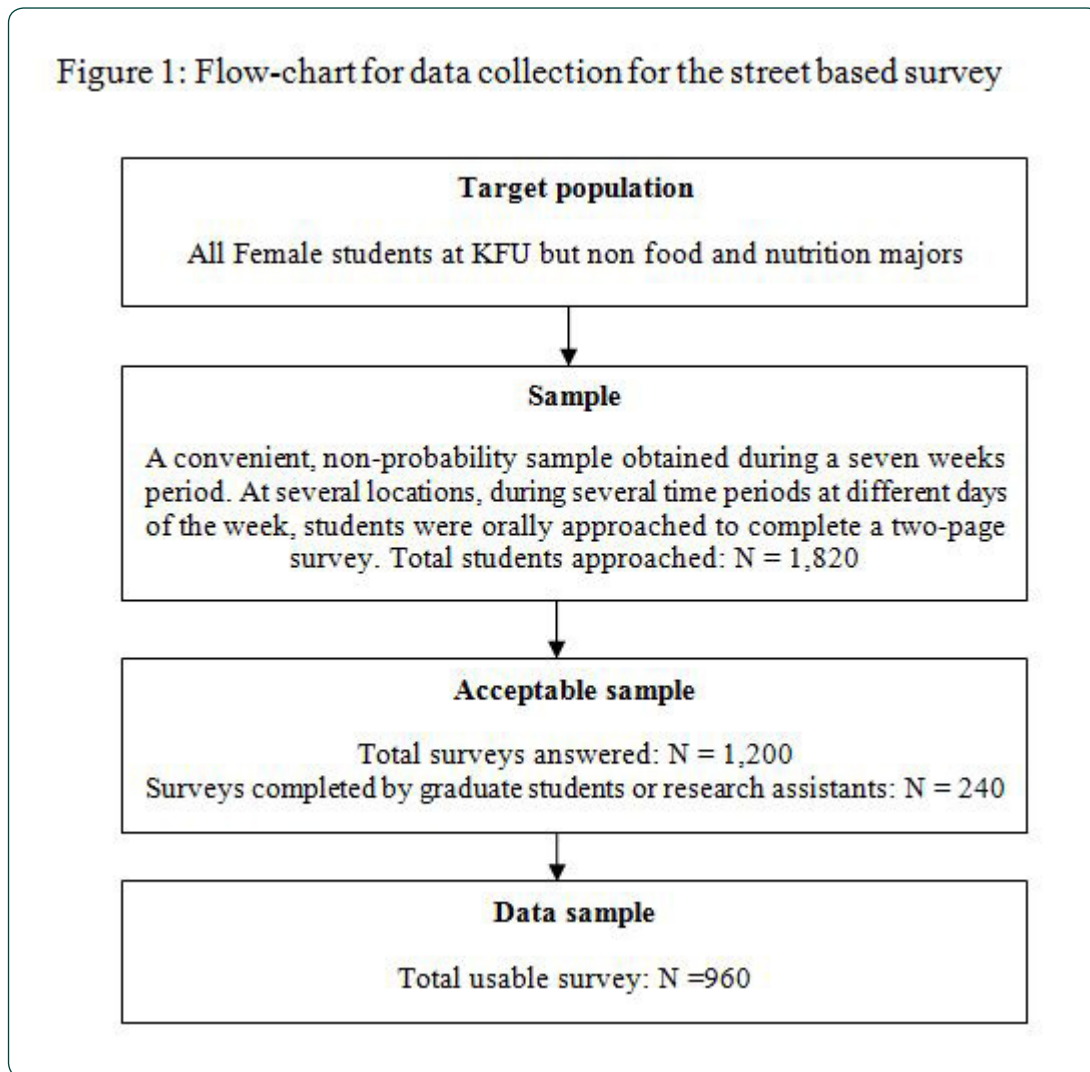
The times and locations were chosen based on the times of the day that classes were offered and the locations as cafeterias and libraries in the colleges, main library and bus stops, where the students usually gather to increase the probability of obtaining a representative sample of the undergraduate students. The volunteers distributed the survey and saying politely "Sorry, Miss; I have something to ask you but you are free to accept or to refuse. We are currently conducting a survey on fruit and vegetable intake among students. Would you accept to respond to the survey that will take you 5-10 minutes?

