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# Relations between Eating and Exercise behaviors and Predicted Risk of Cardiovascular Disease(CVD) and Metabolic Syndrome (METS) among Nurses at Alexandria Main University Hospital

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***Abstract:*** *Unhealthy diet, physical inactivity, obesity, and smoking are considered important lifestyle factors that are related to cardiovascular disease (CVD) in women. The current study aimed to identify the relationship between eating and exercise behaviors andpredicted risk of cardiovascular disease (CVD) and metabolic syndrome* ***(MetS)*** *among nurses at Alexandria Main University Hospital.A descriptive correlational approach method with convenient sampling was used in the present study.Three tools were used;* ***Tool 1****: A structure interview questionnaire, which included four parts:****Part I:****Nurses' socio-demographiccharacteristics****Part II*** *aimed to assess nurses'life style behaviorsas smoking and physical,and daily life activities.****Part III*** *includedthe Rapid Eating Assessment of nurses (REAP) tool, it aimed to assess the intake of whole grains, calcium-rich foods, fruits and vegetables, fat, saturatedfat and cholesterol, sugar-containing foods, and sodium.* ***Part IV****ncluded Eating Behaviors Inventory (EBI)which assessed both positive and adaptive weight management behaviors.****Tool 2:****This included two parts, Part 1: Anthropometric measurements including body height, weight, body mass index,and waist circumference, in addition to biochemical measurement were taken. The diagnosis of Metabolic Syndrome (MetS) was obtained based on the American Heart Association/update.****Part 2:****Predicted Cardiovascular Disease (CVD) risk assessment.10-year risk prediction for CVD using FRAMINGHAM RISK SCORE (FRS.) was specifically used.****Results:****It was found that high Framingham risk score (FRS) was detected among obese nurses and the prevalence of MetSwas also significantly high among nurses with high FRS.Also, the significant inverse relation between the REAP dietary score and FRS was noticed. The eating habits that were common among nurses with high FRS included skipping breakfast, frequent eating outside home, frequent consumption of commercially prepared pastries andsugar sweetened beverages.Three quarters of nurses with high FRS described their work activity as being light to moderate. Few nurses reported walking as a method of transportation which was significantlycorrelated with lower FRS. This study recommended developmentofnurses' health behaviors that have direct impact to patients' health.*

***Keywords****: predicted risk of CVD, Eating behavior, exercise,and metabolic syndrome.*

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## I. Introduction

Diet plays an important rolein many chronic diseases, including coronary heart disease, certain cancers, obesity, stroke, hypertension, and type 2 diabetes mellitus[(1)].Previous studies mainly focused on the association between health-promoting behavior and the onset of CVD.However,on the level of knowledge, some people are aware of the effect of eating and exercise health behavior on predicting the risk of CVD among workers.The Framingham risk score (FRS) is used to estimate an individual's global cardiovascular risk [(2)].Hyperlipidemiaspromote development of atherosclerosis and CVD.Past studies have indicated that, in the general population, a lack of physical activity andinappropriate diet can lead to CVD.Therefore, prevention program for promoting workers' health is an important issue [(3)].

Unhealthy dietary habits are a major preventable risk factor of many chronic diseases. These dietary habits included low intake of fruits, whole grains, vegetables and beans, seafood ω-3 fats, nuts and seeds and polyunsaturated fatty acids (PUFA) as a replacement for saturated fatty acids (SFA) or carbohydrate, and high intake of sodium, trans fats, processed meat, sugar sweetened beverages (SSBs) and unprocessed red meat[(4)].

The main cause of death in Egypt is CVD related to obesity.In adults, However, it is unclear that anthropometric measures is predictor risk of CVD; asBMI,waist circumference,waist - hip ratio or even hip circa 'inference, it reflects abdominal adiposity which lead to CVD[(5)].Several studies have shown that people with different BMI levels adopt different healthylifestyles[(5, 6)].Individuals who are overweight or obese tend to have

poorer diets and a lower participation in physicalactivities compared to those of normal weight **(5).**Therefore,the impact of eating and exercise health behaviors on predicting CVD risk may differsin accordance of BMI workers' levels.The measurement of body mass index (BMI) is used to determine desirable weight. The World Health Organization defined overweight as BMI 25 - <30 $kg/m^2$, and obesity as BMI ≥ 30 $Kg/m^2$**(7).**

In addition, metabolic syndrome (MetS) is a combination of central obesity, glucose intolerance,hyperinsulinemia,lowhighdensity lipoproteins (HDL), high triglycerides and hypertension**(8, 9).** One of the objectives for diagnosis of MetS is to identify individuals with high risk of CVD**(8, 10).** This is based largely on the rationale that increased visceral adipose tissue is associated with a range of metabolic abnormalities, including decreased glucose tolerance, reduced insulin sensitivity and adverse lipid profiles, which are risk factors for type 2 diabetes and CVD**(11).**

Boggosian et al.2011**(12)**reported thatprevalence ofobesityamongemployed midwife nurses were higher compared to the general population, more than 60%of nurses in the study had obesityand they found that older nurses who work full-time are more prone to weight gain, and this in turn is a factor for developingchronic diseases and risks associated with the job and is a requirement to engage in healthy lifestyle behaviors. In his view, unhealthy behaviors or alter endocrine function and rotation shiftcan be promoted by job stress.Long working hours also can result in fatigue and the absence of implementation of the preventive lifestyle behaviors.

Nurses are the largest group of service providers in the health system that can directlyaffect the quality of the provided health care.(13)So that, they should be an ideal potential role models in relation to health promotionto encourage others to adopt similar behaviors(14).In order to display these positive behaviors, nurses must have sufficient knowledge about the subject of health promotion and adopt healthy lifestyle behaviors. Nevertheless, nurses face numerous challenges in terms of adopting healthy lifestyle**(15).**

Nutritional assessment is apart of many medical consultations, it is considered as an important issue for chronic disease prevention and management**(16).**Food frequency assessment is a process of collecting information about food intake (i.e. fruits, vegetables, milk, and fat consumption) and converts it to estimates of nutrient intake of calories. It also seems to be useful as an indicator of fat, cholesterol, fiber and sugar intake.In addition, it estimates frequencies of commonly eaten food**(17).**

Alteration of eating behavior is one of the main modifiable determinants of chronic diseases and result in reduction of diet-related diseases**(18).**Eating behavior that influence energy intake and energy expenditure is affected by some internal and external determinants(19).These determinants are food knowledge, availability, attitudes, emotional state, experiences of the individual and the social and cultural environment in which the behavior occurs**(19,20,21).**Identifying these determinants is a growing area of research and several tools have been developedthat make the studies on eating behavior possible and will be more practical than laboratory tests which are objective measures and suitable only in limited participants**( 22,23).**

**Heidari** and Kermanshahi 2012**(24)**stated that cognitive factors, obstacles and behavioral skills are as determinants associated with lifestyle behaviors. Also in checking the barriers to a healthy lifestyle in adults, they identified that lack of time and the time constraints, lack of energy and motivation and social factors as barriers to physical activity and healthy eating**.**In addition, they introduced job-related factors such as the type of shift and stress as contributing factors in the development of unusual food habits in nurses who mostly use sugary foods and snacks as a way to cope with their stress **(22)**

