



Dietary habits and consumption of fruits and vegetables in type 2 Diabetes in Ha'il Saudi Arabia

Shimaa M Aboelnaga¹, and ²Fahmida Khatoun

¹ Deanship of Preparatory Year, University of Ha'il, Ha'il, KSA

² Associate professor, College Of Medicine, University Of Ha'il

¹ Corresponding Author's Email, shimaasmart@yahoo.com

ABSTRACT

The objective of this study is to determine the BMI and the Dietary habits in Diabetic patient. The Study design is of Cross-sectional type. The research was conducted at the Ha'il University Hospital KSA. The subjects of research were the Diabetic patient, both Male and Female of age group between , 40 to 60 years. During the survey, the measurements of Height and Weight of the Diabetic patient were performed. Among all of the diabetic patients mean height when measured, was found to be 1.66m (SD= 0.91m) while the mean weight was 70.58 Kg (SD=11.21Kg). The mean BMI was 25.43 (SD= 2.38) (n=50). Among the sample population, 36% took no fruits in a typical week; 56% people took fruits 1-3 days a week; 6% took fruits 4-5 days a week while 2% took fruits daily in a typical week. 70% of the sample population took no vegetables in a typical week; 26% took vegetables 1-3 times a week while 4% took vegetables 4-5 times a week. From the given findings it is thus concluded that the mean BMI of the of diabetic patient is increased with more population of overweight and obese individuals. It was also observed that the overall dietary habits of these patients were less towards intake of fruits and vegetables in a typical week.

Keywords: Dietary habits, DM, BMI

Received 21.02.2020

Revised 13.03.2020

Accepted 02.04.2020

INTRODUCTION

Diabetes mellitus, often simply referred to as diabetes—is a group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. This high blood sugar produces the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger).[1,2] There are three main types of diabetes. Type 1 DM is associated with a high morbidity and premature mortality. More than 60% of patients with type 1 DM fare reasonably well over the long term. Many of the rest develop blindness, end-stage renal disease, and, in some cases, early death. If a patient with type 1 DM survives the period 10-20 years after onset of disease without fulminant complications, he or she has a high probability of reasonably good health. Other factors affecting long-term outcomes are the patient's education, awareness, motivation, and intelligence level[3,4]

Type 1 diabetes: results from the body's failure to produce insulin, and presently requires the person to inject insulin. (Also referred to as insulin-dependent diabetes mellitus, IDDM for short, and juvenile diabetes.)[3]

Type 2 diabetes: results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency.

There are more than a billion adults in the World who are Overweight & 300 Million who are clinically Obese. It is a major contributor to the local burden of chronic disease & de-stability.[5]

Overweight & obesity leads to adverse changes in Metabolism, including unhealthy levels of Blood Pressure, cholesterol & Diabetes. Obesity has also been associated with Asthma & Lower Lung Function. Overweight & Obesity raises the risk of CVD which accounts for one out of every 3 deaths in the World.[6] According to the WHO-World health report, 2004, obesity is a major public health problem & is responsible for significant morbidity & mortality among the people.[7,8]

The rising epidemic reflects the profound changes in the society & in behavioral patterns of the communities over the recent decades. Increasing consumption of more energy-dense, nutrient-poor foods with high levels of sugar & saturated fats combined with reduced Physical Activity have led to obesity rates that have risen 3-fold since 1980 in some areas of North America, United Kingdom, Europe, Middle East Pacific Island, Australia & China.[9,10]

Obesity Epidemic is not restricted to industrialized societies; this increase is often faster in developing countries than in developed countries.

Table 1: The International Classification of adult underweight, overweight and obesity according to BMI

Classification	Principal cut-off points
Underweight	<18.50
Severe thinness	<16.00
Moderate thinness	16.00 - 16.99
Mild thinness	17.00 - 18.49
Normal range	18.50 - 24.99
Overweight	≥25.00
Pre-obese	25.00 - 29.99
Obese	≥30.00
Obese class I	30.00 - 34.99
Obese class II	35.00 - 39.99
Obese class III	≥40.00

Source: [16-18].

RATIONALE

Nutritional trends are undergoing worldwide change. Obesity in adults leading to its morbidities is increasing even in developing countries including Pakistan. This research is primarily meant to link the BMI with the Lifestyle amongst the diabetic patients of Institute of diabetes and endocrinology., Karachi, Pakistan.

The objective of this study is to determine the BMI and the Dietary habits in Diabetic patients .