The volunteers were equipped with a set of survey tool (images of serving dishes, cups, bowls, spoons and photos of vegetable and fruit) to help the students in estimating fruit and vegetable serving. For the fruit, the wording was (A portion of fruit is an apple or banana, a small bowl of grapes or dates, or three tablespoons of canned fruit). For vegetables, the wording was (A serving or portion of vegetables means 3 heaped tablespoons of green or root vegetables such as carrots, spinach, small vegetables like peas, baked beans, or sweet corn, or a medium bowl of salad [lettuce, tomatoes, etc.]). In this study, oral consent was obtained from each student before the students filling the survey with information about the study objectives and instructions about filling the survey. After student finished the survey new student passing by were approached. Ethical approval for this study was provided by college of Agriculture and Food Science.

Response Rate

To determine the response rate, the volunteers kept track of how many students were verbally approached and how many actually completed the surveys.

Data collection occurred approximately 20 hours per week, during seven weeks approximately two months. There were 960 usable surveys, and the response rate was 66% (Figure 1).

Figure 1: Flow-chart for data collection for the street based survey

Target population

All Female students at KFU but non food and nutrition majors

Sample

A convenient, non-probability sample obtained during a seven weeks period. At several locations, during several time periods at different days of the week, students were orally approached to complete a two-page survey. Total students approached: N = 1,820

Acceptable sample

Total surveys answered: N = 1,200
Surveys completed by graduate students or research assistants: N = 240

Data sample

Total usable survey: N = 960

Instrument

Face Validity

Face validity refers to how appropriate the items and overall survey are for the target group in this case, students from the perspective of a similar group. This was done to evaluate clarity and readability of the different items and the overall survey thus contributing to the face validity of the survey. Thirty surveys were distributed to female students who were not selected for the study with the request that they complete and return the survey with their comments. Feedback from the students was generally very positive on the length, format and content of the survey. Some minor adjustments were made to the survey as a result of the comments from the students. Because of limited contact time with students, the survey was limited to a two-page instrument.

Internal Consistency

Cronbach's alpha was used to determine internal consistency for the final version of the survey an-deach section. The minimum requirement for internal consistency has been recommended as 0.7[13]. The Cronbach's alpha coefficient for the final version of the survey was 0.841, for the two questions in fruit and vegetable was 0.871 and for the three psychosocial factors; knowledge 0.895, barrier 0.863, and self efficacy 0.763. The questionnaire was noted be a reliable instrument as all constructs had Cronbach's alpha above 0.7.

The Survey Consisted of the Following Parts:

The first part includes: Demographic questions such as age, marital status and family household income. Anthropometric measurements as height and weight were self reported by the students, and then we calculated the Body mass index (BMI) as weight in kilograms divided by the square of height in meters and categorized according to the World Health Organization guidelines [14]. Underweight (BMI < 18.5), normal weight (BMI 18.5 - 24.9), overweight (BMI 25 - 29.9), and obese (BMI ≥ 30).

The second part includes: Fruit and vegetable consumption. Students were asked in two separate questions: How much serving of fruits consumed each day?; How many serving of vegetable consumed each day?. The five response categories were: none, one serving, two serving, three to four serving and five serving or more. The two questions have been previously shown to be an indicator of fruit and vegetable consumption, and these questions have been validated in many studies [15,16].

The third part includes: The three psychosocial factors for fruit and vegetable consumption.

Knowledge

Six items in health benefits and recommended daily consumption of fruit and vegetable, knowledge scale was modified from an existing scale[17]. Respondents answered ''true, false, and I don't know'', the scores for knowledge were calculated based on one score for the correct answer and zero for a wrong answer or I don't know the answer, the maximum scores six and the minimum zero.

Perceived barriers

Perceived barriers of consumption fruit and vegetable scale consisted of seven items modified from a previous study [18]. The items about preparing, cooking, taste, price and other issues related to barriers of consumption. The format of the scale included the three Likert scale, three scores for agree, two scores for undecided and one score for disagree, the maximum scores 21 and the minimum seven.

Self efficacy

Self efficacy is a person's belief in her ability to succeed in specific situations, as eat fruit and vegetable in different circumstances at university, restaurant, snack, lunch, etc. Self efficacy was assessed by five items on a 3-point Likert scale ranging from three scores for '' very confident '' to show a high level of fruit and vegetable self-efficacy, two scores " confident" and one score ",not very confident '' to indicate a low level of diet and lifestyle self-efficacy. The total possible score was 15 and the minimum score five. The self efficacy scale items were modified from previous studies[19].