**Significance of the study**

Several studies have shown that unhealthy eating habits and lack of exercises are significant risk factors linked to CVD**(25, 26)**. Eating problems are very prevalent in the United States andthe prevalence of obesity has also increased sharply, with over 60% of the population overweight orobese.Only 15% of adults do the recommended amount of physical activity, and 40% of adults engage in no leisure-time physical activity **(27).** To datethe lack of clinical research regarding the dietary behaviors of nurses has been noticeable,given the well-documented importance of optimal eating and exercises on various health metrics.In nursing, the importance of studying health promoting behaviors and its results could have several reasons, first, because of the effects of job stress on their quality of life, including life satisfaction, physicalhealth, psychologicaland social stress which are created because of emotional pressure and are related to the stressful events(16).In addition, an aspects of job and also because of the broad implications that this behavior creates in organizations and workplaces. It can affect their job performance and thus threaten the health of patients andcommunity**(16, 28).**

**Operational Definition**:

**Metabolic syndrome:** MetS is known as a syndrome x or dysmetabolic syndrome refers to cluster of metabolic condition that can lead to heart disease. People diagnose with this syndrome are usually overweight or obese. The main features of MetS include insulin resistance, hypertension, abnormal cholesterol and an increased risk for clotting

**Aim of the Study**

This study aimed to investigate the relationship between eating, and exercise behaviors for predicted CVD risk, and metabolic syndrome among nurses at the Alexandria Main University Hospital.

**Research questions:**

What is the relation between eating and exercise behaviors for the predicted CVD risk, and metabolic syndrome among nurses at the AlexandriaMain University Hospital?

## II. Subjects and Method

**Research design:**

Adescriptive correlation study was utilized to conduct this study.

**Setting:**

The study was carried out at different departmentsat the Alexandria Main University Hospital. These were namely: Cardiothoracic, Colorectal, Oncology,Hepatobiliary, Gastrobiliary, and Plastic, Head & neck and Burn departments.

**Subjects**

One hundred and five out of total population of 400nurses working at the above mentioned setting were included in the study.The sample was recruited using random sampling in the different departments mentioned above.Two subjects of total sample hadn't completed the data in their sheet and were excluded from the study**.**Power analysis using the program epi-info to estimate the sample size using the following parameters:

1- Population size 400
2- Expected frequency 50%
3- Maximum error 10%
4- Confidence Coefficient 90%
5- Minimum sample size =105 patients.

**Subjects' inclusioncriteria were:**

- Adult female nurses, aged not less than 30 years old.
- Workingat the hospital during of the study time.
- Theirqualificationsare diploma or technical and baccalaureates degree.
- Neither pregnancy nor lactatingduring the data collection period.
- With no history of cardiovascular disorders.
- Willing to participate in the study.

Tool:The data collection of the study includedtwo tools:

**Tool 1:A structured interview Questionnaire:**

**It was developed by the researchers through review of related literature[2, 3, 4,5,11,13,15,21 ,29]and included four parts:**

**PartI**: It involved data related to sociodemographic characteristics such as: nurses' age, qualification, marital and economic status, and medical history.

**Part II**:Nurses'life style assessment questionnaire: It aimed to assess nurses' Life Style behaviors and consistedof two main subcategories as follows:

**1-Smoking habit,** included questions about years of smoking, number of cigarette per day and type of smoking.

**1- Physical activity questionnaire assessment**: It was developed by Macfarlane, Chan and **Cerin 2010 [29]**and aimed to assess subjects' physical activity pattern in their everyday life. Itincludedthree section**s:**

- **Section A:**Itassesses the nurses' physical activity patterns in and around the house. It includes:
  - Hours of TV watched per day,
  - Number of times the nurses climbs up a flight of stairs (approx.10 steps),
  - Activities in and around the home approximate daily hours.
- **Section B**assesses how participants' goes to job and also, their usual activity at work within the previous 12 months.
  - How many hours of job per week?
  - Activity levels at work - The number of hours in each activity
  - Stairs or step climbing at work
  - Number of times climbing up a flight of stairs (10 steps) at job
  - Transportation/go to and from job: it includes by car, public transport, by bicycle orwalking

- **Section C** asks about usualrecreations or leisure time that nurseshave engaged and spentwithin the previous 12 months, which include:Swimming leisurely,walking forpleasure,Aerobic Exercises, and runningpractice in fast, and dancing.

**Scoring System:**

The participants were asked about the time in minutes) spent watching TV daily in the period before 6 pm and after 6 pm.,a separate question was asked about the time spent in watching TV during the weekends, the total duration(minutes) was added and then divided by 7 to get the daily hours spent in watching TV. Participants were also asked about the time spent in household activities like cooking, doing the laundry, shopping for food, and taking care of young children. The time in minutes spent daily for different categories were summed up and divided by 7 to get the daily hours spent in household activities.The daily frequency of Using stairs at home or at work was asked and reported. Also number of working hours and the usual mode of transportation to work was recorded.Also the participants were asked for frequency practicing daily of leisure activities which is classified by a three point of Likert scaleLikerScale Liker scale, scored as: " never" = 0, "Once / two month" = 1 "Once/month" =2, "2-3times/month" 3 Once/week"=4and"2-3 times/week"= 5with a total scores 25.The Score was modified and classified by the researchers as follow: Low practicing = <15, moderate practicing=15- 20 and high practicing = >20

**Part III: The Rapid Eating Assessment for Participants - Short Version (REAPs):**

This partdeveloped and adapted from***Gans et al (2003***)[(30)]as a new tool to help in primary care providers' rapidassessment ofdiet intake. The REAP tool includes questions to assess the intake of whole grains, calcium-rich foods, fruits and vegetables, fat, saturated fat and cholesterol, sugar-containing foods and beverages, and sodium and alcoholic beverages. The final developed version of REAP consists of 13 questions.It designed to give an idea about average daily consumption offood which is classified by afour point ofLikert scale,scored as:"never"=4"sometimes"=3 "usually" =2"often"= 1 with a total scores 52. Experts injurychanged these score to be measured on a 3point only, "never" = 3 "sometimes" = 2 "often" = 1 with a total score39. It comprised 13 sub items as mentioned above.It rated in "low" = 13-< 22, "moderate" = 22 -< 31 and " high" = 31- 39.The high scores show that the eating pattern is adherent moreadherentto the diet guidelines.

**Part IV: Eating Behavior Inventory (EBI):**

The EBI assesses both positive and adaptive weight management behaviors**.**Items on the EBI were developed from a survey of behavioral treatment manuals withthe goal of generating items that represented specific behaviors that had been theoretically implicated in weight loss.This tool was adaptedfromO'Neil & Rieder, (2005)[(31)]**.**It consists of 26 items and two items were added that assess behaviors by self-reporting of food intake, shopping patterns, and habits that help to lose weight.Participants use a 5-point Likert-type scale from 1 (never or hardly ever) to 5 (always or almost always) according to how frequently they enact each behavior. Higher scores are thought to be indicative of participant behavior that is conducive to weight loss or weight management. Negative items are reverse scored.The total score of the questionnaire was 140 marks: (It comprised 28 sub items).Each subscale's item score, ranged from 1 to 5,and multiplied by the number of response items.The total EBI score was considered aspoor= 28-<75, fair = 75-< 121 and good = 121- 140.

