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Original Paper

The Effect of Diet and Lipoprotein Levels on Cardiovascular Disease in Karachi

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Abstract*— Malnutrition and high lipoprotein level have a significant relationship with cardiology, as it can increase the risk of cardiovascular disease (CVD) and exacerbate outcomes in patients with existing CVD. This research aimed to assess the effect of diet and lipoprotein levels on cardiovascular disease in Karachi of Aged 30-60 Years. In this cross-sectional study conducted from January 2023 to April 2024. The participants´ dietary intake, physical activity, body mass index, fat mass, blood pressure, fasting blood glucose, and serum lipid profile were analyzed in the current study. A Questionnaire was used to assess physical activity and a structured 24-hour food-recall questionnaire was used to assess the participants´ dietary intake and exercise or physical activity was recorded on two separate days. Results: A total of 640 individuals were enrolled in the study. All persons had complete participation, filling out two separate 24-hour food-recall questionnaires. The number of females was 320 and similarly, the males were 320. Most of them were married, had an education level less than high school, in physical activity most of the higher-aged people were not involved remained in rest conditions, and were living in urban regions. Their dietary intakes of were contained regularly based on a balanced diet. The vegetable intake was also not proper. Based on age groups, they were divided into five groups marital status, education level, based on region, physical activity, and dietary information were properly recorded. Observing variables (age, gender, physical activity, and daily intake of food groups) showed that more physiological risk factors for CVD revealed that daily intake of a balanced diet, and regular exercise had a significant association with having physiological risk factors of CVD. Based on the current study, it is concluded that most middle-aged (40-50 years) aged people in urban areas, had one to four physiological risk factors for cardiovascular disease and daily intakes of carbohydrates and protein were higher than dietary reference intakes for adults. Conclusion: We also found that the relationship of low physical activity with physiological risk factors for CVD was more substantial than the intake of different food groups. It is also observed that the females had more risk factors for CVD than the males. More relation were found between nutritional status, high lipoprotein level and CVD. The people of Karachi must change their lifestyle of exercise and diet to reduce this main health issue of CVD.

Keywords*— Obesity, Diet, Cardiovascular diseases, Overweight

I. INTRODUCTION

World Health Organization described that an assessed 17.7 million people died from CVDs in 2015, representing 31% of all global deaths. Of these deaths, an appraised 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. Over three quarters of CVD deaths take place in low- and middle-income countries (Baker et al 2014)). In previous studies, the risk factors for CVD have been divided into three categories: non-modifiable risk factors (such as age, gender, family history of premature CVD and race); behavioral risk factors (such as smoking, unhealthy diet, and inadequate physical activity); and physiological risk factors (especially hypertension, diabetes, overweight and hyperlipidemia)[1]. A well diet helps safeguard against non-communicable diseases (NCDs), counting heart diseases, stroke, cancer and diabetes mellitus[2]. Un balanced diet and physical inactivity are leading global risks to health[3]. Even in low- and middle-income nations, there have been five significant recent shifts in food consumption patterns worldwide, according to a study from a workshop hosted by the World Heart Federation: One is the transition to refined carbohydrates, which include refined grains and added sugars; two is the rise in vegetable oils, including processed vegetable oils, and the fall in animal fats; three is the rise in meat consumption worldwide; and four is the notable increase in purchases of all packaged foods and drinks; 5. Inadequate consumption of vegetables and fruits[4]. The intake of sugar, salt, and particularly fat from processed foods has been rising quickly across Asia's lower- and upper-middle-income nations, and these dietary changes are the main causes of the rise in overweight and obesity in Asian countries[5] such as Iran. Multiple studies have been conducted in a variety of countries in recent years to explore the impact of food consumption on CVD. Considering the importance of sociocultural factors for food consumption patterns in different regions and the correlation of dietary pattern in each region with the extent of CVD, this study was conducted to evaluate the current situation of physiological risk factors for cardiovascular disease in apparently healthy middle-aged (40-

60 years) adults and their association with dietary intake in the North of Iran[7]