Sample Size Calculation

The sample size was computed using a formula (n=z2pq/d2) based on Daniel et al., [20], were z= 1.96, p= prevalence of daily consumption of fruit and vegetables 30% among university students (11), q=1-p with 95% confidence and indicated a minimal required sample size of 323 students.

Data Analyses

A descriptive statistical analysis was used to determine the mean, standard deviations; frequency and percentage to describe the sample on demographics, anthropometric measurements, knowledge, barriers and self efficacy. The independent T-test was used to determine the mean difference between the >5 servings fruit and vegetables consumption and <5 servings fruit and vegetable consumption groups. Also, Chi-square analyses were used to compare between the groups. Linear regression analysis was conducted to examine predictors of the recommended daily intake of fruit and vegetable. The level of statistical significance was accepted at P< 0.05 for all tests. Data were analyzed using SPSS statistical package version 19.

Results

Socioeconomic Characteristics

Demographic characteristics of this sample population are presented in Table 1. Of the 960 female students completed the survey, only 210 (22%) of their consuming five serving of fruit and vegetable daily, the mean age for the students is 21 years. The majority of the students were single in both groups and most students in > 5 servings/day group (62.5%) had family incomes above 30000 Riyal. A similar percentage (29.7%) of <5 servings /day group had a family income ranged between 3001 to 10,000 Riyal, and one quarter (25.3%) of them had family incomes below 3000 Riyal, but no one in this category from the > 5serving/day group, with a significant difference between the groups (P=0.004).

Anthropometric Measurement

Table 1 contains results for weight, BMI, and BMI categories, while all the results of the anthropometric measurements were significantly different between the groups. Students in the <5 serving /day group were with a mean BMI of 25.7+4.3 which is categorized as overweight. The results show almost similar percentage in > 5servings/day group and <5 servings /day group (20, 18.7%, respectively) were overweight, while 80% were within the normal BMI range of 18.5 to 24.9 in the> 5servings/day group. Low proportion (2.2%) of the <5 servings /day group were obese and underweight (8.8%).

Fruit and Vegetable Consumption

Overall, 22% of students having daily mean fruit consumption 3.1+1.43 servings which exceed the recommended minimum tow serving/ day, but they consumed the recommended daily intake of vegetable (3.21+2.65). The <5 servings /day group consumed almost three servings/ day of fruit and vegetable which are fewer than the recommended minimum five servings/ day with a significant difference between groups.

	<5 servings/day n=750(78%)	≥5 servings/day n=210(22%)	P
Demographic characteristics			
age	21.81±1.78	21.67±1.32	[a]0.069
Marital status			
Single	395 (52.7%)	126 (60%)	[b]0.078
Married	355 (47.3%)	48 (40%)	
Family income			
< 3000	190 (25.3%)	-	[b]0.004*
3001-5000	222 (29.7%)	131 (62.5%)	
5001-10,000	223 (29.7%)	37 (17.5%)	
>10,000	115(15.4%)	42 (20%)	
Anthropometric measurement and indicators			
Weight	63.84±12.76	56.42±15.24	[a]0.001**
Body mass index (BMI)	25.75±4.32	23.19±5.39	[a]0.002*
Underweight (<18.5)	66 (8.8%)	-	[b]0.000**
Normal weight (18 -24.9)	527 (70.3%)	168 (80%)	
Overweight (25-29.9)	140 (18.7%)	42 (20%)	
Obese (<30)	17 (2.2)	-	
Fruit & vegetable intake			
Fruit	1.71±0.84	3.1±1.43	0.000**
Vegetables	1. 12±1.12	3.21±1.32	0.000**
Fruit & vegetables	2.83±1.44	6.31±2.75	0.000**
*P<0.05,**P<0.001 , [a] T-test, [b] χ2			

Table 1: Demographic characteristics, Anthropometric measurement and fruit and vegetables intake of students.

The Psychosocial Factors

Knowledge: Students in > 5servings/day group had higher significant (P=0.045) mean of total Knowledge of fruit and vegetable intake (4.34+1.37) compared to <5 servings /day group (3.4+1.79), while the higher consumption group more knowledgeable about the recommended daily intake, the relationship between obesity and of fruit and vegetable intake, and how the overcook influences the availability of nutrients in fruit and vegetable with a significant difference between groups. The higher consumption group had higher mean knowledge of the following items ''2, 3, 5" but without significant difference between groups (Table 2).