**Tool 2: Clinical data base: This tool was developed based on review of related literatures**[(11, 22, 28, 32)]**.**It aimed to assess the nutritional statusparameters.It comprised oftwo main parts:

**Part 1-Nutritional assessment measurement tool: It include anthropometric and biochemical measurement**. This part included body height(cm) and weight(kg.). The body mass index (BMI) was calculated with weight divided by the height squared ((kg)/(m2).The body mass indexwas categorized into four levels: underweight (BMI < 18.5), ideal weight (18.5 ≤ BMI < 24.0),overweight (24.0 ≤ BMI < 27.0) and obese (BMI ≥ 27.0)**.** As well as waist circumference was also obtained. It was in accordance of Dietary **Guidelines for Taiwan, 2011**[(7)].Biochemical measurement as triglycerides,HDL cholesterol, LDL cholesterol, and Fasting blood sugar were obtained.A diagnosis of MetS was obtained based on the **World Health Organization (2017)criteria**[(32)].These criteria are:

1-Elevated waist circumference [Women 0.35 inches (88 cm)],
2-Elevated triglycerides [_150 mg/dl (1.7 mmol/l)],
3-Reduced HDL cholesterol [Women50 mg/dl (1.29 mmol/l)],
4- Elevated blood pressure [_130/85 mmHg or use of medication for hypertension]
5-Elevated fasting glucose [100 mg/dl (5.6 mmol/l).
A subject with threeor more criteria of MetS definition would be classified as confirmedcase of MetS.

**Part 2 –Predicted CVD risk Assessment:**

Framingham-based toolaims to calculate the global risk of coronary heart disease. It measures the 10-year risk prediction for CVD andis the most widely used tool to estimate an individual's global cardiovascular risk.It was adopted by **Sheridan et al 2003[33].**

The FRS total was calculated by adding scores taken from six clinical andlaboratory parameters:age, gender,smoking habits, total cholesterol, HDL, triglyceride andFasting blood sugaras well as systolic blood pressure. Cutoff points on the FRS list were used to differentiate between three estimation levels for the 10-year risk: low risk (<10%), intermediate risk(10%–20%) and high risk (>20%) [19,26].Researchers adapted these classifications from percentages into numerical scores, as follows: 1 – 8.6 "mild" risk, >8.6 - < 18.52 "moderate" risk and ≥ 18.52" high" risk.

**Method**

- An official letter was forwarded from the dean of the Faculty of Nursing, requesting a permission to conduct the study.
- Awritten approval was obtained from the director of the MainUniversity Hospital tocarry out the study.
- An informed consent for participation in the study was taken from each participantafter fullexplanationof the aim of the study. The participantswere given the opportunity to refuse participation and they couldwithdrawat any stage of the data collection without giving any reason. The studied sample also assured that any information collected would be confidential and used only for the research purpose. It was reassured that the information of subjects would be kept secretly- The EBI and REAP tools were translated into Arabic.
- Tools were tested for content and constructed validity by 5 experts in medical surgical nursing teaching staff from the Faculty of Nursing, Alexandria University, and in nutrition teaching staff. Comments and suggestions were reviewed and necessary changes were done.Experts in a jury added 2 another items, to finally comprise 28 items namely concerning EBI questionnaire:
- ***I shop and cook food by myself and don't depend on fasting food***
- ***I usual sleep immediate after finish from eat supper food***
- Test- retest of reliability for tool 1 (part III and IV) was done by Dennis & Goldberg, Cranach's alpha =.75. It was consistent with known split-half reliability of .20
- A pilot study was carried outwith 10nurses who were not included in thesample to test the clarity, and applicability of the tool 1 and to estimate the time required to fill the sheet.Modifications were introduced, there after as needed

**Collecting Data**

Self-report demo-graphic information, including age, marital status, economic level, and qualification as well as life style assessment includingsmoking and physical activity patternwere filled out by using tool 1partI –II.Subjects were further asked to complete REAP and the EBI Questionnaire using tool 1part III –IV by themselves.The researcher stayed in the vicinity to check the answers and to receive the questionnaires personally. The data were collected throughout 2 months, fromOctober and November 2015.The duration of tools completion for each participant, was approximately20-30min.Weight and height were measured and Body mass index (BMI) was calculated.Blood sample for serum total cholesterol, HDL, LDH, triglyceride and fasting blood sugar were collected to estimated,with measuring systolic blood pressure using tool 2 Part IIto assess the predicted risk of CVD and metabolic syndrome among nurses. For practical reasons further analysis were conducted through stratifying the predicted CV risk scores into low,moderate and high risk to explore the specific effects of eating and/or exercise behaviors on the predicting CVDrisk.

**Limitation of the study**

One of the limitations of the present study was its cross sectional nature that prevent from drawing a causative relation between variables studied and the risk of CVD. Another disadvantage is the wide age interval of the target population, a more focused study on postmenopausal age group would reveal a stronger correlation.

## III. Results

**Table 1 Shows distribution of the study of nurses according to their Socio-demographic Characteristics**.It revealed that aroundhalf of the studied sample have diploma andmore than one third of them were from 30 - < 40 years.Regarding their marital status, the majority(85.4%) of themwere married and income58.3% of them were somewhat enoughhad no medical history of anydiseases of their family members were from 2-4 in 68% and still have menstruation

**Table 2A: Represents daily physical activity of the studied subjects (nurses) and its relation with Framingham cardiac risk score with (n = 103).**Considering number of hours of watching TV per day, the

table shows that it was range from 0 to 6 hours per day; and the mean and standard deviation scores for mild, moderate, and high risk score were 2.22 ± 1.61, 2.17 ± 1.62, & 1.58 ± 1.37 hours respectively, but correlation was not statistically significant (p= 0.553). Regarding climbing up a flight of stairs at home weekday, the table showed that the majority of the studied subjects (71.4%, 68%, and 75%) climbing stairs 1 – 5 times / day for mild, moderate, and high risk score of cardiovascular disease consecutively, without statistically significance difference(p = 0.735).n relation to climbing up a flight of stairs at home in a weekend, the table reveals that more than half of the studied subjects (51.4%, 56.0%, and 62.5%) never climbing stairs in a weekend for mild, moderate, and high risk score of cardiovascular disease consecutively, without statistically significance difference(p = 0.882).Regarding number of working hours per day at job, the table shows thatthe mean and standard deviation scores for mild, moderate, and high risk score were 4.10 ± 2.33, 3.84 ± 1.70,& 4.35 ± 3.59 hours respectively, but correlation was not statistically significant (p= 0.553).Considering number of working hours per week at job, the table shows thatthat the majority of the studied subjects (60%, 72%, and 75%) working more than 36 hours per week at job, but correlation was not statistically significant (p= 0.503.

