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A Comparative Study about the Daily Intake of Fruits and Vegetables among Female Students of Two Universities of Faisalabad

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Abstract: Fruits and vegetables are an important part of the daily diet. Eating 3-5 servings of colorful fruits and vegetables a day is important because deeply hued fruits and vegetables provide the wide range of vitamins, minerals, fiber and phyto-chemicals which body needs to maintain good health. Eating fruits and vegetables may truly promote muscle strength and reduce the risks of neuronal aging and cancer among youth. For this purpose, a study was conducted to analyze the students' daily intake of balanced diet. The present study was conducted on 80 female respondents in "A" university and "B" university, Faisalabad, Pakistan was selected through a simple random sampling technique. The information was gathered from respondents through a questionnaire. Later on the data were analyzed, tables of percentage was applied to interpret the results. Almost both of the students of universities knew about balanced diet. They used to take fruit and vegetable salad in the form of 1/2 cup in a day and 3-4 times in a week. Correspondingly, half of the university students either used to eat vegetable like fried potato, chat, vegetable roll, sandwich, burger or fruit juices and fruit shake at lunch time in university. Both university students agreed that inclusion of fruit and vegetable in junk food would convert the food into healthy food which can help to reduce the obesity and used in weight management programs for youth.

Key words: Diet, fruit and vegetables, university students

INTRODUCTION

Food provides not only essential nutrients needed for life but also other bioactive compounds for health promotion and disease prevention (Liu, 2003).

The word "fruit" usually describes any fleshy part of a plant that has developed from a flower and has seeds. Vegetables are herbaceous plants. Herbaceous plants have soft stems and little or no woody tissue (Mohave, 2004; Rao *et al.*, 2007). Fruits and vegetables are an important part of the daily diet. The benefits of eating fruits and vegetables are endless. Some of the benefits include lower risk of some cancers, healthy memory function, healthy urinary tract, healthy aging, healthy vision, healthy heart, healthy cholesterol levels, healthy immune system, strong bones and teeth (Nelson, 2006; Rethaiaa *et al.*, 2010).

Fruits are generally high in fiber, water and vitamin C. Fruits also contain various phytochemicals that do not yet have an RDA/RDI listing under most nutritional factsheets and which research indicates are required for proper long-term cellular health and disease prevention (Rao *et al.*, 2007). Regular consumption of fruit is associated with reduced risks of cancer, cardiovascular

disease, stroke, Alzheimer disease, cataracts and some of the functional declines associated with aging (Liu, 2004).

Recommendations for fruit and vegetable intake have changed over the time as new scientific literature is published about the relationship of eating fruits and vegetables to health. There are a number of recent studies suggesting that the current recommendations are associated with lower risk of certain diseases, such as high blood pressure, heart disease and some cancers (Yahia *et al.*, 2008). Eat one more fruit and one more vegetable each day (this is probably double while eating now) that will improve health. While using fruits and vegetables get more energy, less fatigue, fewer allergies and fewer headaches. Fruits and vegetables provide water, fiber and lots of nutrients for many different functions in the body (Nelson, 2006). Yellow and orange fruits and vegetables aid in a strong immune system, heart and vision health and help to lower the risk of cancer (Admin, 2009).

It's more important to include a wide variety of fiber-rich foods in the daily diet, than it is to use the highest total fiber amount. Since different fruits and vegetables have

different mixtures of the types of fiber, be sure to get enough of each type if to keep it varied like, cherries, potato, peach, orange, carrot, green beans, cauliflower, apple, pear, spinach, broccoli (Mohave, 2004). The benefits of a high fiber diet include help preventing and controlling atherosclerosis, cancer, diabetes, colitis, constipation, cirrhosis and other major diseases (Angeliki *et al.*, 2007). Fiber strengthens the immune system by removing many toxins and viruses, resulting in slower aging and fewer infections, even from the common cold and flu (Rao *et al.*, 2007). As an added benefit fiber is an essential part of any weight loss diet (Biro *et al.*, 2005).