Barriers

In Table 3 the > 5servings/day group eating five servings of fruit and vegetable daily (1.72+0.61), also time to prepare vegetables as part of their diet (2.05+0.66), and purchase fruit and vegetables in restaurant or university (1.2+0.4). Not barriers for them with a significant difference between the groups in these items. The <5 servings /day group have more mean barriers for items "3, 4, 6" but without significant difference in these items or the total barriers despite the > 5servings/day group had a low mean score in these items and total barriers.

Self Efficacy

As seen in table 4 the total mean self efficacy score and the statements from one to four were significant different between the groups with more self confidence among the > 5servings/day group to consume recommended daily intake of fruit and vegetable, but only one statement " Drink 100% fruit juice instead of soda or fruit punch" no significant difference between the groups (P=0.067) despite the <5 servings /day group had mean score (1.97+0.83) less than the> 5servings/day group (2.2+0.75).

	Knowledge	<5 servings/day n=750	≥5 servings/day n=210	P
1-	5 servings of fruit & vegetables should be eaten every day for preventing major diseases.	0.37±0.12	1±0.41	0.009*
2-	Low intake of fruit & vegetables can contribute to heart problems.	0.58±0.23	0.6±0.41	0.86
3-	Low intake of fruit & vegetables can contribute to obesity.	0.71±0.42	1±0.1	0.000**
4-	Low intake of fruit & vegetables can contribute to certain cancers.	0.53±0.43	0.6±0.32	0.39
5-	It will help me to get enough vitamins and minerals.	0.54±0.32	0.6±0.41	0.203
6-	Overcook influence the availability of nutrients in fruit & vegetables.	0.21±0.1	0.54±12	0.006*
	Total knowledge	3.4±1.79	4.34±1.37	0.045*

*P<0.05,**P<0.001

Table 2: Knowledge of fruit and vegetable intake (Mean ± SD)

	Barriers	<5 servings/day n=750	≥5 servings/day n=210	P
1-	It is difficult to eat 5 servings of fruit & vegetables every day.	2±0.9	1.72±0.61	0.007*
2-	Preparing and cooking vegetables would be time con-suming.	2.4±0.49	2.05±0.66	0.000**
3-	I don't know enough recipes for fruit & vegetables.	1.8±0.44	1.64±0.73	0.147
4-	Fruit & vegetables are expensive.	2.6±0.49	2.4±0.63	0.078
5-	Fruit & vegetables are not delicious.	1.55±0.71	1.45±0.49	0.305
6-	Members of my household won't eat fruit & vegetables.	2.34±0.72	2.21±0.75	0.186
7-	I can't get fruit & vegetables in restaurant and university.	1.56±0.71	1.2±0.4	0.000**
	Total barriers	13.6±0.8	13.27±2.7	0.406

*P<0.05,**P<0.001

Table 3: Barriers of fruit and vegetable intake (Mean ± SD)

	Self-efficacy	<5 servings/day n=750	≥5 servings/day n=210	P
1-	Eat fruit & vegetables as part of lunch most days.	1.81±0.8	2.82±0.41	0.000**
2-	Eat fruit & vegetables for a snack instead of chips or candy.	2.12±0.75	2.6±0.49	0.001**
3-	Eat fruit & vegetables when eating out at restaurant and university.	2.25±0.73	3.0±0.12	0.000**
4-	Eat 5 servings of fruit & vegetables every day.	1.28±0.54	2.5±0.81	0.000**
5-	Drink 100% fruit juice instead of soda or fruit punch.	1.97±0.83	2.2±0.75	0.067
	Total self-efficacy	9.54±2.11	13.12±2.1	0.000**
		3.4±1.79	4.34±1.37	0.045*

*P<0.05,**P<0.001

Table 4: Self-efficacy of fruit and vegetable intake (Mean± SD)

Results of Linear Regression Analysis

In a Linear Regression analysis (Table 5), a higher level of self efficacy was significantly a predictor for recommended daily fruit and vegetables consumption, but lower perceived barriers and a greater level of knowledge were not predicted to the recommended daily consumption of fruit and vegetable.