**Table 2B: shows relation between Framingham Cardiac Risk Score with participants' Leisure Activities (n = 103**).It revealed that the majority of nurses were attached with low level of leisure activities that were with mild, moderate and high predicting of cardiac risk (92.9, 88.0, and100%), respectively. But the findings revealed that there is statistically insignificant correlation between nurses' leisure Activities and their cardiac risk scores (P= 0.583).

**Table3: illustrates the distributions of the studied sample according to obesity (BMI) and Framingham Cardiac Risk Score.** It displays that the high rate of obesity among nurses which represents more than two third (68%). Based on Framingham score, more than two third of the study subjects had low risk and 24.3had moderate risk, while a little of them had high risk of developing cardiac risk disease in the next 10 years with mean 8.0 ±11.74.

**Table 4:represents the means and standard deviations of the Rapid Eating Assessment of Participants (REAP) and Eating Behavior Inventory (EBI) and their Relation with Framingham cardiac risk score (n= 103).**It is evident from this table that the nurses with high FRS has the lowest mean of REAP score (23.13 ± 4**.55)**compared to those with moderate FRS (24.88 ± 3.33) and those with mild risk (25.14 ± 3.57). There is a significant weak negative correlation between the REAP score and FRS (r= -0.186 P=0.049*).On the other hand, no significant difference or correlation between the EBI score and FRS. (r=0.090 P=0.363)

**Table 5: shows the relation between FRs score with the Rapid Eating Assessment of Participants(REAP) (n = 103).**It revealed that skipping breakfast is a common practice among nurses within groups of FRS although this association is not statistically significant.Three fourths of nurses with high FRS reported to eat outside home 1-2 times weekly compared nurses with moderate and low FRS (24 %, 12.9 %) respectively, and this difference is statistically significant.Regarding whole grains half of the nurses with high FRS reported to consume them rarely compared to 40 % of moderate FRS and 32.9 % of low FRS ( p>0.05).Low intake of fruits and (less than 2 servings a day) is more common among nurses with high FRS than those with moderate,although not statistically significant.Half of the nurses with high FRS reported higher weekly animal protein intake compared to 32% of moderate FRS and 31.4 % of thosewith low FRS.In addition, 37.5 % of those with high FRS reported higher intake of processed meat but with no statistical significance.The consumption of regular fried and salted snacks was higher among nurses with high FRS 37.5 % compared to nurses with moderate and low risk (24 %, 28.6%), respectively (P>0.05). Adding fat to food on table has been reported by a high percentage of nurses with high FRS (62.5 %) compared to moderate FRS (32 %) and low FRS (44.3 %). Half of nurses with high FRS reported frequent consumption of sweets3-4 times weekly compared to 28 % of moderate and 24.3 % of low FRS. In addition, frequent drinking of sugar sweetened beverages have been reported by half of nurse with high FRS, although it was insignificant

**Table 6: Illustrates relation between Framingham Cardiac risk score with metabolic syndrome diagnosis and body mass index.**It showed a higher prevalence of MetS among the studied subjects who in mild, moderate and high cardiac risk were statistical significant difference 14.675* (p=<0.001*).The presence of high Fasting blood sugar and high triglyceride level were highly significant indicators with cardiac risk score (18.043*=<0.001*and12.138*p=0.002*),respectively.Highblood pressure was high significantly prevalent(P=<0.001*) among the majority (87.5%)of nurses with high FRS compared to nurse inmoderate (68 %) and low FRS (25.7 %).The prevalence of MetS was more than half of the studied nurses, they were distributed inLow (38.6% ) and moderate ( 80.0% ) and high(75.0 %) cardiac risk scores and were statistical significant differences (14.675* p=<0.001*).This finding might illustrate the highrate of metabolic syndrome in

this study.Also, it observed although that the prevalence of obesity is high among nurses as follow 62.9% of who in low cardiac risk and 72% and 75% of total who in moderate and high cardiac risk, respectively. But it was statistically insignificant differences with predicting risk of cardiac disease.

**Table 7: Shows the correlation between Mets, BMI, EBI and REAP with age and menstrual status**. This table illustrates a highly positive significant correlation between metabolic Syndrome and BMI, age and menstrual status (r= 0.436* P=<0.001**, 0.381* p==<0.001** and 0.370 p==<0.001**) respectively. Also, it revealed that significant positive correlation was observed between BMI and age. (r=0.537 p= 0.001**) but negativity significant with EBI (r = -0.537 P= 0.001**)

## IV. Discussion

Lifestyle factors like obesity, unhealthy diet, smoking, physical inactivity, is considered animportantdeterminants of CVD in women[34]. Overweight and obesity are prevalent among the studied sample (25.2 %, 66 % respectively). The prevalence of obesity in the present study is highest (75 %) among nurses with high Framingham risk score (FRS). There is a trend towards an increased FRS among nurses with higher BMI and larger waist circumference although not statistically significant.In many cohort studies [35, 36]BMI is considered a risk factor forcardiovascular disease occurrence- like coronary heart disease (CHD) and stroke- which was increased among those who were overweight and obese.On the other hand, findings from studies showed that waist circumference predicts CVD occurrence independent of BMI [37, 38]. The Eating Behavior Inventory (EBI) is a questionnaire formed to assess behaviors associated with losing weight and weight management. In the present study BMI is highly correlated to EBI. Studies showed a strong correlation between change in EBI scores and weight loss in obese women [39, 40]. On the other hand, EBI in the present study did not show any significant association with the FRS. This might be attributed to that tool was self-reported that nurses' participants tend to report what they believe the researcher expects to see or report what reflects positively on their own abilities, eating habits and behavior. This exaggeration may positively skew the data.

Almost half of the studied sample had Metabolic Syndrome (MetS). A recent review in the Middle East region showed that the prevalence of MetS is between 15–60 %[41]. In the current study there is a high correlation between metabolic syndrome and Body mass index, in addition theprevalence of MetS is significantly high among nurses with high Framingham Risk Score (FRS) which agrees with a similar studies showing that individuals with MetS had an increased incidence of CVD[42, 43]. The prevalence of MetS is positively correlated with the increase in age and with postmenopausal state. This was in line with the study conducted by Al-Thani et al. (2016)[44]which showed that the prevalence of metabolic syndrome increased with higherage groups. A significant inverse relation between the Rapid Eating Assessment (REAP) dietary score and the FRS is shown in the present study. REAP is a reliable and valid short dietary assessment questionnaire that gives an idea about average daily consumption of fruits vegetables, milk, and fat and acts as a general indicator of cholesterol, total fat, fiber and sugar intake[45,46].Short dietary assessment questionnaires were used in several studies where ischemic stroke patientsand ischemic heart disease patients had higher scores of saturated fat (SFA), lower scores of monounsaturated fat (MUFA), poly unsaturated fat (PUFA), fruitsand vegetables, and a lower overall dietary scores[47,48].