MATERIAL AND METHODS

- **Study Design:** It is a Cross-sectional Survey.
- **Study Period:** 1 month, starting from November, 2019 to December 5, 2020 January 30th in Hail University Clinic KSA
- **Sample Size:** 50 diabetic patients, both male and female from hail clinic ranging from age 40 to 60 years.
- **Sampling Strategy:** Since the type of Survey being done is a Census type of Survey, therefore no Strategy is required.
- **Selection Criteria:**
 - 1) **Inclusion Criteria:** patients of diabetes from ages 40 years to 60 years
 - 2) **Exclusion Criteria:**
 - (a) non diabetic individuals
 - (b) ages below 40 and greater than 60.

(B) Questionnaire Development: A detailed questionnaire was prepared by the researchers containing questions regarding the Lifestyles and BMI measurement of the sample population

(C) Data Collection: A group of 3 students of students were assigned to determine the BMI and the lifestyle of Diabetic patients in Ha'il University Hospital Saudi Arabia

The Lifestyle was evaluated by determining variables like dietary habits and physical activity. After taking the consent from individuals, the group members distributed the prepared questionnaire. The group also measured Weight and Height of individuals as a part of their Survey.

(D) Data Collection Tools: The Survey team used a self-prepared questionnaire.

(E) Data Analysis: The Data entry and analysis was done on SPSS version 17.

(F) Data Cleaning: The Data Cleaning was done:

- To make the Survey as error-free as possible.
- To ensure the Validity of our research.

RESULTS

During the survey, the BMI and the dietary habits of the patients were evaluated by measuring the height and weight and by asking various questions through a prepared questionnaire respectively.

For BMI; To calculate the BMI, the height and weight of the patients were measured. Following were the statistical observations while measuring the height, weight and BMI of individuals.

Table 1; Showing BMI of Subjects

	Weight in kilograms	Height in meters	BMI calculated as mass in kg divided height in m ²
N Valid	50	50	50
Missing	0	0	0
Mean	70.58	1.6614	25.4366
Std. Deviation	11.211	.09100	2.37909
Minimum	49	1.52	21.09
Maximum	94	1.82	31.25

The mean height when measured, was found to be 1.66m (SD= 0.91m) while the mean weight was 70.58 Kg (SD=11.21Kg). The mean BMI was 25.43 (SD= 2.38) (n=50). Minimum BMI measured was 21.09 and maximum BMI measured was 31.25.

It was thus observed, that more than 50% of the patients were overweight with a BMI ranging from 40 to 48 while 14% were found to be obese with a BMI of more than or equal to 29.

Dietary Habits

The dietary habits of individuals were determined by analyzing it through a prepared questionnaire. Questions were asked from the patients regarding the consumption of fruits and vegetables in a typical week. The consumption of fruits and vegetables were determined in male and female population separately as well.

a) Consumption of Fruits in a typical week is shown below in Table 2**Table 2 showing Gender Distribution * number of days of eating fruits: Cross tabulation**

			number of days you eat fruits				Total
			no fruits	1-3 days per week	4-5 days per week	everyday	
Gender	Male	Count	9	17	2	1	29
		% within gender	31.0%	58.6%	6.9%	3.4%	100.0%
		% within number of days you eat fruits	50.0%	60.7%	66.7%	100.0%	58.0%
	female	Count	9	11	1	0	21
		% within gender	42.9%	52.4%	4.8%	.0%	100.0%
		% within number of days you eat fruits	50.0%	39.3%	33.3%	.0%	42.0%
Total	Count	Count	18	28	3	1	50
		% within gender	36.0%	56.0%	6.0%	2.0%	100.0%
		% within number of days you eat fruits	100.0%	100.0%	100.0%	100.0%	100.0%

It was observed that in the male population, about 31% people take no fruits in a typical week; 58.6% take fruits 1-3 days a week; 6.9% individuals take fruits 4-5 days a week while 3.4% take fruits everyday in their typical week

In the female population, approx 43% individuals take no fruits in a typical week, 52.4% take fruits in 1-3 days a week; 4.8% take fruits 4-5 days a week; while none (0%) of the females take fruits daily in their typical week.