Model	B	S.E	β	t	P
Constant	0.447	0.272	-	1.641	0.101
knowledge	0.025	0.028	0.028	0.883	0.378
Barriers	0.032	0.019	0.055	1.643	0.101
Self-efficacy	0.211	0.023	0.303	9.074	0.000**
R2=0.113; adjusted R2=0.110					

**P<0.001

Table 5: Linear regression analysis predicting of fruit and vegetables intake

Discussion

Our study results show that a low percentage (22%) of the female students consumed > 5servings/day from fruit and vegetable which is related to research conducted among female university students in Saudi Arabia,[4,5]. Abdle-Megeid et al,[6] reported a higher percentage 40% among female students from food science and nutrition department consume an adequate amount of fruit and vegetable. These students are studying nutrition, and they are more concern about their health perhaps provides an explication behind this higher percentage of consumption. In this study, we exclude students of food science and nutrition major. Similarly reports on low fruit and vegetable consumption among young females (19-28 years) have been documented in other countries. Musaiger et al.,[21] found that 26.3%

of Bahrain students consumed five servings of fruit and vegetable daily, while 20% of Pakistani female university students consumed only two serving daily of fruit and vegetable [8], also in US King et al.,[22] reported 66% of university students not meeting fruit and vegetable consumption recommendations which related to the present study percentage (78%).

Eating raw fruit and vegetables in the course of a meal is uncommon among Saudi people; also the traditional meal (Kabsa) of Saudi contains a small amount of vegetable (rice, lamb meats, onion and tomato). But fruits are usually taken as desserts after meals, and that can explain why student in > 5servings/day group consumed fruit more than the recommended daily intakes (2 servings/day), this also explains <5 servings /day

group students consumed almost two servings of fruit.

The present study found that <5 servings /day group had overweight mean of BMI (25.7+4.3)and 18.7% of students were in the overweight category comparable to > 5servings/day group who had a normal mean of BMI (23.19+5.3) and 80% of the student were in the normal BMI category and none of them obese. Overall obesity and overweight did not prevalent among the groups which are related to research conducted among female university students in Saudi Arabia[5,6]. Young female students usually worried about their body shape, while previous study conducted among female university students in Saudi Arabia reported that 33.5% of female students more likely than male students to see themselves as overweight and to express dissatisfaction with body shape because females are more cautious about their weight status due to society perceptions, which encourages females to be slim [23].

Overall, students in > 5servings/day group were knowledgeable about the minimum daily intake of fruit and vegetable, yet a <5 servings /day group did not attain the recommended level of consumption which is related to Violet and Colleagues [9] who conducted a cross sectional study among university nursing students in South Africa found that only 44.7% of the students know the daily recommended number of servings of fruit and vegetable. The > 5servings/day group were more knowledgeable about the correlation between fruit and vegetable intake and obesity comparable to <5 servings /day group who are overweight. This study found students who reported eating more than the recommended levels of fruits and vegetables scored significantly higher mean of the total knowledge scale than those students who ate less than the recommended amount of fruit and vegetable. However, there was no significant different between groups which are related to Kolodinsky and Colleagues[24] who conducted an internet survey among university students in Virginia and reported students who consumed five serving daily or more had higher mean of total knowledge related to fruit and vegetable consumption than students who consumed less than five serving daily, but without significant difference (P> 0.05).

The results of this study reveal that there is no barrier for eating five servings of fruit and vegetable daily among > 5 servings/day group as they can eat the fruit and vegetable in the university's cafeteria and restaurant, and time of cooking and preparing were not a barrier for them compared to the <5 servings /day group with a significant difference between them. Time pressure as a barrier for <5 servings /day group were related to research conducted among young female, while King et al,[22] found more than half of female university students reporting time as a barrier to eat fruit and vegetables (57.8%), also Welch et al,[15] found 54% of

female under 30 years old reported time as a barrier to healthy eating including fruit and vegetables. A plausible explanation for why students consistently report time as one of the most common barriers to fruit and vegetable consumption, maybe they do not want to wait in a long lunch line at university restaurant, and prefer ordering delivered fast food because the food is deliver to them quickly as they believe, while it may take a similar amount of time to deliver the food from a restaurant as it does to wait in a long lunch line in the university restaurant. This highlights the importance of developing an intervention that focus on improving time management skills among students.

However, both groups reported that they do not know enough recipes which is a barrier for them to prepare a basic, healthful meal also maybe they had limited cooking skills, while both groups reported higher mean for statement members of their household won't eat fruit and vegetable, while majority of them unmarried and living in the family house eat what their mothers prepared for the family food, in Saudi Arabia majority of the families still gathered to eat the three major meals. Finally with a low mean score for taste of fruit and vegetable it was not barriers for both groups, but the price had higher mean scores as they believe fruit and vegetables are expensive especially among low consumption group were 25% of students had a family income blow 3,000 Riyal. Other studies reported both taste and price were barriers for female university students[22, 25]. To address the barrier high prices of fruit and vegetable, we can suggest increasing inexpensive especially kinds of (single) fruits, such as peaches, apples, or bananas are commonly available on colleges' cafeteria or university restaurant may help in increasing consumption.

