International Journal of Chemical and Biochemical Sciences
(ISSN 2226-9614)

Journal Home page: www.iscientific.org/Journal.html

Dietary habits in patients undergoing coronary artery bypass graft surgery (CABG)

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Abstract

Cardiovascular diseases (CVDs) are the leading cause of death globally. An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths which is a 21% increase compared to a decade prior. Aim of this study is to identify the dietary habits in patients undergoing CABG surgery. A descriptive cross-sectional hospital-based study was conducted among 210 patients attending cardiothoracic outpatient clinic or were admitted in the internal ward in Assiut University Heart Hospital, Egypt. The mean age of the study population was 65.8 ± 8.31(Mean ± SD.). Male patients represented (60%), while female patients represented (40%). The mean ± SD of servings of fruit consumed per day among male patients (1.7±0.5) was significantly higher than that of female patients (1.5±0.5) (P= 0.016). However, the mean ± SD of day's vegetables consumed in a typical week among male patients (5.0±0.5) was significantly less than that of female patients (5.3±0.8) (P= 0.002). The percentage of those who added salt or salty sauce to their food before eating or as they were eating among male patients is 40.4% versus 59.6% among female patients with statistically significant difference (P=0.001). In addition, the percentage of those who ate processed foods high in salt among male patients was significantly less than that of female patients (P=0.012). We concluded that the vast majority consumed less than the daily-recommended amount of fruits and vegetables. Male gender and older age were significantly associated with low fruit and vegetable consumption.

Keywords: CABG, diet, risk, cardiovascular

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1. Introduction

Cardiovascular diseases (CVDs) are the leading cause of death globally. An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths, which is a 21% increase compared to a decade prior. Of these deaths, 85% were due to heart attack and stroke. Out of the 17 million premature deaths (under the age of 70) due to Non-communicable diseases (NCDs) in 2019, CVDs. 1 out of 3 deaths worldwide are due to CVDs caused 38%. Over 3 out of 4 deaths from CVDs occur in low- and middle-income countries [1]. By 2030, CVD will be responsible for more than half of all deaths in Africa CVD is becoming one of the greatest challenges that threaten the development in such countries adding a heavy burden on health services [2]. In 2017, CVD accounted for 46.2% of the overall mortality in Egypt**.** Given the aging of the population and the success in prolonging the survival of those with coronary events, heart failure (HF) poses an important and growing public health burden [3]. According to the latest WHO data published in 2020, CHD Deaths in Egypt reached 173,871 or 32.40% of total deaths. The age-adjusted Death Rate is 268.11 per 100,000 of the population ranks Egypt 15th in the world. Also, stroke Deaths reached 43,839 or 8.17% of total deaths. The age-adjusted Death Rate of 65.24 per 100,000 of the population ranks Egypt #110 worldwide [4]. Egypt is the most populous country in the Eastern Mediterranean Region (EMR); however, there is a lack of data representing the risk factors' pattern of patients undergoing CABG surgery [5]. Worldwide, Dietary risks accounted for 6.58 million cardiovascular deaths and 8 million deaths overall in 2021. The all-cause disability-adjusted life year (DALYs) due to dietary risks were 2,340 per 100,000 in the same year [6]. There is a well-known association between eating habits and CVD risk. One of the

first clinical studies to prove this connection is the study of "Seven Countries Study" **[7].** It has shown a correlation between poor eating habits (food rich in saturated fats) and the onset of ischemic heart disease. Healthy nutrition is the basis of CV prevention. Eating habits affect the level of fat and blood sugar, BP, body weight. Healthy nutrition reduces the risk of other chronic diseases. It is considered that the Mediterranean type of nutrition satisfies all the healthy nutritional recommendations. Healthy food must contain [8]. Saturated fatty acids <10% of total daily energy intake; replace them with polyunsaturated fatty acids. Trans fat acids should be avoided (they are found in the factory processed food) and should be <1% of the total energy input. Salt <5g per day. 30 to 45 grams of fiber per day (whole grains, fruits, vegetables). 200g of fruit a day (2 to 3 meals per day). 200g vegetables a day (2-3 servings per day). Fish at least 2x per week (1 meal a week blue fish). Alcoholic beverages: 2 glasses a day (20g/day) for men and 1 glass per day (10g/day) for women. There is good evidence for recommending diets high in fiber, fruit and vegetable intake and low in simple sugars and salt. Adherence to a Mediterranean style diet also appears to be cardioprotective [9]. Coronary artery bypass grafting (CABG) is a major surgical operation where atheromatous blockages in a patient's coronary arteries are bypassed with harvested venous or arterial conduits. The bypass restores blood flow to the ischemic myocardium, which, in turn, restores function, viability, and relieves anginal symptoms. Almost 400,000 CABG surgeries are performed each year making it the most commonly performed major surgical procedure, but surgical trends have decreased as the use of alternative options such as medical treatment and percutaneous coronary intervention (PCI) have increased [10]. The aim of the study is to identify dietary habits as a modifiable risk factor of cardiovascular diseases that may predispose to coronary artery bypass graft surgery.

