

A Comparative Studies of Nutritional Status, Physical Activity and Life Style between Male and Female Patients of Coronary Heart Disease in Khulna City, Bangladesh

Kaisun Nesa Lesa¹, Md. Reyad-ul-Ferdous^{2,3,*}, Farzana Alam⁴

¹Food and Nutrition Department, Khulna City Corporation Women's College, Affiliated by Khulna University, Khulna, Bangladesh

²Department of Pharmaceutical Sciences, North South University, Dhaka, Bangladesh

³Department of Pharmacy, Progati Medical Institute, Dhaka, Bangladesh

⁴Biotechnology and Genetic Engineering Discipline, Khulna University, Khulna, Bangladesh

Email address:

Kaisun_nesa@yahoo.com (K. N. Lisa), rockyreyad@yahoo.com (M. R. Ferdous), faprova@yahoo.com (F. Alam)

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Abstract: Aim: The main purpose of this study was to compare the coronary heart disease between male and female, aged 30 to upto 60 years hailing at Khulna city in Bangladesh, during may, 2014 to November, 2014. Methods and Results: Data were collected by questionnaires on the basis of sex, age, smoking, body mass index and presence or absence of other diseases like kidney and diabetes and then compared between them. 69.1 % Males were found more vulnerable to coronary heart disease than 30.9 % females because their food intake pattern, nutritional status, physical activity and life style. Between 69.1 % male and 30.9 % female; 15.8% male and 1.7% female are in obese, 40.8% male and 13.3% female are overweight, 12.5% male and 9.2 % female are normal where 6.7% female are malnourished and 55.8% male and 24.2% female have hypertension and 60.8% male and 22.5% female are suffer from diabetics and 35.8% male and 22.5% female respondents gain heart disease from family and 54.1% male do smoke all time and 10.0% male respondents intake excess cholesterol and 24.1% male and 19.1% female intake excess cholesterol in sometimes and 30.3% male and 3.3% female have tend on uncooked salt where 27.1% male and 18.4% female have no tend on uncooked salt and 11.7% male and 9.2 % female have tend on uncooked salt for sometimes and 6.7% male are usually drink alcohol and 19.1% male and 9.2% female patients gain LDL cholesterol level above 100 mg/dl and finally 42.5% male and 13.3% female patients gain LDL cholesterol level below 100 mg/dl. Conclusion: This study demonstrates that males are more vulnerable to coronary heart disease than females.

Keywords: Nutritional Status, Physical Activities, Nutritional Status, Life Style, Coronary Heart Disease in Khulna City, Bangladesh

1. Background

Bangladesh is a developing country and Khulna is in the south-west of the country and one of the seven divisions of Bangladesh and is in the south-west of the country. It had an area of 22,285 and population approaching 163,654,860 (July 2013). Bangladesh develops tremendously as a result the life-style and food habits of the people has been changed. Lifestyle modification and health awareness are known to reduce long term morbidity and mortality in patients with coronary heart disease. Previously some communicable diseases were the principal causes of death in the poor countries like ours (MA Hussain *et al.*, 2008).

Coronary vascular disease is a general category of diseases that affects the heart and the circulatory system. CVD is caused by disorders of the heart and blood vessels and includes congestive heart failure (CHF), coronary heart disease (CHD), hypertension, stroke, rheumatic heart disease and peripheral artery disease (Badiuzzaman *et al.*, 2009). Coronary heart disease is generally assumed that various sorts of problems are growing day by day which are increasing the anxiety and tension of the mankind. The incidence of coronary heart disease is increasing in the developing countries of South Asia and in Bangladesh (MA

Hussain *et al.*, 2008).

Coronary heart disease (CHD) is the leading cause of death globally, get across 21.9 per cent of total deaths and are forecast to increase to 26.3 per cent by 2030 (Mohammed K. Ali *et al.*, 2010). Despite the significant decline in cardiovascular mortality in Europe by nearly 50% over the last three decades cardiovascular diseases remain the primary cause of death accounting for 42% of fatalities in men and 52% of deaths in women. They cause over 4 million deaths in Europe annually (17.3 million worldwide) among them 1.5 million are premature below the age of 75 (Nexhbedin Beadini *et al.*, 2013). CHD is the leading cause of death in the United States. Approximately 600,000 people in America die of heart disease each year. In the past three decades, Morbidity and mortality rate from coronary heart disease (CHD) have increased to an epidemic form in the past several decades. CHD is related to social deprivation and low socio-occupational classes. CHD is the leading cause of death among individuals with diabetes. As regards diabetes, Bangladeshis were found to have a high prevalence of impaired fasting glucose (IFG: 4 – 12%) and type-2 diabetes (T2DM: 4-11%) in the age group equal to or greater than 20 years. Thus, it appears that the people of Bangladesh are likely to develop CHD for the two obvious reasons – first, due to the exposure of social deprivation; and second, there being a high prevalence of diabetes (M Abu Sayeed *et al.*, 2010).