Figure 1; Showing Consumptions of Fruits/Day by female and Male Subjects
Bar Chart

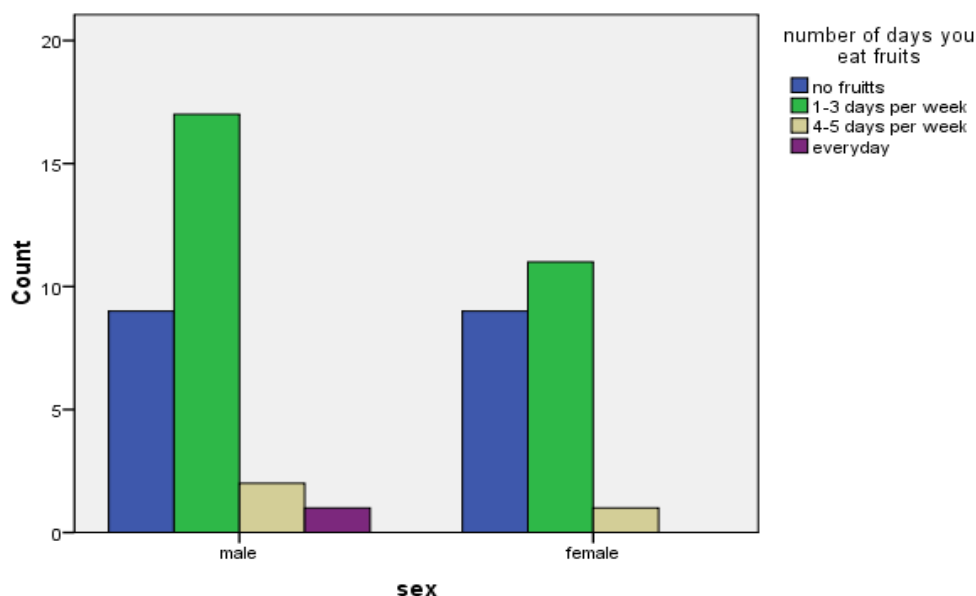


Table 3 Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.374 ^a	3	.712
Likelihood Ratio	1.736	3	.629
Linear-by-Linear Association	1.200	1	.273
N of Valid Cases	50		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .42.

Table 3: Consumption of Vegetables in a typical week
Gender * number of days you eat vegetables: Crosstabulation

		number of days you eat vegetables			Total
		no vegetable	1-3 days per week	4-5 days per week	
Male	Count	20	7	2	29
	% within sex	69.0%	24.1%	6.9%	100.0%
	% within number of days you eat vegetables	57.1%	53.8%	100.0%	58.0%
female	Count	15	6	0	21
	% within sex	71.4%	28.6%	.0%	100.0%
	% within number of days you eat vegetables	42.9%	46.2%	.0%	42.0%
Total	Count	35	13	2	50
	% within sex	70.0%	26.0%	4.0%	100.0%
	% within number of days you eat vegetables	100.0%	100.0%	100.0%	100.0%

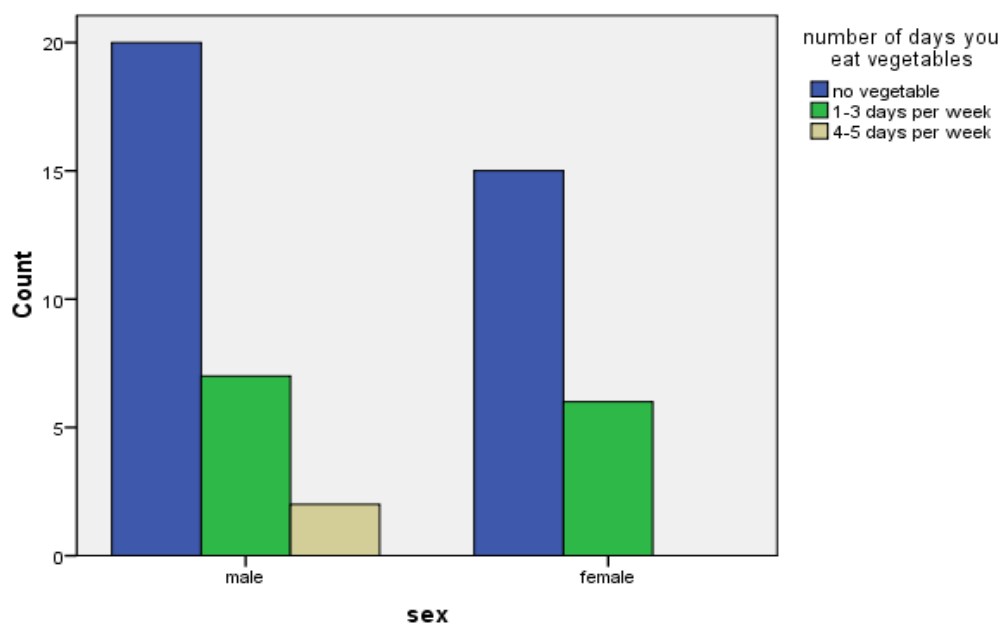
Table 4 Chi-Square Tests for vegetables use by subjects

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.551 ^a	2	.460
Likelihood Ratio	2.281	2	.320
Linear-by-Linear Association	.344	1	.558
N of Valid Cases	50		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .84.