The self efficacy measure assessed people confidence in eating fruit and vegetables under difficult circumstances, such being away from home or in socially demanding situations. Students who reported eating more than the recommended levels of fruits and vegetables expressed high self efficacy of eating fruits and vegetable in different places as university and restaurant; also they ate fruit and vegetables as snacks or candy with a significant difference for total self efficacy. These results are agreeing with other similar studies conducted among female[10-11,19].

Our study reported self-efficacy to be the psychosocial factor most consistently and strongly associated with consumption of the recommended daily of fruit and vegetables. Self-efficacy was confirmed as a positive predictor for fruit and vegetable intakes in the present study as other studies have shown. While, Chung and Hoer [11] found that self efficacy predicted to eat fruit and vegetables among 236 female university students in the US (P<0.001), it should be noted that the objective of Chung and Hoer study was to identify predictors of

fruit and vegetable consumption by gender in collegiate young adults to guide intervention to help increase intakes. Henry and Colleagues[19] reported self-efficacy was consistently associated factor with higher consumption of fruit and vegetable in low income African American mothers. Knowledge and barriers of fruit and vegetable consumption was not predicted for intakes in the present study, Sharma et al.,[25] a conducted cross sectional study to examine the association between nutrition knowledge and eating behavior in Mexican American and they found nutrition knowledge was not a significant predictor of fruit and vegetable intakes.

Limitations and Strengths of the Study

There are some limitations in the present study. First, the students were undergraduate students from one university, and that might not be representative for a larger community of young adults in Saudi Arabia. Second, this study design (cross sectional) does not allow the establishment of a causal relationship. Third, the anthropometric measurements were self-reported; it is entirely possible that some students did not know how much they currently weigh or did not want to share a weight. Fourth, the street based survey nonrandom sample and that there was no opportunity for any follow up questions. Finally, fruit and vegetable consumption were assessed only in two short separate questions may cause to overestimation of fruit and vegetable consumption. While, there is a tendency for subjects to provide what they believe to be socially acceptable answers rather than the truth that (as healthy foods) is can be potential bias. However, to overcome these possible bias this tool was valid in a sample group that had the same characteristics as the students. The two questions have been previously validated in many studies[15,16]. These limitations notwithstanding the present study also have strengths. It is a street based survey is short data collection time, the low cost and involvement of undergraduate students in a research project. In addition, there is an assurance that the student who received the survey actually completed the survey.

Conclusion and Recommendation

Results of this study indicated that almost 80% of female university student did not meet the recommended daily intake of fruit and vegetables. To overcome this serious problem different strategy we can use as distributing free samples or reduce the cost at the colleges cafeteria or university restaurant. Students can also be given recipes, or different methods for preparing fruit and vegetable in a variety of ways, or encouraging students to maintaining their weight or loss weight by eating more fruit and vegetable through established research study. Finally, understanding the eating habits of university students can help health professionals develop and provide effective programs target the low fruit

and vegetable consumption among this community.

Acknowledgments

References

1) World Health Organization (2004) Fruit and vegetable for health. Report of a joint FAO/WHO Workshop. Kobe, Japan.

2) Ministry of Health (MOH). Healthy lifestyle, Diet and Physical activity Program 2013; Available at: http://moh-ncd.gov.sa/dpa/ar/index.php.

3) Ministry of Health (MOH). Healthy Food Palm. 2013; Available at: http://www.moh.gov.sa/Portal/WhatsNew/Pages/WatsNews-2013-01-14-001.aspx

4) Aboul Azm S, Elebiary HA (2010) Prevalence of Overweight and Obesity in Relation to Life-Style Among Saudi Arabian Female Nursing Students. Med. J. Cairo Univ 78: 377-385.

5) AL-Qauhiz NM (2010) Obesity among Saudi Female University Students: Dietary Habits and Health Behaviors. J Egypt Public Health Assoc 85: 45-59.

6) Abdel-Megeid FY, Abdalharem HM, EL- Fetouh AM (2011) Unhealthy Nutritional Habits in University Stu- dents Are Risk Factor for Cardiovascular Diseases. Saudi Med J 32: 621-627.