2. Materials and Methods

It is a descriptive cross-sectional hospital-based study that had been conducted in Assiut University Heart Hospital, a one of the tertiary care teaching hospitals located in Assiut University, Assiut Governorate. had been adapted in the present study. The study was conducted from April 2022 to March 2023. The study included 210 patients who seek care at the cardiothoracic outpatient clinic or were admitted in the internal ward. All patients who underwent coronary artery bypass surgery and accepted to participate were included in the study. Patients who refused to participate or seeked medical care other than CABG surgery were excluded from the study. The researcher interviewed the patients, took written consent from them to be included in the study, and explained the purpose of the study and the patients' rights. Moreover, a full revision of the medical record was done to complete the clinical data. Data collection was conducted using a structured questionnaire. The questionnaire was divided into three sections: The first section contained: socio-demographic factor as (age, gender, marital status, education, and residence), behavioral risk factor as (tobacco use, alcohol consumption, fruits and vegetable intake and physical activity. The second section contained physical measurements of participants such as height, weight, and blood pressure. The third section contained Biochemical measurements as: Blood Glucose, Urinary sodium and creatinine, Blood Lipids, Triglycerides and HDL Cholesterol. A Pilot study was carried out on 30 study subjects to assess the duration of the interview and the wording of the questionnaire. This step did not result in the exclusion or rephrasing of any item; thus, the subjects of the pilot study were included in the results. THE STEPS instrument questionnaire was used. It`s a tool used to collect data and measure non-communicable disease (NCD) risk factors within the WHO STEP wise approach to surveillance is called the STEPS Instrument. The STEPS Instrument covers three different levels or 'steps' of risk factor assessment: Step 1 (questionnaire), Step 2 (physical measurements) and Step 3 (biochemical measurements). Data management including data entry, cleaning, statistical analysis, and tabulation were taking place using IBM SPSS (Statistical Package of the Social Sciences) statistical software, version 23.

3. Results and discussion

From April 2022 to March 2023, 210 patients were admitted to Assiut university hospital and fulfilled the inclusion criteria. The mean age of the study population was 65.8 ± 8.31 (Mean ± SD.). Regarding gender, 126 patients were male (60%), while 84 patients were female (40%) Most of the study population were employed (91.4%). Nearly half of the study population had college or university education (41.9%), while only 2.4% were not educated. Residency was in urban areas for 77 patients (36.7%) and in rural areas for 133 patients (63.3%). (Table 1). The mean ± SD days of fruit consumed among the study population in a typical week was (1.2 ± 0.4) with the mean± SD servings of fruit consumed in those days was (1.6 ± 0.5). However, the mean ± SD days of vegetables consumed among the study population in a typical week was (2.65 ± 0.85) with the mean ± SD servings of vegetables consumed in those days was (2.7 ± 0.9). Nearly one quarter of the study population added salt or salty sauce to their food before eating or as they are eating (24.76%), While (10.95%) of the study population reported eating processed foods high in salt (table 2). More than half (57.1%) of the studied patients consumed fruit and vegetables five times or more per day. Also, more than third (35.2%) of the studied patients consumed fruit and vegetables three or four times per day. While only (7.6%) consumed fruit and vegetables less than 2 servings per day. (Figure 1). Regarding Distribution of patients by gender in relation to dietary habits, it was noted that mean ± SD of servings of fruit consumed per day among male patients (1.7±0.5) was significantly higher than that of female patients (1.5±0.5), (P= 0.016). However, the mean ± SD of day's vegetables consumed in a typical week among male patients (5.0±0.5) was significantly less than that of female patients (5.3±0.8) (P= 0.002). The percentage of those who added salt or salty sauce to their food before eating or as they were eating among male patients is 40.4% versus 59.6% among female patients with statistically significant difference (P=0.001). Also, the percentage of those who ate processed foods high in salt among male patients was significantly less than that of female patients (P=0.012) (table 3).