II. METHODOLOGY

This analytic study, carried out as a cross-sectional research, is a part of a population-based research. This way the research aimed to assess the effect of diet and lipoprotein levels on cardiovascular disease in Karachi. Adults and their association with dietary intake and exercise. In this cross-sectional study conducted from January 2023 to April 2024 among adults aged 30-60 years living in Karachi. The participants´ dietary intake, physical activity, body mass index, fat mass, blood pressure, fasting blood glucose, and serum lipid profile were analyzed in the current study. A Questionnaire was used to assess physical activity and a structured 24-hour food-recall questionnaire was used to assess the participants´ dietary intake and exercise or physical activity was recorded on two separate days. A thorough explanation of the methodology used in this investigation has been documented in a prior paper. Women who were pregnant or nursing, people with physical or mental disabilities and people who self-reported having diabetes or hyperlipidemia that required them to follow a particular diet or take lipid-lowering or hypoglycemic medications were all excluded. Participants' physical activity, food consumption, body mass index, fat mass, blood pressure, fasting blood glucose, serum lipid profile, and demographic variables (age, gender, education level, marital status, and residing region) are among the data reported in this study. Specifics of the sampling process and recruitment criteria for the research population have been previously detailed elsewhere[10]. To put it briefly, we recruited and invited middle-aged people in the research area using a variety of techniques. Basic random sampling was used to select the households in which a person in 40-70 years age- group was living. Sampling continued until a population of almost equal size of men and women in the age groups of 40-70 years old have been entered in the study.

The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity (PA). Validity and reliability of the Iranian version have been confirmed. This questionnaire includes four parts (1. activities at work; 2. housework, gardening and caring for family; 3. PA in transportation; and 4. PA in recreation, sport and leisure time) and asks about the intensity and time a person spent being physically active in the last 7 days. In order to determine the influence of daily intake of different food groups on presence of three or more CVD risk factors, the third quartile of the data (gram/day) was considered as a cutoff point. Weight and height were measured and body mass index (BMI) was calculated as weight (in kilogram) divided by height2 (in meters) and was classified according to World Health Organization (WHO) recommended cutoff- points: 18.5-24.9 kg/m2 as normal, 25-29.9 kg/m2 overweight and ⩾30kg/m2 obese. BMI values in the range of 30-34.9 was classified as obesity class I; 35-39.9 as class II and ⩾40 as obesity class III . Blood pressure was measured with the participant in a sitting position, using a digital sphygmomanometer (Omron M-6 brand). Fat mass percentage was measured using a hand-to-foot bioelectrical impedance analysis technique with a digital body fat calculator (Omron Company: BF511 Model). This technique has been reported as a simple, quick and non-invasive method which can give reliable measurements of body composition with minimal intra- and inter-observer variability. The results are available immediately and reproducible with <1% error on repeated measurements (31). Early morning venous blood samples (5 mL) were collected after fasting for at least 12 hours to assess fasting blood sugar (FBS), total cholesterol, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, total cholesterol and triglycerides (TG) levels. These values were measured using Pars Azmun kits via autoanalyzer respons®910 DiaSys system. All laboratory tests were conducted in a single laboratory which undertook external quality control.

According to the National Cholesterol Education Program Adult Treatment Panel III Report, cutoff points for fasting blood glucose are considered to be less than 126; total serum cholesterol <200; triglyceride<150; and LDL level less than 100 mg/dL. Serum TG levels in the range of 150-199 was classified as borderline-high TG, 200-499 as high TG and >500 mg/dL as very high TG categories. HDL cholesterol <40 mg/dL was considered as low HDL level (32). High systolic or diastolic blood pressure (⩾140/90 mm/Hg), fasting blood glucose ⩾126 mg/dL, body mass index ⩾25 kg/m2 and abnormal serum lipid profile (total serum cholesterol ⩾200, triglyceride ⩾150, HDL<40 and LDL ⩾ 100 mg/dL) has been considered as physiological risk factors for cardiovascular disease.

III. RESULTS

Total of 640 individuals were enrolled in the study. All persons had complete participation, filling out two separate 24-hour food-recall questionnaires. The number of females was 320% and similarly the males were 320%. Most of them were married, had education level less than high school, in the physical activity most of the higher aged people were not involved remained in rest condition and were living in urban regions. The dietary intakes of them were contained regular on the basis of balanced diet. The vegetables intakes were also not proper. On the basis of aged groups they were divided into five groups marital status, education level, on the basis of region, their physical activity and dietary information were properly recorded

