AN ASSOCIATION OF THE DIETARY DIVERSITY WITH THE NUTRITION STATUS OF CARDIOVASCULAR DISEASED PATIENTS IN THE PRIVATE TERTIARY CARE UNIT OF DISTRICT PESHAWAR

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ABSTRACT

OBJECTIVES

The aim of this study was to analyze the effect of socio-demographic and dietary intake patterns on the nutritional status of cardiovascular disease (CVD) patients and to determine the dietary diversity of the households.

METHODOLOGY

This cross-sectional study was conducted from May 2018 to June 2018 at the Rehman Medical Institute, Peshawar. Based on written consent, a sample of 250 adult CVD patients was selected through a convenient sampling method. The data was collected through a structured questionnaire containing demographic, anthropometry, biochemical, clinical data, and a dietary record.

RESULTS

In a sample of 250 patients mean age was 55.41±12.558. On the basis of BMI, almost 52.8% were overweight and 0.8% of the patients were obese. Overweight was the major trend among the patients where this tendency was more common in males (57.5%) as compared to females (41%). Diabetes and hypertension were the major complications among these patients. Daily and per week food frequency and dietary diversity scores showed high intake of meat, milk, saturated fats, high glycemic index fruits, intake of processed foods along with good consumption of vegetables. The regression coefficient of DDI showed whole milk, cream, meat and processed meat as a strong predictor of obesity, overweight and CVD.

CONCLUSION

The overall dietary diversity of the patients showed a trend toward western dietary patterns with a focus on meat, whole milk, and processed foods. Among the financially stable families of Khyber Pakhtunkhwa, this dietary trend may pose a serious health concern in the context of non -communicable diseases in this region and demand for nutrition education at all levels of the society.

KEYWORDS: *Cardiovascular Disorders, Anthropometry, Demographic Factors, Food Frequency, Dietary Diversity*

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INTRODUCTION

Cardiovascular diseases (CVDs) are the most common cause of death around the world. One-third of all deaths globally in 2019 were due to CVD. From 1990 (271 million) to 2019(523million) CVD cases become doubled with the estranging increasing from 12.1 million in 1990 to 18.6 million in 2019, among people between the ages of 30-70 yrs. Around 80 - 86% of

deaths due to CVD in the world occur in low and middle-income countries.[1] There are about > 500 million obese and 2 billion overweight individuals worldwide. Densely populated countries of South Asia are creating 60% burden on CVD cases.[2] Pakistan being a developing country, is facing a high risk of both communicable and non-communicable diseases and 30 to 40% of deaths in Pakistan is due to CVD.[3] Dietary Diversity is described as the combination of different food and food groups containing essential micro and macro nutrients that ensure nutrient adequacy. It promotes good health, adequate intake of essential nutrients and reduce consumption of selected nutrients such as fats, refined sugars and salt.[4] Dietary Diversity in global food system is increasing alarmingly. As the diets of poorly developed countries are largely centered on starchy staples and typically include little or no animal products and few fresh fruits and vegetables ; CVD is high in these countries.[5] There has been an intense change in the eating patterns of people, which has resulted in the rise of non-communicable diseases (NCD) including CVD. A complete methodology is needed in all sectors including health, finance, transport, education, agriculture, planning and others – to reduce diet-related CVD. Policies targeting whole populations are likely to be the most beneficial and sustainable, and should be arranged.[6] The root cause of CVD is diet and sedentary life style .Increased consumption of saturated and trans fatty acids being found in dairy products and meat elevates cholesterol levels.[7] Intake of salt more than 6g per day and high intake of sugar, less intake of fiber and not consuming fruits and vegetables in recommended daily amount can cause high blood pressure and stroke. Along with that increased consumption of alcohol, smoking, genetic and economic factors can also play part in evolving of CVD.[8] The shift to refined from whole grain carbohydrates and increased consumption of processed meat is also one of the major factor. The reason behind that is change in eating patterns .People now prefer outdoor dining, take away and delivery of food at door step more than home cooked healthy food.[9] Vegetable oil from soya bean and canola oil and Palm oil (deodorized) has become an increasing source of saturated fatty acids and partially hydrogenated fats are the main source of trans fatty acids .They are used to make margarines ,vegetable shortenings and bleaching deodorized oils for use in processed foods is also taken in high proportion leading to CVD.[10] Poor quality and unhealthy diet increases LDL and TG levels in blood .Taking nutrients according to recommended daily allowance and consuming more whole grain cereals, fruits, Vegetables legumes, fish and nuts and maintaining healthy life style can minimizes the risk of chronic diseases.[11] People need to eat various food items to take benefit of the different foods related with them. Without altering the dietary practices of the community, locally available food is an accessible and cost-effective choice that results in healthier nutritional output[12]. Encouraging dietary patterns through food programs and policies by increasing whole grains, legumes, vegetables and fruits in diet and reducing refined carbohydrates, excess Na and processed meats can prevent CVD because major factor behind the rise in hypertension, diabetes, obesity and other CVD components is the diet.[13]