Skipping breakfast was a common dietary habit in the studied sample especially in females with high FRS.Breakfast skipping has been associated with higher risk of CVD[49, 50].This might be attributed to that those who consume breakfast daily were less likely to have high blood pressure than those skipping. Three quarters of females with high FRS consumed meals outside home once or twice weekly, which was statistically significant. In similar studies diets characterized by low consumption of fruit and vegetables and a high intake of red meat, processed foods, snacks, and frequent eating outside home (≥2 times per week) was significantly associated with higher cardiovascular risk[51,52].Half of the nurses with high FRS consumed less than 2 servings of fruits and vegetables per day.This was in line with the women's health study that examined fruit and vegetable intake among 39876 female health professionals who did not complain of past history of CVD. The studynoticed a significant negative association between the intake of fruit and vegetables and CVD risk [53]. Follow up studies revealed thatin individuals without cardiovascular disease followed up for 10 years, the higher intake of total fruit, vegetable, and legume was inverselyassociated withCVD incidence[54, 55].

Half of the nurses with high FRS consumed more than 250 gram of animal protein daily. More than half of the nurses with high FRS add butter, margarine or oil to food at table. This was in line with a study on Chinese women which found that dietary pattern that contain high intake ofanimal offal, convenience foods and desserts, pickles , poultry, and red meat - this pattern is high in Saturated fat , cholesterol and salt -was associated with the high systolic blood pressure (SBP), diastolic blood pressure (DBP), total cholesterol (TC) and low density lipoprotein cholesterol (LDL-C) on the contrary vegetable protein and legumes consumption was associated with decreasedchanges in fasting blood glucose (FBG) and TC[56].In the Nurses' Health study,it was found that higher consumption of red meat and high-fat dairy were significantly related with elevated risk

of coronary heart diseases (CHD) on the other hand higher consumption of poultry, fish, and nuts were significantly related with lower risk[57]. A contradictory result was found inthe Atherosclerosis Risk in Communities (ARIC) study which found that neither total animal nor vegetable protein consumption was associated with risk of coronary heart disease (CHD**)**[58]**.**

Half of the nurses with high FRS ate commercially prepared pastries high in saturated fat and sugar and made of refined grains more than twice daily. Half of them drank sugar sweetened beverages as soda, fruit drinks daily. These foods are considered a source of carbohydrates with high glycemic index. Similarly, the cross-sectional Chennai Urban Rural Epidemiology (CURES) study found that increased consumption of refined grain intake was associated with increased waist circumference, SBP and DBP, fasting glucose, triglycerides, and insulin resistance and lower HDL-C levels[59].Also in the study conducted on a cohort of 75521 women aged 38-63 followed for 10 years for incident CHD, dietary glycemic load

(GL)was positively associated with risk of CHD[60].In a longitudinal cohort study conducted within the general Dutch population including a sample of 8,855 men and 10,753 women found GL total carbohydrate intake and starch intake were associated with a higher CHD in men but not in women[61]**.**Sugar sweetened beverages (SSB) accounts for about 50 % of added sugar in the American diet and there is a significant relationship between added sugar consumption and increased risk for CVD mortality and developing diabetes[62, 63].This effect of SSB due to the rapid absorption of corn syrup used as a sweetener with concomitant rise of blood insulin and exhaustion of pancreatic B cells.

Sedentary behavior is common among nurses in the present study. Three quarters of nurses with high FRS reported their work as a light to moderate active. Blood pressure body mass index and waist circumference were significantly higher among Nigerian employees who reported that their work activities were highly sedentary compared with participants who reported that their work was moderately active or highly active[64]. Low level of occupational physical activity has been found to independently increase the risks of CVD in a group of French adults and Australian sedentary employees [65, 66].Promoting and encouraging physical activity at work is a practical and effective approach that could prevent and control the risk of CVD. Walking or cycling for transportation is one way to accumulate PA as part of a daily routine. In our sample of 15.5 % of nurses only reported walking to work as a method of transportation which was significantly associated with a lower FRS. This was in line with the study conducted in UK which reported that walking or cycling was associated with a lower risk of having diabetes, and walking was associated with a lower risk of having hypertension than private transport [67]**.**The impact of physical activity on dyslipidemia and body weight was investigated in another cross sectional study where time spent on commuting, leisure time and total physical activity was directly associated with high-density lipoprotein cholesterol and negatively associated with low-density lipoprotein cholesterol, triglycerides, waist circumference and body mass index[68]**.**On the other hand, there was a negative association between active commuting and triglycerides, diastolic blood pressure and fasting insulin, and positive relation with HDL was evident in men but not in women[69].

## V. Conclusion

In the present study the prevalence of obesity is highest among nurses with high FRS.There was a trend towards an increased FRS among nurses with higher BMI and waist circumference although it was statistically insignificant.Findings from several studies showed that waist circumference is a predictor of CVD risk independent of BMI.In the current study metabolic syndrome was highly significantly correlated with body mass index.In addition, the prevalence of MetS was significantly high among nurses with high cardiac risk score (FRS).The present study revealed that there was a significant inverse relation between the REAP dietary score and the FRS.

The results indicated that baseline EBI scores were not generally influenced by patient variables.The EBI has been shown to be insignificantly correlated with FRS, but it appears influenced and negatively correlated with REAP dietary score.Although physical activity is clearly beneficial for weight loss, these behaviors are not assessed by the EBI.Sedentary behavior is common among nurses in the present study. Three quarters of nurses with high FRS reported their work as a light to moderately active and this was statistically significant.Only 15.5 % reported walking to work as a method of transportation which was significantly correlated with a lower FRS.

**Recommendations:**

From the study findings, the following recommendations are formulated :

- To make a difference in the nurses' health behaviors that have direct impact to patients and the public health, it requires proper planning at the level of health.

- There should be an ongoing training by health care professionals to inform nurses about the risks of CVDs, its prevention and promotion of healthy heart habits. It is believed that by identifying the groups at risk and by raising awareness within this group, has to be increased monitoring level so as to minimize the occurrence of heart related illnesses.
- Future research in this context should include topics about the environment, family, eating and exercise, health responsibility, and lifestyle. Social, cultural need to be further investigated. The sample would be including different setting or countries. In addition, the underlying causes willinvestigate for their behaviors in relation to health and lifestyle in long period

**Table (1): Distributions of the studied sample according to socio- demographic data (n = 103)**

| Variables | No. | % |
|---|---|---|
| **Age (years)** | | |
| 30 - <40 | 42 | 40.8 |
| 40 - <50 | 33 | 32.0 |
| 50+ | 28 | 27.2 |
| **Qualification** | | |
| Secondary school | 20 | 19.4 |
| Diploma | 49 | 47.6 |
| Bachelor | 34 | 33.0 |
| **Marital status** | | |
| Single | 6 | 5.8 |
| Married | 88 | 85.4 |
| Divorced | 3 | 2.9 |
| Widow | 6 | 5.8 |
| **Income** | | |
| Not enough | 10 | 9.7 |
| Somewhat enough | 60 | 58.3 |
| Enough | 33 | 32 |
| **Number of family member** | | |
| 1 | 2 | 1.9 |
| 2 – 4 | 70 | 68.0 |
| 5 – 7 | 30 | 29.1 |
| >7 | 1 | 1.0 |
| **Menstrual status** | | |
| Yes | 72 | 69.9 |
| No ( menopause) | 31 | 30.1 |
| **Medical history** | | |
| No | 59 | 57.3 |
| Type I diabetes | 7 | 6.8 |
| Type II diabetes | 12 | 11.7 |
| HTN | 31 | 30.1 |
| Blood fat | 10 | 9.7 |
| Others* | 8 | 7.7 |