All vegetables benefit from proper post harvest care. Many root and non-root vegetables that grow underground can be stored through winter in a root cellar or other similarly cool, dark and dry place to prevent mold, greening and sprouting (Joni, 2009; Nelson, 2006). Care should be taken in understanding the properties and vulnerabilities of the particular roots to be stored. These vegetables can last through to early spring and be nearly as nutritious as fresh (Rasmussen *et al.*, 2006). During storage, leafy vegetables lose moisture and the vitamin C in them degrades rapidly. They should be stored for as short a time as possible in a cool place, in a container or plastic bag (Rao *et al.*, 2007).

Fruits and vegetables are essential part of balanced diet. Fruits and vegetables contribute a healthy diet. People are becoming obese by using empty caloric foods. By this study the researchers wanted to find out the daily intake of fruits and vegetables in the universities students (Freeman, 2009). By sharing the information we can promote the good eating habits and healthy life style. The major objective of this study was to find out the students balanced diet depends upon seven food groups. Each and every food groups have its own importance and recommended servings. By this study we informed the servings are required of fruits and vegetables in daily diet (Joni, 2009). Eating 3-5 servings of colorful fruits and vegetables a day was important because deeply hued fruits and vegetables provide the wide range of vitamins, minerals, fiber and phytochemicals which body needs to maintain good health (Rasmussen *et al.*, 2006).

Now a day people were consuming less fruits and vegetables. By this study we have to promote the benefits of antioxidant and phyto-chemicals which can help in reducing lower risk of some cancers, diabetes, heart diseases, high blood pressure, healthy memory function, healthy urinary tract, healthy aging, healthy vision, healthy heart, healthy cholesterol levels, healthy immune system, strong bones and teeth (Biro *et al.*, 2005; Rethaiaa *et al.*, 2010). Keeping in view the above facts, there was needed to conduct such a study to evaluate the nutritional habits and to assess the daily intake of fruits and vegetable of the university female students.

MATERIALS AND METHODS

Present research was aimed to find out the comparison study about the daily intake of Fruits and Vegetables among "A" University, Faisalabad and "B" University, Faisalabad. The names of the universities were coded to avoid social, political, administrative and legal complexities. The female students of "A" University, Faisalabad and "B" University, Faisalabad were selected through a simple random sampling technique. A sample size of 80 respondents was selected in such a way that every unit available for sampling had an equal probability of being done. A questionnaire survey method was selected as a tool of data collection. The questionnaire was prepared in English language but was later on explained verbally into Urdu language for the different terms to clarify questions and understanding of respondents. Pre-testing of the questionnaire was conducted on 10 respondents which helped to detect the mistakes and some ambiguities were also identified. The data were analyzed, tables of percentage was applied to interpret the results.

RESULTS AND DISCUSSION

It was found (Table 1) that 62.5% of students in "B" University knew about balanced diet as compare to "A" University students where 60% were know about balanced diet. It means almost both of the students of universities knew very well about balanced diet. Similar trends have also been observed by Angeliki *et al.* (2007) and Bazzano *et al.* (2003) that university students were used to aware of the balanced diet over all bases, but Biro *et al.* (2005) argued that at least there should be a balance diet along with some specifications under specific conditions.

It was found (Table 2) that 60% of students in "A" University and 55% of students in "B" university preferred to intake any kind of fruit, vegetable salad 1 time a day. Liu (2003) and Linda (2003) also confirmed that university students used to intake fruit and vegetable salad once in a day. Liu (2004) further investigated that usually in lunch students intake vegetables and fruit as salad, but Mohave (2004) and Nelson (2006) confronted that it was not necessary as this situation used to prevail in hostels but not in homes.

It was found (Table 2a) that 37.5% of "A" University students were serving 1/2 cup of serving of fruit and vegetables salad but 47.5% in "B" University students were serving 1/2 cup of fruits and vegetables salad. Rao *et al.* (2007) also confirmed that university students used to take fruit and vegetable 1/2 cup in a day. Rasmussen *et al.* (2006) further investigated that usually in lunch students used to take 1 cup of vegetables and fruit as salad, but Rethaiaa *et al.* (2010) confronted that it was not necessary as this situation used to prevail more pleasurable in terms of cups in hostels but not in homes.