Table 1. Socio-demographic characteristics among patients undergoing CABG surgery, Assiut University Heart Hospital, Assiut University, 2022

Variable	Study population (n = 210)
Age	
Less than 60	58 (27.6)
More than 60	152 (72.4)
Mean ± SD.	65.8 ± 8.31
Median (IQR)	67 (59 - 72)
Range (Min-Max)	34 (48 - 82)
Gender	
Male	126 (60%)
Female	84 (40%)
Employment Status	
Employed	192 (91.4%)
Unemployed	18 (8.6%)
Marital Status	
Never Married	14 (6.7%)
Currently married	175 (83.3%)
Divorced or widowed	21 (10%)
Residence	
Urban	77 (36.7%)
Rural	133 (63.3%)
Highest level of education	
No formal education	5 (2.4%)
Less than primary school	19 (9.1%)
Primary education	25 (11.9%)
Secondary education	43 (20.5%)
College or university	88 (41.9%)
Postgraduate education	30 (14.3%)

SD: standard deviation **IQR:** interquartile range

Table 2. Dietary habits among patients undergoing CABG surgery, Assiut university Heart Hospital, Assiut University, 2022

Variable	Study population (n = 210)
Day's fruit consumed in a typical week	
Mean ± SD.	1.2 ± 0.4
Median (IQR)	1 (1 - 1)
Range (Min-Max)	1 (1 - 2)
Servings of fruit consumed per day in those days	
Mean ± SD.	1.6 ± 0.5
Median (IQR)	2 (1 - 2)
Range (Min-Max)	1 (1 - 2)
Day's vegetables consumed in a typical week	
Mean ± SD.	5.1 ± 0.7
Median (IQR)	5 (5 - 6)
Range (Min-Max)	4 (3 - 7)
Servings of vegetables consumed per day in those days	
Mean ± SD.	2.7 ± 0.9
Median (IQR)	3 (2 - 3)
Range (Min-Max)	4 (1 - 5)
Add salt or salty sauce to their food before eating or as they are eating	52 (24.8%)
Eat processed foods high in salt	23 (10.9%)

SD: standard deviation **IQR:** interquartile range

Table 3. Distribution of patients undergoing CABG surgery by gender in relation to dietary habits, Assiut university Heart Hospital, Assiut University, 2022

Variable	Male (n= 126)		Female (n= 84)		P-value
	No.	%	No.	%	
Day's fruit consumed in a typical week•					0.460
Mean ± SD.	1.2±0.4		1.3±0.4		
Servings of fruit consumed per day in those days•					0.016*
Mean ± SD.	1.7±0.5		1.5±0.5		
Day's vegetables consumed in a typical week•					0.002*
Mean ± SD.	5.0±0.5		5.3±0.8		
Servings of vegetables consumed per day in those days•					0.066
Mean ± SD.	2.65±0.73		2.64±1.01		
Add salt or salty sauce to their food before eating or as they are eating					0.001*
Yes	21	40.4	31	59.6	
No	105	66.5	53	33.5	
Eat processed foods high in salt					0.012*
Yes	8	34.8	15	65.2	
No	118	63.1	69	36.9	

Chi-square test Row percentages were used • Mann Whitney test.