It was observed that in the male population, about 69% people take no vegetables in a typical week; 24% take vegetables 1-3 days a week; 6.9% individuals take vegetables 4-5 days a week.

In the female population, approx 71.4% individuals take no vegetables in a typical week, 28.6% take vegetables in 1-3 days a week; 0% takes vegetables 4-5 days a week.

**Figure 2 ; Showing Habit of Using Vegetable By subjects
Bar Chart****Table 5 ; Summarizing the observations assessed from the questionnaire:**

Variable	Options	Students			Chi-square	P-Value
		Males (n=29)	Females (n=21)	Total (N=50)		
Vegetable users	Yes	8	7	15	1.551 ^a	0.460
	No	16	19	35		
Fruit Users	Yes	20	12	32	1.374	0.712
	No	9	9	18		

While determining the BMI, the mean height when measured, was found to be 1.66m (SD= 0.91m) while the mean weight was 70.58 Kg (SD=11.21Kg). The mean BMI was 25.43 (SD= 2.38) (n=50).

Minimum BMI measured was 21.09 and maximum BMI measured was 31.25. Over weight students were 52% having BMI ranging from 25-28 while 14% were obese having BMI more than and equal to 29.

Amongst all the Diabetic patients who were interviewed, 36% were those who didn't take any fruit in a typical week, 56% had fruits 1-3 days a week, while 8% had fruits for 4 and more days a week.

Table 6. Number of days you eat fruits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no fruits	18	36.0	36.0	36.0
	1-3 days per week	28	56.0	56.0	92.0
	4-5 days per week	3	6.0	6.0	98.0
	everyday	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

While determining the vegetable consumption, 70% didn't take any vegetables, 26% had vegetables 1-3 days a week while 4% had vegetables 4 or more days a week.

Table 7;Number of days you eat vegetables

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no vegetable	35	70.0	70.0	70.0
	1-3 days per week	13	26.0	26.0	96.0
	4-5 days per week	2	4.0	4.0	100.0
	Total	50	100.0	100.0	

DISCUSSION

A study by Bazzano L. A., revealed that an increase of one serving of green leafy vegetable consumption per day is associated with a modestly reduced harmful effects of of diabetes Neuropathy.[11]Consumption of fruits contributes to intake of certain antioxidant vitamins and Minerals and thus combats deficiencies that could arise with diabetes [12].Green leaves made as *mallum*, curry,*sambol*, and porridge were consumed by the diabetes subjects shown beneficial for these population. However, this study proved that one-third of soda diabetes patients do not consume the recommended intake of fresh leafy vegetables (45.5%) which could contribute to reducing the monosaccharide intake and absorption.

Diabetes patients believe that certain Vegetables such as fenugreek seeds (*uluhal*), *Coscinium fenestratum* or yellow vine (*venivelgeta*), curry leaves and powder, bitter-gourd, passion fruit leaves, finger millet, jack fruit leaves, wood apples, *Scoparia dulcis* (*walkoththamalli*) porridge, dried night jasmine flower, *Wattaka kavolubilis* leaves (*anguna kola*), *Costusspeciosus* (*thebu*) leaves, and ceylon olive fruit (*veralu*) are effective in reducing serum blood glucose [13].Eighty five to Ninety percent of Sri Lankan obese patients are reported to use one or more herbs as part of a meal or as an antihypertensive to control hyperglycemia [13]. However, among them only 60 % of the present study population consumed herbal remedies which could be due to the lack of availability of certain herbs in urban and suburban areas of Colombo District. Most of the patients tend to follow the remedies that the others follow in an ad hoc manner maybe due to the lack of knowledge on research data due to lack of accessibility to data sources. As some herbs cause toxic effects with long term consumption, patients need to be educated on the use and the dose of herbal remedies.[14]

Although a some study reported that 50% of patients were knowledgeable that regular exercise could control obesity only 15% of the present study population engaged in regular walk and use of fruits [15].Among the individuals who reported that they exercise, most considered "walking" for any other determination also as exercising.[16] Similar results were obtained in another study, which revealed that a considerable number of Obese are diabetic due to lack of exercise and Unhealthy Dietary Habits[17,18]. Our study will definitely help their diabetic patient to maintain their use of Fresh leafy vegetables and were satisfied with their normal regular everyday work and considered these activities as part of their Healthy Life.

CONCLUSION

From the given findings it is thus concluded that the mean BMI of the Diabetic patients is increased with more population of overweight and obese individuals. It was also observed that the overall dietary habits of these Diabetic patients were less towards intake of fruits and vegetables in a typical week.

RECOMMENDATIONS

According to the research results, the overall BMI among the Diabetic patients is found to be high so it is recommended that the patients should add some exercise in their daily schedule.