TABLE I. AGED WISE DEMOGRAPHIC CHARACTERISTICS OF PATIENTS FROM 30 TO 60 YEARS

Aged	Marritial status		Education		Region		Physical Activity			Dietary Intake			
	Married	Unmarried	Educated	Uneducated	Urban	Rural	Exercise	Activity	Rest	Balanced Diet	Dairy	Meat	Vegetables
30 Years	90% M	10%U	65%	35%	65%	35%	45% E	45% A	10% R	25%	20%	30%	25%
40 Years	92% M	8% U	50%	50%	60%	40%	40%E	40%A	20% R	25%	30%	20%	25%
50 Years	93% M	7%U	40%	60%	55%	45%	10%E	50%A	40% R	20%	30%	30%	20%
60 Years	89% M	11%U	15%	85%	50%	50%	5% E	5%A	90% R	10%	18%	22%	50%

TABLE II. OVERALL ASSOCIATION OF NUTRITIONAL STATUS WITH CARDIOVASCULAR DISEASE

Gender	Protein Deficiency	Micronutrients Deficiency	Obesity	Iron-deficiency Anemia	No-CVD	CVD Patient
Male	20	26	30	24	128	40
Female	24	36	44	30	168	70
Total	44	62	74	54	296	110

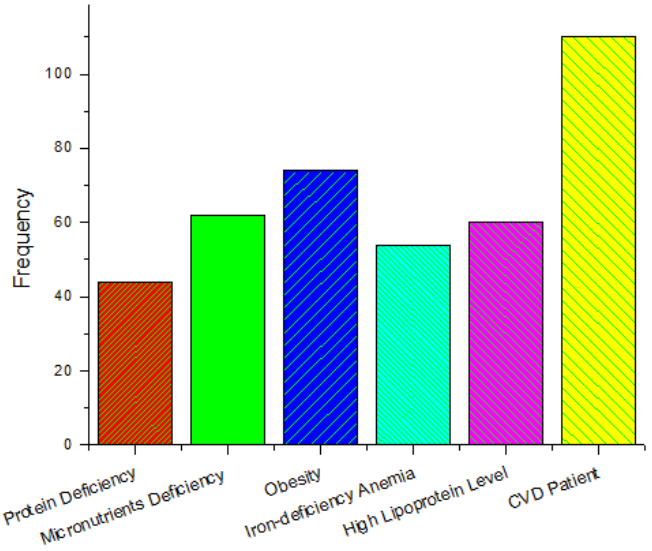

Fig. 1. Overall Nutritional status, lipoprotein levels and CVD

In the study population the distribution of nutritional risk factors, high lipoprotein level for cardiovascular disease is presented in table 2. This table shows that the BMI level of women and of men were high in the range of overweight or obesity. Moreover the blood pressure level of female was also high in the female than the male. Also the fasting blood glucose, high serum triglyceride and low serum HDL level were found high in females than the males. The overall 55% of the study population had no physiological risk factors for CVD. The correlation between the physiological risk factors for CVD and daily intake of the food groups was identified. The results showed that daily intake of vegetables, dairy products and balanced diet had great effect on CVD and significantly reduced the chances of cardio vascular diseases. The number of females was 320 and similarly, the males were 320. Most of them were married, had an education level less than high school, in physical activity most of the higher-aged people were not involved remained in rest conditions, and were living in urban regions. Their dietary intakes of were contained regularly based on a balanced diet. The vegetable intake was also not proper. Based on age groups, they were divided into five groups marital status, education level, based on region, physical activity, and dietary information were properly recorded. Observing variables (age, gender, physical activity, and daily intake of food groups) showed that more physiological risk factors for CVD revealed that daily intake of a balanced diet, and regular exercise had a significant association with having physiological risk factors of CVD. Based on the current study, it is concluded that most middle-aged (40-50 years) aged people in urban areas, had one to four physiological risk factors for cardiovascular disease and daily intakes of carbohydrates and protein were higher than dietary reference intakes for adults. Conclusion: We also found that the relationship of low physical activity with physiological risk factors for CVD was more substantial than the intake of different food groups. It is also observed that the females had more risk factors for CVD than the males. The people of Peshawar must change their lifestyle of exercise and diet to reduce this main health issue of CVD.