**Others**/Dysarrythmia,Rheumatic arthritis, Rheumatoid, Hypothyroidism, Cholecystitis

**Table 2 A: Represents daily physical activity of the studied subjects (nurses) and its relation withFramingham cardiac risk score with(n = 103)**

| Variables | Framingham risk score | | | | | | Test of sig. | p |
|---|---|---|---|---|---|---|---|---|
| | <1 – 8.6 mild risk (n = 70) | | >8.6 - < 18.52 moderate risk (n = 25) | | ≥ 18.52 high risk (n = 8) | | | |
| | No. | % | No. | % | No. | % | | |
| **Number of hours of watching TV** | | | | | | | | |
| Min. – Max. | 0.0 – 6.0 | | 0.0 – 5.50 | | 0.0 – 3.40 | | F=0.597 | 0.553 |
| Mean ± SD | 2.22 ± 1.61 | | 2.17 ± 1.62 | | 1.58 ± 1.37 | | | |
| **2-Number of times/day climbing up a flight of stairs at home (approx 10 steps):** | | | | | | | | |
| **On a weekday** | | | | | | | | |
| Never | 12 | 17.1 | 6 | 24.0 | 1 | 12.5 | | |
| 1 – 5 | 50 | 71.4 | 17 | 68.0 | 6 | 75.0 | $\chi^2$=3.492 | $^{MC}p$= 0.735 |
| 6 – 10 | 6 | 8.6 | 1 | 4.0 | 0 | 0.0 | | |
| 11 – 15 | 2 | 2.9 | 1 | 4.0 | 1 | 12.5 | | |
| **On a weekend day** | | | | | | | | |
| Never | 36 | 51.4 | 14 | 56.0 | 5 | 62.5 | $\chi^2$=1.423 | $^{MC}p$= |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 – 5 times | 30 | 42.9 | 11 | 44.0 | 3 | 37.5 | | 0.882 |
| 6 – 10 times | 4 | 5.7 | 0 | 0.0 | 0 | 0.0 | | |
| **3-Activities inandaroundthehome (hours)Approximate number of hours / day** | | | | | | | F=0.597 | 0.553 |
| Mean ± SD | 4.10 ± 2.33 | | 3.84 ± 1.70 | | 4.35 ± 3.59 | | | |
| **II- Activity at work Number of working hours/week** | | | | | | | | |
| ≤36 | 28 | 40.0 | 7 | 28.0 | 2 | 25.0 | $\chi^2$=1.467 | $^{MC}$p= 0.503 |
| >36 | 42 | 60.0 | 18 | 72.0 | 6 | 75.0 | | |
| **Activity level at work*** | | | | | | | | |
| Sitting - light work | 9 | 12.9 | 3 | 12.0 | 1 | 12.5 | $\chi^2$=0.204 | $^{MC}$p=1.00 |
| Sitting - Moderate work | 18 | 25.7 | 6 | 24.0 | 0 | 0.0 | $\chi^2$=2.665 | 0.264 |
| Standing - light work | 7 | 10.0 | 3 | 12.0 | 4 | 50.0 | $\chi^2$=7.449* | $^{MC}$p=0.021* |
| Standing - Moderate work | 15 | 21.4 | 12 | 48.0 | 2 | 25.0 | $\chi^2$=6.472* | 0.039* |
| Standing - heavy work | 8 | 11.4 | 3 | 12.0 | 3 | 37.5 | $\chi^2$=3.767 | $^{MC}$p=0.143 |
| Walking at work – carrying light briefcase | 27 | 38.6 | 12 | 48.0 | 2 | 25.0 | $\chi^2$=1.408 | $^{MC}$p=0.516 |
| Walking - carrying something heavy | 8 | 11.4 | 6 | 24.0 | 0 | 0.0 | $\chi^2$=3.131 | $^{MC}$p=0.189 |
| Moving, pushing heavy objects objects weighing | 9 | 12.9 | 1 | 4.0 | 0 | 0.0 | $\chi^2$=1.630 | $^{MC}$p=0.384 |
| **Number of times you climbed up a flight of approx 10 steps):(stairsat work** | | | | | | | | |
| Never | 27 | 38.6 | 13 | 52.0 | 4 | 50.0 | | |
| 1 – 5 | 39 | 55.7 | 12 | 48.0 | 4 | 50.0 | $\chi^2$=3.548 | $^{MC}$p=0.811 |
| 6 – 10 | 3 | 4.3 | 0 | 0.0 | 0 | 0.0 | | |
| **Transportation used to travel to work* Walking** | | | | | | | | |
| Always | 5 | 7.1 | 0 | 0.0 | 2 | 25.0 | | |
| Usually | 2 | 28.0 | 0 | 0.0 | 0 | 0.0 | $\chi^2$=9.731* | $^{MC}$p=0.039* |
| Sometimes | 3 | 10.7 | 4 | 16.0 | 0 | 0.0 | | |
| **Car** | | | | | | | | |
| Always | 8 | 11.4 | 2 | 8.0 | 2 | 25.0 | | |
| Usually | 1 | 1.4 | 2 | 8.0 | 2 | 0.0 | 6.189 | $^{MC}$p=0.317 |
| Sometimes | 3 | 4.3 | 0 | 0.0 | 0 | 0.0 | | |
| **Public Transportation** | | | | | | | | |
| Always | 56 | 80.0 | 22 | 88.0 | 4 | 50.0 | | |
| Usually | 3 | 4.3 | 0 | 0.0 | 0 | 0.0 | 7.521 | $^{MC}$p=0.087 |
| Sometimes | 0 | 0.0 | 1 | 4.0 | 1 | 12.5 | | |

$^{MC}$p: p value for **Monte Carlo** for Chi square test
*: Statistically significant at $p \leq 0.05$
$\chi^2$, p: $\chi^2$ and p values for **Chi square test**
F,p: F and p values for **ANOVA test**

Continue

**Table 2 B:Relation between Framingham risk score withparticipants' Leisure Activities (n = 103)**

| Variables | Framingham risk score | | | | | | Test of sig. | p |
|---|---|---|---|---|---|---|---|---|
| | <1 – 8.6 mild risk (n = 70) | | >8.6 - < 18.52 moderate risk (n = 25) | | ≥ 18.52 high risk (n = 8) | | | |
| | No. | % | No. | % | No. | % | | |
| **Leisure Activities*** | | | | | | | | |
| Low | 65 | 92.9 | 22 | 88.0 | 8 | 100 | | |
| Moderate | 5 | 7.1 | 3 | 12.0 | 0 | 0.0 | $\chi^2$= 0.974 | 0.583 |
| High | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Min. – Max. | 5.0 – 20.0 | | 5.0 – 16.0 | | 5.0 – 11.0 | | F= 0.366 | 0.694 |
| Mean ± SD. | 6.61 ± 3.14 | | 7.16± 7.16 | | 6.75± 2.71 | | | |