METHODOLOGY

The study was conducted in the Rehman Medical Institute Peshawar. In order to ensure the participation of patients a convenient consent based random sample of 250 adult CVD was selected. Based on written consent, patients in cardiology department were investigated for different parameters. The data was collected through a pretested structured questionnaire containing the following parameter: Demographic data was collected regarding education, occupation, family income, size of family, type of family, and living conditions. In anthropometrics age and physical measurement of the body such as height, weight while body mass index (BMI) was done through formula BMI=weight (kg)/height (meter).[2] In biochemical analysis the researcher recorded the Hb level of the respondents to analyze micronutrient intake. Clinical data was recorded on a predesigned table containing a list of signs and symptoms occurring in CVD. The data was collected based on patient‘s daily dietary routine through FFQ questionnaire. Dietary diversity in the family food intakes was assessed through a self-constructed Dietary Diversity Scale in which food items were divided into different food groups. Weekly diversity in the diets were recorded. Percent dietary diversity was calculated on intake per day and intake per week. The data was coded and processed on IBM compatible computer, using the Statistical Package for Social Sciences SPSS (version 18). Descriptive analysis using Percentages, Mean and Standard deviation were performed. Independent T-Test and Chi-square were performed to determine differences

among the variables. Significance was considered at P ≤0.05. Linear regression statistics was done to determine major determinants of CVD among the sample.

RESULTS

Table 1: Anthropometric, Biochemical and Clinical Characteristics of the Cardiac Patients (Mean ± SD N (%)) (N=250)

Characteristics	Overall Sample	Males (N=179)	Females (N=71)	P-Value
Anthropometric Characteristics				
Patient's Age(year)	55.41±12.558	55.88±12.575	54.23±12.52	NS
Weight(kg)	70.54±9.63	71.84±9.12	67.25±10.03	0.001
Height(cm)	166.0±7.056	167.60±6.7	162.17±5.71	0.000
Body Mass Index	25.4±2.63	25.5±2.59	25.1±2.827	0.010
Normal weight(18.99 - 24.9)	116(46.4)	75(42)	41(58)	0.023
Over weight(224.99 - 30.99)	132(52.8)	103(57.5)	29(41)	0.670
Obese(>30.99)	02(0.8)	01(0.5)	01(1)	0.143
Hb (mg/dl)	13.379±2.0	13.699±2.18	12.571±1.513	0.000
Medical Complications				
CVD	65(26)	51(28.4)	14(19.7)	0.154
Diabetes	96(38.4)	64(35.7)	32(45.0)	0.172
Hypertension	65(26)	43(24.0)	22(30.9)	0.258
Obesity	34(13.6)	22(12.2)	12(16.9)	0.338
Surgery	38(15.2)	24(13.4)	14(19.7)	0.210
Smoking	41(16.4)	41(22.90)	71(100)	0.000

P≤ 0.05

Table 2: Percent Frequency (Per Day and Per Week) of the Different Food Group by the Sample (N =250)

	Frequency Per Day						Frequency Per Week					
Times of Food	0	01	02	03	04	≥5	0	01	02	03	04	≥5
Milk Products	13.6	43.2	43.2	0	0	0	0	0	0	10	0	90
Meat Products	64.4	35.6	0	0	0	0	0	0	0	0	0	100
Fruits	44.8	55.2	0	0	0	0	0	0	0	0	0	100
Vegetables	0	100	0	0	0	0	0	0	0	0	0	100
Cereals	36	64	0	0	0	0	0	0	0	0	0	100
Fats / Oils	2.8	47.6	49.6	0	0	0	0	0	100	0	0	0
Soft and Sweetened Drinks	20.4	33.6	44	02	0	0	4.4	0	15.6	21.6	18.4	40
Processed Foods	0	0	0	0	0	0	0	0	19.2	12.8	10	58

0= Nil, 1= Once a week, 2= Twice a week, 3= Thrice a week, 4= Four times a week, 5= Almost daily