TABLE III. DISTRIBUTION OF PHYSIOLOGICAL RISK FACTORS FOR CARDIOVASCULAR DISEASE IN PATIENTS OF 30-60 YEARS

Factors	Males	Females
BMI	≤18 - ≥40	≤20 - ≥40
Obesity	30 % obese 70% normal weight	40% obese 60% normal weight
Blood pressure	40% normal 60% were high	35% normal 65% were high
Sugar level	35% were high 65% were normal	40% normal 60% were high
Lipid profile	33% were normal 67 were high	40% normal 60% were high

IV. Discussion

In the total of 320 individuals were enrolled in the study. All persons had complete participation, filling out two separate 24-hour food-recall questionnaires. The number of females was 320 and similarly the males were 320. Most of them were married, had education level less than high school, in the physical activity most of the higher aged people were not involved remained in rest condition and were living in urban regions. The dietary intakes of them were contained regular on the basis of balanced diet. The vegetables intakes were also not proper. On the basis of aged groups they were divided into five groups marital status, education level, on the basis of region, their physical activity and dietary information were properly recorded. Same study was also conducted in northern Iran, 96.2% of supposedly healthy 30-60 years old adults had at least one of the physiological risk factors for CVD and 75.9% had overweight or obesity; 33% with high blood pressure; 6.2% had high fasting blood glucose; 64.6% with hypercholesterolemia, 47.8% had hypertriglyceridemia, and 8.9% with low HDL. Hajian-Tilaki examined a sample of 1000 adults aged 20-70 years in urban areas of Babol, North of Iran and demonstrated that only 7.8% of men and 2.7% of women in this region had no assessed CVD risk factors (abnormal serum lipid profile, abdominal obesity, high blood pressure and fasting blood glucose). A greater amount of CVD risk factors in our research can be attributed to recruitment of higher aged adults in our study in comparison with Hajian´s study. Jafari-Adli reported in his systematic review that the prevalence of overweight or obesity among normal adult or children population samples in Iran was 27.0-38.5%[13]In the study population the distribution of physiological risk factors for cardiovascular disease is presented in table 2. This table shows that the BMI level of women and of men were high in the range of overweight or obesity. Moreover the blood pressure level of female was also high in the female than the male. Also the fasting blood glucose, high serum triglyceride and low serum HDL level were found high in females than the males. The overall 55% of the study population had no physiological risk factors for CVD. The correlation between the physiological risk factors for CVD and daily intake of the food groups was identified. The results showed that daily intake of vegetables, dairy products and balanced diet had great effect on CVD and significantly reduced the chances of cardio vascular diseases. The number of females was 320 and similarly, the males were 320. Most of them were married, had an education level less than high school, in physical activity most of the higher-aged people were not involved remained in rest conditions, and were living in urban regions. Their dietary intakes of were contained regularly based on a balanced diet. The vegetable intake was also not proper. Based on age groups, they were divided into five groups marital status, education level, based on region, physical activity, and dietary information were properly recorded. Observing variables (age, gender, physical activity, and daily intake of food groups) showed that more physiological risk factors for CVD revealed that daily intake of a balanced diet, and regular exercise had a significant association with having physiological risk factors of CVD. Based on the current study, it is concluded that most middle-aged (40-60 years) aged people in urban areas, had one to four physiological risk factors for cardiovascular disease and daily intakes of carbohydrates and protein were higher than dietary reference intakes for adults. Conclusion: We also found that the relationship of low physical activity with physiological risk factors for CVD was more substantial than the intake of different food groups. It is also observed that the females had more risk factors for CVD than the males. The people of Peshawar must change their lifestyle of exercise and diet to reduce this main health issue of CVD. Esmaillzadeh reported in his research that food intake patterns may explain the high prevalence of CVD risk factors in Iranian women. He demonstrated that higher fiber intake with lower energy and cholesterol intakes was correlated with lower serum triglyceride, total and LDL cholesterol, and fasting plasma glucose concentrations, lower systolic and diastolic blood pressures, and a higher serum HDL-cholesterol concentration[19]. Darani Zad in Iran evaluated dietary patterns and associations with biochemical blood profiles and body weight among 400 adults aged 40–60 years and reported that a mixed dietary pattern (including nuts, fruit, olive oil and tea) was associated with healthier lipid profiles[21].

Conclusion

Based on the current study, it is concluded that most middle-aged (40-50 years) aged people in urban areas, had more risk factors for cardiovascular disease and daily intakes, high lipoprotein level with nutritional status of carbohydrates and protein were higher than dietary reference intakes for adults. We also found that the relationship of low physical activity with physiological risk factors for CVD was more substantial than the intake of different food groups. It is also observed that the females had more risk factors for CVD than the males. More relation was found between nutritional status, high lipoprotein level and CVD. The people of Karachi must change their lifestyle of exercise and diet to reduce this main health issue of CVD.

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