The Diabetic patients should also maintain a Balanced diet and must contain a balanced range of all the necessary nutrients, vegetables and fruits.

Providing a better diet plan along with proper physical training can control diseases like Hypertension & Metabolic disorders.

ACKNOWLEDGEMENT

I am thankful to Dr. Naveed for her help, advice, and guidance during study Without her guidance, this project would not have been possible. We are also thankful to Subjects people who contributed their time to complete this study.

REFERENCES

1. Stevenson CR , Critchley JA , Forouhi NG , Roglic G , Williams BG , Dye C , et al . (2007). Diabetes and the risk of tuberculosis: a neglected threat to public health . *Chronic Illness*. 3 : 228 – 245 . doi: 10.1177/1742395307081502 18083679
2. Jeon CY & Murray MB . (2008). Diabetes mellitus increases the risk of active tuberculosis: a systematic review of 13 observational studies .*PLoS Medicine* .5 : e152 . doi: 10.1371/journal.pmed.0050152 18630984
3. Lonnroth K , Roglic G , Harries AD . (2014). Diabetes and tuberculosis 1: Improving tuberculosis prevention and care through addressing the global diabetes epidemic: from evidence to policy and practice . *Lancet Diabetes Endocrinol* . 2 : 730 – 739 . doi: 10.1016/S2213-8587(14)70109-3 25194886
4. www.WHO.org (2008). Global Strategy On Diet, Physical Activity & Health-WHO
5. Katzmarzyk PT, Jenssen I. (2004). The economic costs associated with physical inactivity and obesity in Canada: An update. *Can J App Physiol*;29:90-115
6. Kelshidi R, Pour MH, Sarraf-Zadegan N, Sadry GH, Ansari R, Alikhassy H, et al. (2003). Obesity and associated environmental factors in Iranian adolescents: Isfahan Healthy Heart Program-Heart Health Promotion from Childhood. *PediatrInt* ;45:435-42
7. Nicklas TA, Baranowsky T, Cullen KW, Berenson G. (2001). Eating pattern, dietary quality and obesity. *J Am Coll Nutr* 20:599-608.
8. World Health Organization: (1998). Global prevalence and secular trends in obesity. In: "Obesity preventing and Managing the Global Epidemic, Report of a WHO Consultation on Obesity." Geneva: WHO; p. 17-40
9. WHO.(1995). Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series 854. Geneva: World Health Organization,
10. WHO. (2000). Obesity: preventing and managing the global epidemic. Report of a WHO Consultation. WHO Technical Report Series 894. Geneva: World Health Organization.
11. Bazzano L. A., Li T. Y., Joshipura K. J., Hu F. B. (2008). Intake of fruit, vegetables, and fruit juices and risk of diabetes in women. *Diabetes Care*.31(7):1311–1317. doi: 10.2337/dc08-0080.
12. Bazzano L. A., He J., Ogden L. G., et al. (2002). Fruit and vegetable intake and risk of cardiovascular disease in US adults: the first National Health and Nutrition Examination Survey Epidemiologic Follow-Up Study. *The American Journal of Clinical Nutrition*. 76(1):93–99.
13. Ediriweera E. R. H. S. S., Ratnasooriya W. (2009). A review on herbs used in treatment of diabetes mellitus by Sri Lankan ayurvedic and traditional physicians. *AYU (An International Quarterly Journal of Research in Ayurveda)* ;373(4):373–391.
14. Perera D. P., De Silva R. E. E., Perera W. L. S. P. (2013). Knowledge of diabetes among type 2 diabetes patients attending a primary health care clinic in Sri Lanka. *Eastern Mediterranean Health Journal*. 19(7):644–648.
15. Clinical practice guidelines—Management of Diabetes, (2013), <http://www.slco.org.lk/img/guidelines/Other%20national%20Guidelines/Physicians/Book%201/Management%20of%20Diabetes%20Mellitus.pdf>
16. WHO/IASO/IOTF. (2000). The Asia-Pacific perspective: redefining obesity and its treatment. Health Communications Australia: Melbourne, 2000.
17. James WPT, (2002). Chen C, Inoue S. Appropriate Asian body mass indices? *Obesity Review*, 3:139.
18. WHO expert consultation.(2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *The Lancet*, 157-163.

CITATION OF THIS ARTICLE

Shimaa M Aboelnaga , and Fahmida Khatoon. Dietary habits and consumption of fruits and vegetables in type 2 Diabetes in Ha'il Saudi Arabia. *Bull. Env. Pharmacol. Life Sci*, Vol 9[5] April 2020 : 05-11