The CHD death rate however varies dramatically across the developing countries both as a proportion of cardiovascular disease (CVD) deaths and as a proportion of all deaths. Forty-three percent of all CVD deaths are attributable to CHD according to the global burden of disease estimates from 2001. Worldwide CVD deaths represent about 30% of all deaths. High income countries have CVD deaths rates of approximately 38%. While the overall rate of CVD deaths (28%) in low and middle-income countries collectively is less. Where as a great range from as high as 58% in Eastern Europe to as low as 10% in Sub Saharan Africa (WHO;2011).

The proportion of death due to chronic diseases increased to 41% by 1996 and 68% by 2006 (Nazmus Saquib *et al.*, 2010). Coronary heart disease (CHD) is the single largest cause of death in the developed countries and is one of the leading causes of disease burden in developing countries. In 2001, worldwide almost 7.3 million deaths occurred due to CHD. Three-fourths of global deaths due to CHD occurred in the low and middle-income countries. The rapid rise in CHD burden in most of the under developing countries is due to increase in life span and acquisition of lifestyle related risk factors and socio-economic changes. The economic burden of CHD is equally large but solutions exist to manage this growing burden (Thomas *et al.*, 2010).

In recent years, there has been an increase in interest to evaluate other potential functions of vitamin D and particularly with its relation to CHDs. Few studies have demonstrated an increased risk for CHD death in individuals with vitamin D deficiency (Virtanen *et al.*, 2011). Males were found more vulnerable to ischemic heart disorder than

females. This study also indicates that increased body weight, higher body mass index, hypertension, smoking, sedentary life style and family history of cardiac diseases are influential risk factors for ischemic heart disorder (Sultana *et al.*, 2012).

CHD's impact on women traditionally has been underappreciated due to higher rates at younger ages in men. Microvascular coronary disease disproportionately affects women. Women have unique risk factors for CHD, including those related to pregnancy and autoimmune disease. Trial data indicate that CHD should be managed differently in women (Kavita and Martha; 2013).

CAD is an increasingly important medical and public health problem, and is the leading cause of mortality in Bangladesh. Like other South Asians, Bangladeshis are unduly prone to develop CAD, which is often premature in onset, follows a rapidly progressive course and angiographically more severe. The underlying pathophysiology is poorly understood. Genetic predisposition, high prevalence of metabolic syndrome and conventional risk factors play important role in CHD. Lifestyle related factors, including poor dietary habits, excess saturated and trans fat, high salt intake, and low-level physical activity may be important as well. Some novel risk factors, including hypovitaminosis D, arsenic contamination in water and food-stuff, particulate matter air pollution may play unique role. At the advent of the new millennium, we know little about our real situation. Large scale epidemiological, genetic and clinical researches are needed to explore the different aspects of CAD in Bangladesh.

2. Materials and Methods

Methodology means the mode of action which helps to perfect in graceful acquirements of a study. For completing a successful study according to the order of time it is very necessary that methodology remain and methodology postulates how the research problem is defined, what type of data will be collected and what type of method will be adopted, why particular technique of analyzing data will be used, what type of software will be used and finally how the paper will be presented. To prepare this research paper, here we have followed a proper and rational methodology. However, the several steps of the methodology of this study that have been followed are being illustrated below:

Present study has been identified through on brain storming on various issues, aspects and problems of both present and past time. Title of the study has been finalized after the identification and realization of the problems coronary heart disease of man and women in Khulna city. After the statement of problem some objectives have been set up and defined precisely in compatible with the goal of the study. This study, concepts, perception have been found in various books, progress reports, newspaper and in many other journals and publications.

2.1. Nature of the Study

In this investigation, we were carried out a descriptive

cross sectional study among male and female patients in the selected area.

2.2. Selection of the Area

Selection of the study area is as important as difficult in all kinds of study. The success of the study depends upon the selection of a good and relevant study area. For selecting the study area a number of criteria have been chosen which are as follows-

- The study area needs to be located within minimum distance from the researcher's residence so that visits can be frequent and easy.
- The study area should be fulfilling the recommendation which is needed to conduct the study.

So, after considering above mentioned points, I choose the Khulna Diabetic Association and Sheikh Abu Naser Specialised Hospital for the study.