$\chi^2$, p: $\chi^2$ and p values for **Chi square test**
F,p: F and p values for **ANOVA test**
*: Statistically significant at $p \leq 0.05$

**Table (3):Distributions of the studied sample according to obesity (BMI) and Framingham cardiac Risk Score.**

| Variables | No. | % |
|---|---|---|
| **Body Mass Index For Obesity diagnosis** | | |
| Normal | 9 | 8.7 |
| Overweight | 26 | 25.2 |
| Obese | 68 | 66.0 |

| | | |
|---|---|---|
| Mean ± SD | | 32.95 ± 5.89 |
| **Framingham Risk Score** | | |
| <1 – 8.6 mild risk | 70 | 68.0 |
| >8.6 - < 18.52 moderate risk | 25 | 24.3 |
| ≥ 18.52 high risk | 8 | 7.8 |
| **Mean ± SD** | | 8.0 ± 11.74 |

**Table (4): Means and standard deviations of the Rapid Eating Assessment of participants(REAP) and Eating Behavior Inventory (EBI) and their Relation withFramingham Cardiac RiskScore(n = 103).**

| Variables | Framingham risk score | | | | | | r | P |
|---|---|---|---|---|---|---|---|---|
| | <1 – 8.6 mild risk (n = 70) | | >8.6 - < 18.52 moderate risk (n = 25) | | ≥ 18.52 high risk (n = 8) | | | |
| | No. | % | No. | % | No. | % | | |
| **REAP( TS=39)** | | | | | | | | |
| Min. – Max. | 16.0 – 33.0 | | 16.0 – 31.0 | | 17.0 – 31.0 | | -0.186 | 0.049* |
| Mean ± SD. | 25.14±3.57 | | 24.88±3.33 | | 23.13±4.55 | | | |
| **EBI (TS=140)** | | | | | | | | |
| 28 - <75 poor | 18 | 25.7 | 7 | 28.0 | 1 | 12.5 | 0.090 | 0.363 |
| 75 - <121 fair | 52 | 74.3 | 18 | 72.0 | 7 | 87.5 | | |
| Mean ± SD ( **EBI** ) | 83.58 ± 10.38 | | | | | | | |

$\chi^2$, p: $\chi^2$ and p values for **Chi square testTS= Total Score**
F,p: F and p values for **ANOVA test**
*: Statistically significant at $p \leq 0.05$

**Table (5):Relation between Framingham risk score withREAP (n = 103)**

| REAP | Framingham risk score | | | | | | $\chi^2$ | $^{MC}p$ |
|---|---|---|---|---|---|---|---|---|
| | <1 – 8.6 Mild risk (n = 70) | | >8.6 - <18.52 Moderate risk (n = 25) | | ≥18.52 High risk (n = 8) | | | |
| | No. | % | No. | % | No. | % | | |
| **1- Don't take breakfast before go to work** | | | | | | | | |
| Usually 3 – 4 weekly | 50 | 71.4 | 19 | 76.0 | 6 | 75.0 | | |
| Sometimes 1 – 2 weekly | 9 | 12.9 | 4 | 16.0 | 1 | 12.5 | 1.174 | 0.961 |
| Rarely 1 – 2 monthly | 11 | 15.7 | 2 | 8.0 | 1 | 12.5 | | |
| **2-Eat 4or more meals from sit-down or take out restaurants?** | | | | | | | | |
| Usually 3 – 4 weekly | 5 | 7.1 | 2 | 8.0 | 0 | 0.0 | | |
| Sometimes 1 – 2 weekly | 9 | 12.9 | 6 | 24.0 | 6 | 75.0 | 13.543* | 0.004* |
| Rarely 1 – 2 monthly | 56 | 80.0 | 17 | 68.0 | 2 | 25.0 | | |
| **3-Eat less than 2 servings of whole grain products or Lower fiber starches a day?** | | | | | | | | |
| Usually 3 – 4 weekly | 17 | 24.3 | 9 | 36.0 | 3 | 37.5 | | |
| Sometimes 1 – 2 weekly | 30 | 42.9 | 6 | 24.0 | 1 | 12.5 | 5.202 | 0.261 |
| Rarely 1 – 2 monthly | 23 | 32.9 | 10 | 40.0 | 4 | 50.0 | | |
| **4-Eat less than 2 servings of fruit a day? Serving = ½ cup or 1 med. fruit or ¾ cup 100% fruit juice.** | | | | | | | | |
| Usually 3 – 4 weekly | 30 | 42.9 | 11 | 44.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 30 | 42.9 | 11 | 44.0 | 4 | 50.0 | 0.957 | 0.957 |
| Rarely 1 – 2 monthly | 10 | 14.3 | 3 | 12.0 | 0 | 0.0 | | |
| **5. Eat less than 2 servings of vegetables a day? serving=½ cup vegetables, or 1cup leafy raw vegetables** | | | | | | | | |
| Usually 3 – 4 weekly | 33 | 47.1 | 16 | 64.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 29 | 41.4 | 8 | 32.0 | 3 | 37.5 | 2.655 | 0.612 |
| Rarely 1 – 2 monthly | 8 | 11.4 | 1 | 4.0 | 1 | 12.5 | | |
| **6-Eat or drink less than 2 servings of milk, yogurt, or cheese a day? Serving = 1 cup milk or yogurt; 1½ -2 ounces cheese** | | | | | | | | |
| Usually 3 – 4 weekly | 35 | 50.0 | 11 | 44.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 24 | 34.3 | 7 | 28.0 | 2 | 25.0 | 2.303 | 0.711 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rarely 1 – 2 monthly | 11 | 15.7 | 7 | 28.0 | 2 | 25.0 | | |
| **7-Eat more than 8 ounces (see sizes below) of meat, Chicken, turkey or fish per day?** | | | | | | | | |
| Usually 3 – 4 weekly | 22 | 31.4 | 8 | 32.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 41 | 58.6 | 12 | 48.0 | 3 | 37.5 | 3.321 | 0.506 |
| Rarely 1 – 2 monthly | 7 | 10.0 | 5 | 20.0 | 1 | 12.5 | | |
| **8-Use regular processed meats (like bologna, salami, corned beef, hotdogs, sausage or bacon) instead of low fat processed meats (like roast beef, turkey, lean ham; low-fat cold cuts/hotdogs)** | | | | | | | | |
| Usually 3 – 4 weekly | 7 | 10.0 | 2 | 8.0 | 3 | 37.5 | | |
| Sometimes 1 – 2 weekly | 15 | 21.4 | 5 | 20.0 | 2 | 25.0 | 5.351 | 0.217 |
| Rarely 1 – 2 monthly | 48 | 68.6 | 18 | 72.0 | 3 | 37.5 | | |