Table 3a: Regression Coefficient of DDI and Anthropometry

	Weight		BMI		Hemoglobin (g/dl)	
Characteristics	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**
Whole milk	0.768	0.005	0.141	0.064	0.024	0.674
Yogurt	12.8	0.001	01.93	0.085	01.87	0.030
Cream	17.0	0.022	03.36	0.106	03.8	0.016
Minced meat	-25.3	0.048	-2.7	0.445	-3.1	0.261
Beef	-9.45	0.003	-2.1	0.016	-0.12	0.855
Liver	-8.47	0.569	-2.8	0.490	-6.0	0.060
Cake	13.9	0.039	2.5	0.186	3.11	0.034
Spaghetti	-8.8	0.178	-2.4	0.179	-3.2	0.022
Banana	-55.3	0.012	-9.1	0.137	-9.4	0.046
Ghee	0.432	0.323	0.010	0.934	-0.13	0.165
Oil	-2.79	0.438	-0.74	0.461	-2.0	0.009
Soft drinks	14.4	0.064	2.85	0.193	5.0	0.003
Black tea	6.0	0.018	1.41	0.049	0.82	0.133
Kidney bean	1.1	0.614	-0.66	0.311	0.233	0.644
Shawarma	-9.0	0.023	-1.2	0.277	-0.46	0.589
Nuggets	12.4	0.011	2.0	0.133	2.36	0.024
Fried chips	16.2	0.021	2.7	0.168	0.231	0.878

P≤ 0.05

Table 3b: Weekly Dietary Diversity Scores of the Sample (N=250)

Food Group	Dietary Diversity Scores		
	Overall	Male	Female
Milk Products			
Milk	99.2	98.89	100
Yogurt	100	100	100
Milkshake	100	100	100
Icecream	72.4	69.83	78.88
Kheer	90	91.07	87.32
Cream	74.8	72.07	81.69
Custard	90	91.06	87.33
Butter	74.8	72.07	81.7
Meat Products			
Fish	100	100	100
Minced Meat	100	100	100
Beef	100	100	100
Egg	100	100	100
Liver	100	100	100
Chicken	100	100	100
Mutton	100	100	100
Cereals And Legumes			
Rice	100	100	100
Channa Daal	100	100	100
Mash Daal	100	100	100
Mung Daal	96	96.65	94.36
Bread	60	64.24	49.3
Cake/Bakery Products	95.2	95.53	94.37
Biscuit	79.6	75.98	88.74
Spaghetti	14.4	13.41	16.9
Black Beans	48.8	46.36	54.93
Kidney Beans	48.8	44.7	57.75
Fruits			
Apples	100	100	100
Apricot	56.4	58.1	52.11
Banana	100	100	100
Mango	100	100	100
Grapes	100	100	100
Orange	100	100	100
Peach	82.2	83.79	80.28
Straw Berries	62	60.34	66.2
Vegetables			
Cabbage	84.4	80.45	94.37
Cauliflower	84.4	80.45	94.37
Peas	84.4	80.44	94.36
Carrots	100	100	100
Spinach	100	100	100
Potato	100	100	100
Lady Fingers	100	100	100
Cucumber	100	100	100
Tomato	100	100	100
Fresh Beans	59.6	55.87	69.01
Fats and Oils			
Ghee	100	100	100
Oil	100	100	100
Drinks			
Fresh Fruit Juices	78	74.86	85.92
Canned Juice	45.6	42.46	53.52
Soft Drinks	26.4	24.58	30.98
Coffee	31.2	31.85	52.12
Black Tea	95.6	96.08	94.36
Green Tea	80	76.54	88.73
Processed Foods			
Burger	84.8	81	94.36
Samosa	95.6	96.09	94.37
Pizza	70	67.04	77.47
Shwarma	46.8	41.34	60.57
Nuggets	41.6	36.31	54.93
Fried Chips	87.6	84.36	95.78