2.3. Reconnaissance Survey

After selecting the study area, sample units, working schedule and enlisting data sources a reconnaissance visit was conducted in the study area. It helped in gaining a clear idea of the study area and preparing an effecting questionnaire for the study. In reconnaissance survey attention was given on the pattern of different types and ages of coronary heart disease patients.

2.4. Study Population

The adult male and female coronary heart disease patients who live in different areas of Khulna city of Bangladesh selected for the study population.

2.5. Sample Size Determination

Purposive sampling method was used to conduct this study. Total number of sample or sample size was (120) and these were selected purposively and principle of proportionality was need.

2.6. Sources of Data

There are two sources of data collection.

- a) Primary source: Primary source includes the field where the incidence occurs. Through face-to-face interaction, data were collected. Here primary sources are respondents.
- b) Secondary source: Secondary source is such a data, which is supplied by some institution. For conducting the study, secondary data were collected from different sources, which are as following-
 - Relevant books and journal.
 - Relevant thesis.
 - Relevant articles from website.

2.7. Data Collection Methods

The study is mainly based on primary data. Secondary data is also collected to supplement primary data. To fulfill the

objective some data is collected from reference materials, official records and other secondary sources.

2.7.1. Interview and Examination

Structured questionnaires were used to conduct patient interviews with information on demographics, including food intake pattern, nutritional status, physical activity and life style (smoking habits; and use of drugs etc).

Measurements taken include height, weight and blood pressure (BP). Weight was measured while the subjects were light clothing with no shoes. Body mass index (BMI) was calculated as weight (kg)/height (m²). A sphygmomanometer was used to measure BP while the subjects were in a sitting position and after they had rested for 5 min. The diagnosis of diabetes was based on previous diagnosis by a physician or if their fasting plasma glucose concentration was ≥ 7 mmol/l.

2.7.2. Food Records

A 1-day food record (24 hours) was completed at hospital and clinical by the patients and they estimated the amounts of foods consumed using portion sizes listed in a booklet. The food records were returned during the interview and all records were checked by a clinical or hospital nutritionist and missing information was completed if necessary.

2.7.3. Laboratory Measurements

Collection of low density lipoprotein (LDL) and high density lipoprotein (HDL) and triglyceride were then analyzed.

2.8. Data Processing, Analysis and Presentation

After collecting of all required data, it have been processed and analyzed to extract the findings of the study. Collected data were complied, code, tabulated for processing and analysis in accordance with the objectives of the study for arriving at a meaningful conclusion. For processing and analysis purpose, computer software – Statistical Package for Social Scientist (SPSS), MS word and MS Excel are used. MS power point is used for presentation.

3. Results and Discussion

This chapter represents data analysis and discussion of nutritional status, physical activity and life style (patient's occupation, their Neat and cleanness, Patient's hypertension probability, diabetics, their family history of CHD, high blood pressure, excess cholesterol intake of different types of oil, Different types of meat taken by patient ,Patients tend on coconut, uncooked salt, Legume intake in a week of Patient, Acceptance of densed legume, Taking egg in a week of Patient, Milk intake in a week of Patient, Quantity of taking alcohol of patient's, patient's Different foods taking and so on) between male and female coronary heart disease in Khulna city based on CHD.

3.1. Neat and Cleanness of Patient According to Gender

Below this table 1 shows that, most of the people are aware of themselves about keeping neat and clean.

Table No.1. Neat and cleanness of patient according to gender.

Answer	Frequency	Percent
Yes	95	79.3
No	2	1.7
Sometimes	23	19.0
Total	120	100.0

3.2. Patient's Occupation Based on Gender

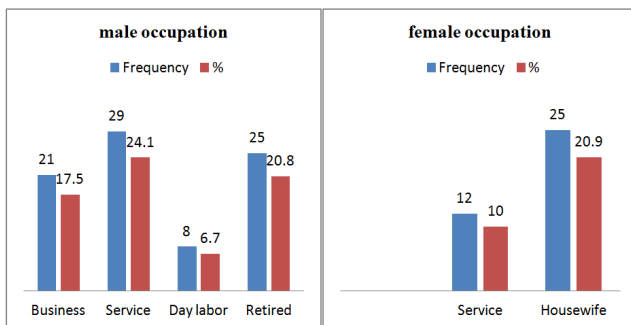


Figure No. 1. Patient's occupation Based on gender.

Figure 1 illustrates Patient's occupation based on gender. 17.5% male are business man, 24.2% service person, 6.7% day labor and 20.8% retired person where 10% female are service person and 20.8% housewife.