$\chi^2$, p: $\chi^2$ and p values for **Chi square test**
$^{MC}$p: p value for **Monte Carlo** for Chi square test
*: Statistically significant at $p \leq 0.05$

**ntinue**

**'Table(5):Relation between Framingham risk score withREAP (n = 103)**

| REAP | Framingham risk score: <1 – 8.6 Mild risk (n = 70) | | >8.6 - <18.52 Moderate risk (n = 25) | | ≥18.52 High risk (n = 8) | | $\chi^2$ | $^{MC}$p |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| **9-Eat fried foods such as fried chicken, fried fish, French fries, fried plantains, to stones or fried yuca?** | | | | | | | | |
| Usually 3 – 4 weekly | 36 | 51.4 | 15 | 60.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 31 | 44.3 | 9 | 36.0 | 3 | 37.5 | 2.264 | 0.684 |
| Rarely 1 – 2 monthly | 3 | 4.3 | 1 | 4.0 | 1 | 12.5 | | |
| **10. Eat regular potato chips, nacho chips, corn chips, crackers, regular popcorn, nuts instead of pretzels, low-fat chips or low-fat crackers, air-popped popcorn?** | | | | | | | | |
| Usually 3 – 4 weekly | 20 | 28.6 | 6 | 24.0 | 3 | 37.5 | | |
| Sometimes 1 – 2 weekly | 26 | 37.1 | 9 | 36.0 | 1 | 12.5 | 2.375 | 0.692 |
| Rarely 1 – 2 monthly | 24 | 34.3 | 10 | 40.0 | 4 | 50.0 | | |
| **11. Add butter, margarine or oil to bread, potatoes, rice or vegetables at the table?** | | | | | | | | |
| Usually 3 – 4 weekly | 31 | 44.3 | 8 | 32.0 | 5 | 62.5 | | |
| Sometimes 1 – 2 weekly | 20 | 28.6 | 11 | 44.0 | 2 | 25.0 | 3.291 | 0.525 |
| Rarely 1 – 2 monthly | 19 | 27.1 | 6 | 24.0 | 1 | 12.5 | | |
| **12. Eat sweets like cake, cookies, pastries, donuts, muffins, chocolate and candies more than 2 times per day.** | | | | | | | | |
| Usually 3 – 4 weekly | 17 | 24.3 | 7 | 28.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 26 | 37.1 | 11 | 44.0 | 2 | 25.0 | 3.008 | 0.569 |
| Rarely 1 – 2 monthly | 27 | 38.6 | 7 | 28.0 | 2 | 25.0 | | |
| **13. Drink 16 ounces or more of non-diet soda, fruit drink/punch or Kool-Aid a day? Note: 1 can of soda = 12 ounces** | | | | | | | | |
| Usually 3 – 4 weekly | 24 | 34.3 | 8 | 32.0 | 4 | 50.0 | | |
| Sometimes 1 – 2 weekly | 26 | 37.1 | 10 | 40.0 | 1 | 12.5 | 2.330 | 0.703 |
| Rarely 1 – 2 monthly | 20 | 28.6 | 7 | 28.0 | 3 | 37.5 | | |

$\chi^2$, p: $\chi^2$ and p values for **Chi square test**
$^{MC}$p: p value for **Monte Carlo** for Chi square test

**Table (6):Relationbetween Framingham Cardiac risk score withmetabolic syndrome diagnosis and body mass index (n = 103)**

| Variables | Framingham risk score: <1 – 8.6 mild risk (n = 70) | | >8.6 - < 18.52 moderate risk (n = 25) | | ≥ 18.52 high risk (n = 8) | | $\chi^2$ | P |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| **Waist circumference** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ≤88 normal | 15 | 21.4 | 4 | 16.0 | 1 | 12.5 | 0.418 | $^{MC}$p= 0.921 |
| >88 abnormal | 55 | 78.6 | 21 | 84.0 | 7 | 87.5 | | |
| **Fasting blood sugar** | | | | | | | | |
| <100 | 60 | 85.7 | 16 | 64.0 | 2 | 25.0 | | |
| 100 – 126 | 7 | 10.0 | 5 | 20.0 | 2 | 25.0 | 18.043* | <0.001* |
| ≥126 | 3 | 4.3 | 4 | 16.0 | 4 | 50.0 | | |
| **BP** | | | | | | | | |
| ≤ 130/85 normal | 52 | 74.3 | 8 | 32.0 | 1 | 12.5 | 21.148* | $^{MC}$p <0.001* |
| >130/85 abnormal | 18 | 25.7 | 17 | 68.0 | 7 | 87.5 | | |
| **HDL** | | | | | | | | |
| ≥50 normal | 6 | 8.6 | 1 | 4.0 | 1 | 12.5 | 1.094 | $^{MC}$p= 0 .469 |
| <50 abnormal | 64 | 91.4 | 24 | 96.0 | 7 | 87.5 | | |
| **Triglyceride** | | | | | | | | |
| ≤ 150 normal | 59 | 84.3 | 15 | 60.0 | 3 | 37.5 | 12.138* | 0.002* |
| >150 abnormal | 11 | 15.7 | 10 | 40.0 | 5 | 62.5 | | |
| **Metabolic syndrome** | | | | | | | | |
| Non metabolic S. | 43 | 61.4 | 5 | 20.0 | 2 | 25.0 | 14.675* | $^{MC}$p <0.001* |
| Metabolic S. | 27 | 38.6 | 20 | 80.0 | 6 | 75.0 | | |
| **Body Mass Index** | | | | | | | | |
| Normal | 8 | 11.4 | 1 | 4.0 | 0 | 0.0 | | |
| Overweight | 18 | 25.7 | 6 | 24.0 | 2 | 25.0 | 1.506 | $^{MC}$p= 0.838 |
| Obese | 44 | 62.9 | 18 | 72.0 | 6 | 75.0 | | |

$\chi^2$, p: $\chi^2$ and p values for **Chi square test**
$^{MC}$p: p value for **Monte Carlo** for Chi square test
*: Statistically significant at $p \leq 0.05$

**Table (7):Correlation between Mets, BMI, EBI and REAP with age and menstrual status. (n = 103)**

| Variables | | metabolic syndrome Mets | Body Mass Index | Eating behavior inventory | REAP |
|---|---|---|---|---|---|
| **Body Mass Index BMI** | $r_s$ | 0.436* | | | |
| | p | <0.001** | | | |
| **Eating behavior inventory EBI** | $r_s$ | -0.125 | -0.357 | | |
| | p | 0.208 | <0.001** | | |
| **REAP** | $r_s$ | 0.060 | -0.026 | 0.288 | |
| | p | 0.545 | 0.793 | 0.003* | |
| **Age (years)** | $r_s$ | 0.381* | 0.357 | -0.014 | 0.058 |
| | p | <0.001* | <0.001** | 0.891 | 0.561 |
| **Menstrual status** | $r_s$ | 0.370* | 0.115 | 0.122 | 0.032 |
| | p | <0.001* | 0.247 | 0.221 | 0.747 |

$r_s$: Spearman coefficient
*: Statistically significant at $p \leq 0.05$

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