It was found (Table 3) that 55% of "B" university students eat varieties of vegetables 3-4 times in a week that

Table 1: Frequency and percentage distribution of respondents according to their knowledge about balanced diet

Knowledge about balance diet	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
A balanced diet contain cereal/pulses	2	5.0	0	0.0
A balanced diet contain egg/meat	0	0.0	2	5.0
A balanced diet contain milk and milk products	3	7.5	1	2.5
A balanced diet contain fruits	8	20.0	8	20.0
A balanced diet contain vegetables	3	7.5	4	10.0
All of them	24	60.0	25	62.5
Total	40	100.0	40	100.0

Table 2: Frequency and percentage distribution of respondents according to the intake of fruits and vegetables salad

Intake of fruits and vegetables salad	"A" University		"B" University	
	Freq.	%	Freq.	%
1 time per day	24	60.0	22	55.0
2 times per day	7	17.5	7	17.5
3 times per day	5	7.5	5	7.5
4 times per day	0	0.0	0	0.0
3-4 times per week	4	10.0	6	15.0
Total	40	100.0	40	100.0

Freq. = Frequency

Table 2a: Frequency and percentage distribution of respondents according to that how much they usually eat fruits and vegetables salad

Serving of fruits and vegetable salad	"A" University		"B" University	
	Freq.	%	Freq.	%
½ cup	15	37.5	19	47.5
1 cup	19	47.5	19	47.5
2 cup	6	15.0	2	5.0
More than 2 cup	0	0.0	0	0.0
Total	40	100.0	40	100.0

Freq. = Frequency

Table 3: Frequency and percentage distribution of respondents according to eat varieties of vegetables

Intake of varieties of vegetables	"A" University		"B" University	
	Freq.	%	Freq.	%
1 time per day	20	50.0	10	25.0
2 times per day	3	7.5	1	2.5
3 times per day	1	2.5	1	2.5
4 times per day	2	5.0	6	15.0
3-4 times per week	13	32.5	22	55.0
No	1	2.5	0	0.0
Total	40	100.0	40	100.0

Freq. = Frequency

include vegetables such foods as sandwiches, casseroles, stews, stir-fry and omelets as compared to "A" university students who were 32.5%. It means students of "B" university used to eat more varieties of vegetables as compared to students of "A" university. Yahia *et al.* (2008) also confirmed that university students used to take fruit and vegetable salad 3-4 times in a week. Freeman (2009) further investigated that usually in lunch students used to take vegetables and fruit as salad, but Bazzano *et al.* (2003) and Joni (2009) confronted that it was not necessary as this situation used to prevail in hostels but not in homes.

Table 4: Frequency and percentage distribution of respondents according to their choice in breakfast

Choices in breakfast	"A" University		"B" University	
	Freq.	%	Freq.	%
Drink a glass of favorite juice	32	80	28	70
Add fruits to cereal	8	20	12	30
Total	40	100	40	100

Freq. = Frequency

It was found (Table 4) that 80% of "A" University students drink a glass of favorite juice in breakfast time. But 70% in "B" University students were taken a glass of favorite juice in breakfast time. It means there is no significant difference among different university students regarding drink of favorite juice. These results are in accordance with the findings of Admin (2009) and Angeliki *et al.* (2007) that students used to take a glass of fruit juice in breakfast time, but Liu (2003) and Mohave (2004) confronted that location used to play significant role in this regard that students in home used to take a glass of favorite juice than that of taking juice in hostels.

It was found (Table 5) that 55% of "A" University students drink fruit juices and fruit shakes at lunch time and 50% in "B" University liked to drink fruit juices and fruit shakes at lunch time in university. It shows that there was no significant difference among the students of both universities regarding the percentage distribution of respondents according to their choices in lunch at university. These results are in line with the findings of Admin (2009), Freeman (2009) and Amin *et al.* (2008) that half of the university students either used to eat vegetable like fried potato, chat, vegetable roll, sandwich, burger or fruit juices and fruit shake.