7) Adlaf EM, Gliksman L, Demers A, Newton-Taylor B (2012) The prevalence of elevated psychological distress among Canadian undergraduates: findings from the 1998 Canadian Campus Survey. J Am Coll Health 50: 67–72.

8) Khalid U, Nosheen F, Raza A, Ishaque M, Ahmad M, et al. (2001) A Comparative Study about the Daily Intake of Fruits and Vegetables among Female Students of Two Universities of Faisalabad Pakistan Journal of Nutrition 10: 684-689.

9) Violet L, Berg VD, Okeyo AP, Dannhauser A, Nel M (2012) Body weight, eating practices and nutritional knowledge amongst university nursing students, Eastern Cape, South Africa. African Journal of Primary Health Care & Family Medicine. 4: 9.

10) Steptoe A, Perkins-Porras L, McKay C, Rink E, Hilton S, Cappuccio FP (2003) Psychological factors associated with fruit and vegetable intake and with biomarkers in adults from a low-income neighborhood. Health Psychol 22: 148 - 155.

11) Chunga SJ, Hoerr SL (2005) Predictors of fruit and vegetable intakes in young adults by gender. Nutrition Research 25: 453–463.

12) Van Duyn MA, Kristal AR, Dodd K, Campbell MK, Subar AF, et al. (2001) Association of awareness, intrapersonal and interpersonal factors and stage of dietary change with fruit and vegetable consumption: a national survey. Am J Health Promot 16: 69 -78.

13) Steyn, NP, Labadarios D, Nel JH, Heidi-Lee R (2005) Development and validation of a questionnaire to test knowledge and practices of dietitian regarding dietary supplements. Nutrition 21: 51-58.

14) World Health Organization (1998) Obesity: Preventing and Ma- naging the Global Epidemic. Report of a World Health Organization Consultation on Obesity.

15) Welch N, McNaughton SA, Hunter W, Hume C, Crawford D (2008) Is the perception of time pressure a barrier to healthy eating and physical activity among women? Public Health Nutr 12: 888–895.

16) Ball K, Crawford D, Mishra G (2006) Socio-economic inequalities in women's fruit and vegetable intakes: A multilevel study of individual, social and environmental mediators. Public Health Nutr 9: 623–630.

17) Holdsworth M, Delpeuch F, Landais E, Gartner A, Eymard-Duvernay S, et al. (2006) Knowledge of dietary and behaviour-related determinants of non-communicable disease in urban Senegalese women. Public Health Nutr. 9: 975-981.

18) Townsend MS, Kaiser LL (2005) Development of a tool to assess psychosocial indicators of fruit and vegetable intake for 2 federal programs. J Nutr

Educ Behav 37: 170-184.

19) Henry H, Reimer K, Smith C, Reicks M (2006) Associations of decisional balance, processes of change and self-efficacy with stages of change for increased fruit and vegetable intake among low-income, African-American mothers. J Am Diet Assoc 106: 841–849.

20) Daniel WW (1999) Determination of sample size for estimating proportion in biostatistics: A foundation for analysis in the health sciences 18.

21) Musaiger AO, Bader Z, Al-Roomi K, D'Souza R (2001) Dietary and lifestyle habits amongst adolescents in Bahrain. Food Nutr Res 55: 7122.

22) King KA, Mohl K, Bernard AL, Vidourek RA (2007) Does Involvement in Healthy Eating Among University Students Differ Based on Exercise Status and Reasons for Exercise?. Californian Journal of Health Promotion 5: 106-119.

23) AL-Otaibi HH, Nassef SL, Raouf TA (2013) Body Shape Dissatisfaction, Weight Status and Physical Activity among a Sample University Students in Saudi Arabia. Food and Nutrition Sciences 4: 616-625.

24) Kolodinsky J, Harvey-Berino JR, Berlin L, Johnson RK, Reynolds TW (2007) Knowledge of current dietary guidelines and food choice by college students: Better eaters have higher knowledge of dietary guidance. J Am Diet Assoc 107: 1409-1413.

25) Sharma SV, Alison D. Gernand R, Day S (2008) Nutrition Knowledge Predicts Eating Behavior of All Food Groups Except Fruits and Vegetables among Adults in the Paso del Norte Region: Qué Sabrosa Vida. J Nutr Educ Behav 40: 361-368.