Values are percentage of a particular food item consumed in at least once a week

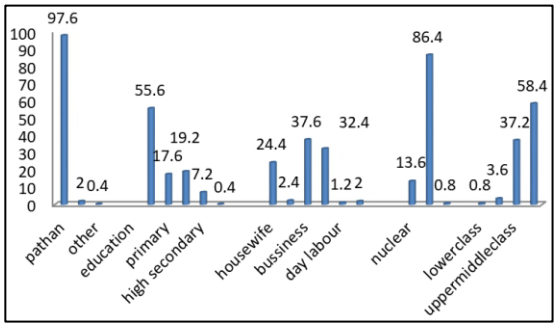

Figure 1: Socio-Demographic Characteristic of the Sample

DISCUSSION

Anthropometric characteristics of the patients given in (Table 1) shows current cross sectional study that consisted of 179 (71.6%) males while 71(28.4%) females. Mean age was55.41±12.558, mean height was 166.0cm±7.056cm ,mean weight was 70.54 kg ± 9.63 kg while mean BMI was 25.4±2.63, respectively. On the basis of BMI, almost 52.8% were overweight and 0.8% of the cases were obese .The data showed an overall overweight tendency in the sampled patients. This tendency was more prevalent among males as mean BMI of males (25.5%) was higher as compare to females (25.1%).These findings are opposite to the findings of Yadav et.al, in which the BMI was highest among women as compared to men in the rural, urban and slum population of north India.[14] In this study females had the highest prevalence of obesity, while in study of Nasreddine et al. , both adult men and women in the MENA region revealed the highest obesity prevalence.[15] Where obesity was problem among females, smoking was chronic problem among males in our study. The mean hemoglobin level of the respondents lied in normal ranges. Majority of the sample also suffered from other chronic complications related to CVD such as diabetes (38.4%), hypertension (26%), obesity (13.6%) and 15.2% had also undergone some surgery. The food frequency per day and per week (Table 2) showed quite a high percent of patients(43.2%) consuming milk & milk products twice a day and 90 % were consuming it more than 5 times a week. About 35.6 % consumed meat and meat products twice a day and 100 % consumed it more than 5 times in a

week Fruits vegetables and cereals consumption was also quite good .About 100% of patients were consuming fats and oils on daily basis . Soft and sweetened drinks were consumed twice a day by 44% of the patients. About 58% patients consumed processed food more than 5 times in a week . The findings of current study are in strong agreement with the study done in Bahrain, by WHO in in which 11.6 & 11.9% of men & women, respectively never consumed fresh fruits, and 9.4 and 11.3%, respectively never consumed green vegetables.[16] The DDI of 250 families from the sampled patients is shown in Table 3(a) while the regression coefficient of DDI and anthropometry is shown in Table 3(b) . An overall varied diet was observed where milk and milk product specially milk(99.2%), yogurt(100%), milkshake(100%), desserts , fats and oils(100%), and meat products(100%) were taken quite high in proportion. Along with cereal and legumes mainly rice , deals (100%) were also taken in increased quantity. In drinks black tea consumption was high among all (95.6%) Processed foods consumption was also high. In fruits high glycemic fruits like grapes (100%), banana (100%), mango (100%), oranges (100%) were consumed more while low glycemic fruits like peaches (17.2%), strawberries (38%). and apricots (43.6%), were consumed in less frequently . The data showed a quite diversified pattern containing both heart protective and CVD causing foods but since the frequency of meat, saturated fats ,whole milk, yogurt, high glycemic index fruits , processed foods and carbohydrates dense cereals are high these might have led to the CVD. One factor that might have contributed to there high consumption of animal based foods will be a comparatively higher purchasing power of the families who can afford to spend on processed foods and foods like meat , milk fruits on daily basis .The overall consumption of black tea was seen more than coffee i.e. 95.6% respectively whereas habit of drinking more sweetened tea in rural areas of Egypt.[17] As evident from Table 3b whole milk, yogurt, milk cream, meat, beef, bakery products, starchy fruits ,soft drinks ,tea and processed foods are strong predicators of weight ,BM1,and hemoglobin. The higher the intake of such products the more the weight gain and highest the probability of developing of CVD. This also suggest the dietary shift which can be a serious public health concern among Pakhtunkhwa population of this region. The Socio Demographic Characteristics of the sample in fig 1 showed that only 0.4% of the patients were educated up to graduation. Males literacy was higher than females. Majority of the females (76%) were illiterate compared to males (47.4%) respondents. Most of the respondents were uneducated(55.6%) these findings are in agreement with the findings of Ghaffar and Waheed (2016) in which illiteracy was also the striking parameter (68.5%).[17]Majority of the respondents were Pakistani pathan (97%), other language speaking were only 2% respectively Occupational background showed most of the adult males were businessman (37.6%).By occupation only 24.4% females were house wife in current study. These findings are opposite to the study of Ghaffar and Waheed (2016) in which 99.9% of females were house wives by occupation. Economic background showed that majority of the sample belonged to upper income class (58.4%).Huge majority lived in extend families (86.4%). About 13.6% lived in nuclear families which is in strong agreement with the study of Ghaffar and Waheed in which extended families were also more than nuclear families i-e 71%.

LIMITATION

The study was conducted in a single private tertiary care hospital. Such studies need to be conducted in other hospitals in order to determine the association of CVD, dietary diversity and socio economic status of the KPK population.

CONCLUSION

The overall dietary analysis of the patients showed high purchasing power contributing to western dietary pattern trends with focus on meat, whole milk and processed foods. Among the financially stable families of Khyber Pakhtunkhwa this dietary trend may pose a serious health concern in the context of non-communicable diseases in this region and demand for nutrition education at all levels of the society.

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