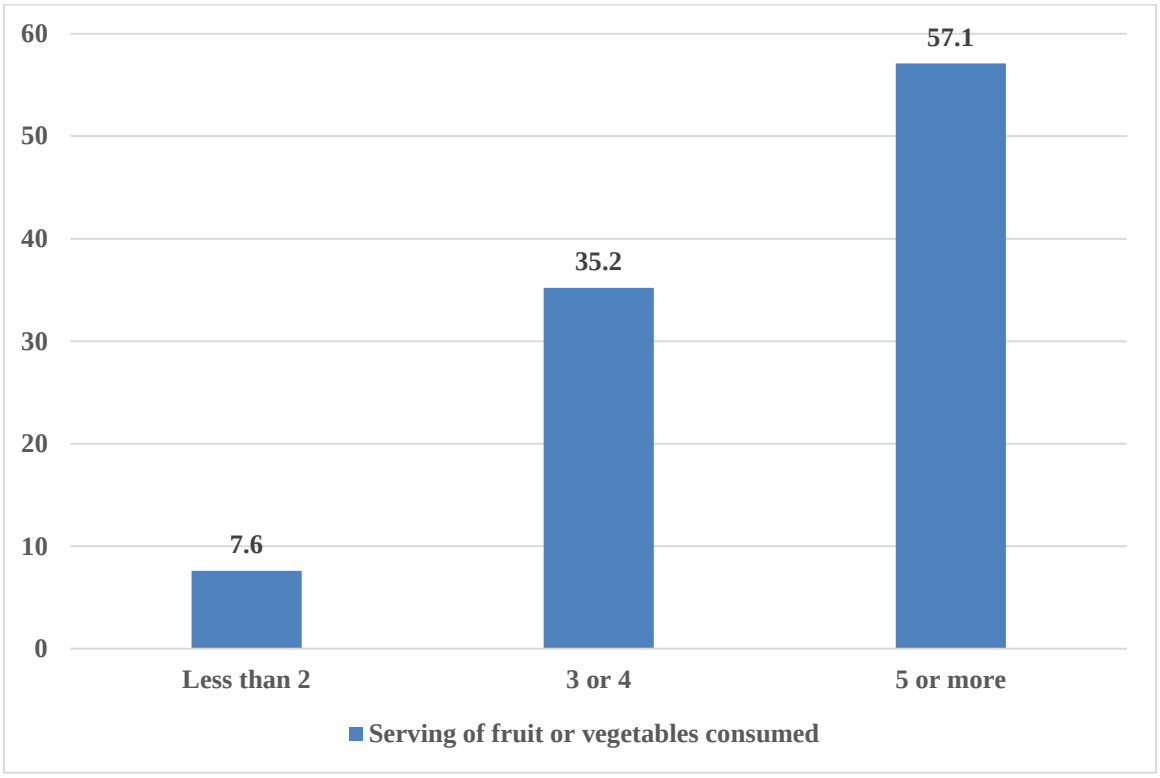

Figure 1. Consumption frequency of vegetables & fruits per day among patients undergoing CABG surgery, Assiut University Heart Hospital, Assiut University, 2022

Cardiovascular diseases, including coronary artery disease, are associated with the highest mortality rate in western Europe. Despite prophylactic and therapeutic efforts in the last decades, the prevalence of this disease continues to grow. On-pump and/ or off-pump coronary artery bypass grafting surgery is a common and effective procedure used to treat triple vessel disease. The discrepancies between both procedures regarding morbidity and mortality have been critically discussed in the last decades [11]. The main findings of **[**12] study is that, after propensity matching, males group received significantly more bypass grafts than the matched females group. In this study we demonstrated that gender was significantly associated with some variables like age, age groups and marital status. Mean age of male patients was significantly higher (67.7 ± 6.9) than female patients (62.9 ± 6.4) (P= 0.0001). Regarding age group 60 years or more male patients, percentage was significantly higher than that of female patients (P= 0.0001). Similarly, percentage of male patients was significantly higher among married and never married and significantly less than that of female patients among widow or divorced (P= 0.007). In this study we found that Old age represented (72.4%) of the study patients with mean age (65.8 ± 8.31). Male patients represented (60%). Number of married patients was 157 (83.3%). Most of the study population was employed. More than half of them were rural residence. Nearly half of the study population had college or university education. In this study we illustrated that mean of servings of fruit consumed per day among male patients (1.7±0.5) was significantly higher than that of female patients (1.5±0.5) (P= 0.016). However, the mean of day's vegetables consumed weekly among male patients (5.0±0.5) was significantly less than that of female patients (5.3±0.8) (P= 0.002). The percentage of those who added salt or salty sauce to their food before eating or as they were eating among male patients is 40.4% versus 59.6% among female patients with statistically significant difference (P=0.001). Also, the percentage of those who ate processed foods high in salt among male patients was significantly less than that of female patients (P=0.012). Found that 907 (92.2%) participants reported Low fruit and vegetable consumption with observed significant difference between men and women [13].

3.1. Limitation of the study

The limitations of our study are retrospective design and the sample size is small, so results can`t be generalized on all Egyptians and we need further evaluations to explain variation in results between men and women.

4. Conclusions

The population living in Egypt are at increased cardiovascular risk, with higher rates of behavioral risk factors. The vast majority consumed less than the daily-recommended amount of fruits and vegetables. Male gender and older age were significantly associated with low fruit and vegetable consumption. Behavioral risk factors can be changed but people living in disadvantaged areas are at increased vulnerability to unhealthy lifestyles and hence risk factors for cardiovascular disease because of low levels of income, education, and employment. To overcome this, both national and individual awareness campaigns about healthy diet or healthy lifestyle should be increased. Moreover, Larger sample size longitudinal studies are needed to better evaluate dietary habits as a risk factor and its effect in men and women undergoing CABG.

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