It was found (Table 6) that 85% of "A" University students liked to eat vegetable salad lunch time at home as compare to "B" University students who were in there 75%. This indicates that both university students used to prefer eat vegetable salad to eat favorite fruit instead of usual dessert. These results are in concomitant with the findings of Yahia *et al.* (2008), Nelson (2006) and Amin *et al.* (2008) that students used to prefer to eat vegetable salad to eat favorite fruit instead of usual dessert.

It was found (Table 7) that 45% of "B" university students liked to eat favorite fruit instead of favorite cookies or snacks as compared to 25% "A" university students. Correspondingly, 22.5% students of "A" university prefer to choice favorite raw vegetable instead of favorite cookie

Table 5: Frequency and percentage distribution of respondents according to their choices in lunch at university

Choices in lunch at university	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Eat a vegetable like fried potato, chat, vegetable roll, sandwich and burger	18	45	20	50
Fruits juices and fruits shake	22	55	20	50
Total	40	100	40	100

Table 6: Frequency and percentage distribution of respondents according to their choices in lunch at home

Choices in lunch at home	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Eat vegetable salad	34	85	30	75
Eat favorite fruit instead of usual dessert	6	15	10	25
Total	40	100	40	100

Table 7: Frequency and percentage distribution of respondents according to their choice for snack

Choices for snack	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Favorite fruit instead of favorite cookie	10	25.0	18	45
Favorite fruit instead of favorite candy bar	16	40.0	16	40
Favorite raw vegetable instead of favorite cookie	9	22.5	4	10
Favorite raw vegetable instead of favorite candy bar	5	25.0	2	5
Total	40	100.0	40	100

Table 8: Frequency and percentage distribution of respondents according to their choices in dinner

Choices in dinner	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Eat a serving of vegetables	22	55	23	57.5
Eat favorite fruit instead of usual dessert	18	45	17	42.5
Total	40	100	40	100.0

as compared to 10% of the "B" university students. These results are in line with the findings of Joni (2009), Admin (2009) that university students used to choose favorite fruit or vegetable instead of favorite cookie, but Rao *et al.* (2007) argued that they used to do this because of unavailability of cookies.

It was found (Table 8) that 57.5% of "B" University students preferred to eat a serving of vegetables for dinner and 55% of "A" University students. Likewise, 45% students of "A" university prefer to choose favorite fruit instead of usual dessert as compared to 42.5% students of "B" university. These findings are in accordance with the findings of Amin *et al.* (2008), Freeman (2009) and Nelson (2006) that university students used to like a serving of vegetables and a favorite fruit instead of usual dessert.

It was found (Table 9) that 80% of "A" University students were informed that all fruits and vegetables are rich in fiber, vitamins and minerals but in "B" University students 67.5% were informed. It means students of "A" university were more educated and well informed than that of "B" university students. The possible reason might be the socio-economic conditions of the both universities. Linda (2003), Mohave (2004) and Rao *et al.* (2007) also confirmed that socio-economic conditions of the educational institutes tend to influence the nutritional knowledge of the students.

Table 9: Frequency and percentage distribution of respondents according to the information that fruits and vegetables are rich in fiber, vitamin and minerals

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	32	80	27	67.5
No	8	20	13	32.5
Total	40	100	40	100.0

Table 10: Frequency and percentage distribution of respondents according to the information that fruits and vegetables contain phyto-chemical which has different health benefits

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	28	70	10	25
No	12	30	30	75
Total	40	100	40	100

It was found (Table 10) that 70% of "A" university students know that fruits and vegetables contain phyto-chemicals which have different health benefits as compared to "B" university students 25% was informed about that fruits and vegetables contain phytochemical which have different health benefits. Liu (2003) and Liu (2004) have also confirmed that phyto-chemicals containing fruit and vegetables have different health benefits.

Table 11: Frequency and percentage distribution of respondents according to the information that fruits and vegetables have compound like phyto-chemical which can reduce the risk of cancer

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	20	50	16	40
No	20	50	24	60
Total	40	100	40	100

Table 12: Frequency and percentage distribution of respondents according to know the role of vitamin C as antioxidant in the body

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	30	75	16	62.5
No	10	25	24	37.5
Total	40	100	40	100.0

Table 13: Frequency and percentage distribution of respondents according to fruits and vegetables, like apples, apricot, peach, loquat and pears, are best when eaten with the peel because fiber is present in the skin

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	36	85.0	30	75
No	4	7.5	10	50
Total	40	100.0	40	100

It was found (Table 11) that 50% of "A" university students responded in yes regarding the their information level that fruits and vegetables have compound like phyto-chemicals as compared to 40% of "B" university students which can reduce the risk of cancer. Liu (2003) and Liu (2004) have also confirmed that phyto-chemicals containing fruit and vegetables used to reduce the factor of cancer.

It was found (Table 12) that 75% in "A" University were well aware of the role of vitamin C as antioxidant in the body, likewise 62.5% students in "B" university students were aware of the role of vitamin C as antioxidant in the body. Amin *et al.* (2008) supported this argument that university students used to remain well aware of their nutritional knowledge about antioxidants.

It was found (Table 13) that 85% students of "A" university and 75% of "B" university students know that fruits and vegetables, like apples, apricot, peach, loquat and pears, are the best, when eaten with the peel because fiber is present in the skin. Bazzano *et al.* (2003) and Angeliki *et al.* (2007) also confirmed that these fruit and vegetables are the best source of fiber.

It was found (in Table 14) that 95% of "A" university students and 85% of "B" university students know that fruits and vegetables help to reduce the obesity and used in weight management programs. It mans students of both universities have sufficient knowledge

Table 14: Frequency and percentage distribution of respondents according to knowledge that fruits and vegetables help to reduce the obesity and used in weight management programs

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	38	95	34	85
No	2	5	8	15
Total	40	100	40	100

Table 15: Frequency and percentage distribution of respondents according to their knowledge to convert junk food into healthy foods by the addition of fruits and vegetables

Information level	"A" University		"B" University	
	Frequency	Percentage	Frequency	Percentage
Yes	36	90	30	75
No	4	10	10	25
Total	40	100	40	100

that fruits and vegetables help to reduce the obesity and used in weight management programs. Biro *et al.* (2005) and Liu (2003) have supported this argument that fruit and vegetables help to reduce obesity and over weight.

It was found (Table 15) that 90% of "A" university and 75% of "B" university students have an idea that they can convert junk food into healthy foods by the addition of fruits and vegetables. Biro *et al.* (2005) and Liu (2003) confirmed that by the addition of fruits and vegetables in to junk food, it could be converted into a healthy food, but Rasmussen *et al.* (2006) and Joni (2009) did not agree to this statement that only inclusion of fruit and vegetables could convert junk food into a healthy food because of irreversible changes occurred in junk food that might cause any abnormality.

Conclusion: It is concluded that

- Both universities students were taking fruits and vegetables in the form of 1 cup only in a day and 3-4 times in a week which is not balanced diet as per recommended dietary intake of youth.
- Universities students had nutritional knowledge regarding the use of fruit and vegetables which can helps to improve the health, reduces obesity and risk of diseases occurrence.

Recommendations: It is therefore suggested that

- Fruit and vegetables should be strictly included in junk food to make it a healthy food like French Fries should be oven baked not deep fried, Pizza should be vegetable topped rather than high fat meat version and Ice Cream should be make with home made fruit puree.
- Universities should establish fresh fruits and vegetables tuck shops to embrace the students for shopping raw vegetables, fresh fruits and juices on reasonable rates.

- Both Universities should start Nutrition Education and Health Programs by the department of Home Economics for connivance meal plans of youth to ensure their healthier physical and mental state.

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