3.3. Patient's Working Hour per Day Based on Gender

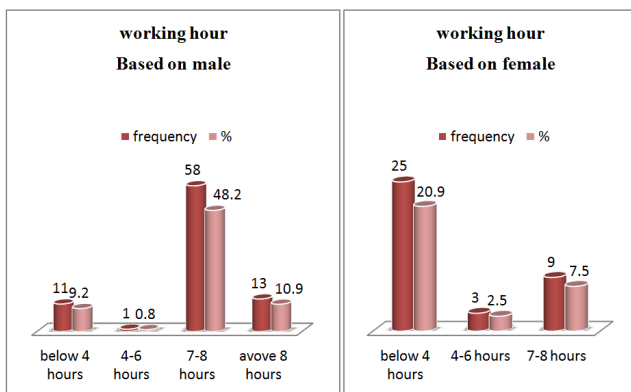


Figure No. 2. Patient's working hour per day Based on gender.

Figure 2 shows that Patient's working hour based on gender. .8% male work per day 4-6 hours, 48.2% male work 7-8 hours, 10.9% male work above 8 hours and 9.2% male work below 4 hours where 2.5% female work per day 4-6 hours, 7.5% female work 7-8 hours and finally 20.9% female's working period is below 4 hours.

3.4. Regularity Maintain on Walk Based on Gender

Figure 3 indicates that Regularity maintain on walk based on gender. 10% male maintain regularity for their walk, 35% do not maintain regularity and 24.1% male sometimes

maintain their walk regularly where 6.7% female maintain regularity for their walk, 11.7% do not maintain regularity and 12.5% sometimes maintain regularity for their walk.

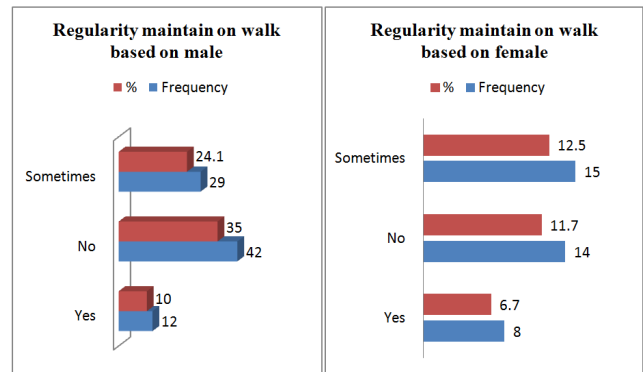


Figure No. 3. Walking regularly based on gender.

3.5. Patient's Nutritional Status Based on Gender

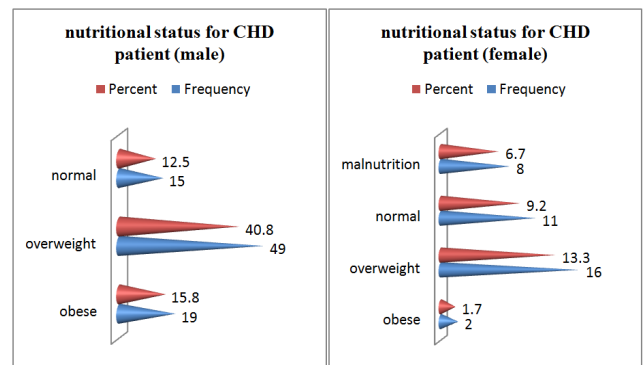


Figure No. 4. Patient's nutritional status based on gender.

Figure 4 shows that Patient's nutritional status based on gender. 15.8% male are in obese, 40.8% overweight, 12.5% normal where 1.7% female are obese, 13.3% overweight, 9.2% normal and 6.7% malnourished.

3.6. Patient's Hypertension Based on Gender

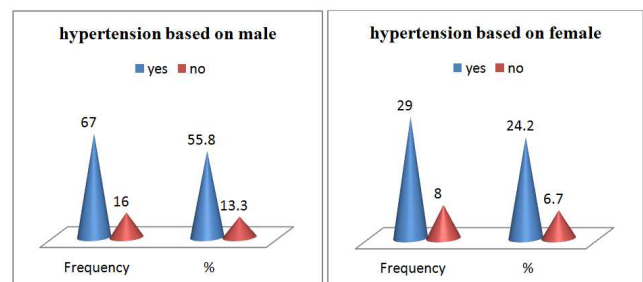


Figure No. 5. Hypertension based on gender.

Figure 5 provides that 55.8% male have hypertension and 13.3% male have not where 24.2% female have hypertension and 6.7% have not.

3.7. Patient's Diabetics Based on Gender

Figure 6 represents that 60.8% male suffer from diabetics

and 8.3% male do not where 22.5% female suffer from diabetics and 8.4% do not. So diabetics are very common in coronary heart disease patient for both male and female.

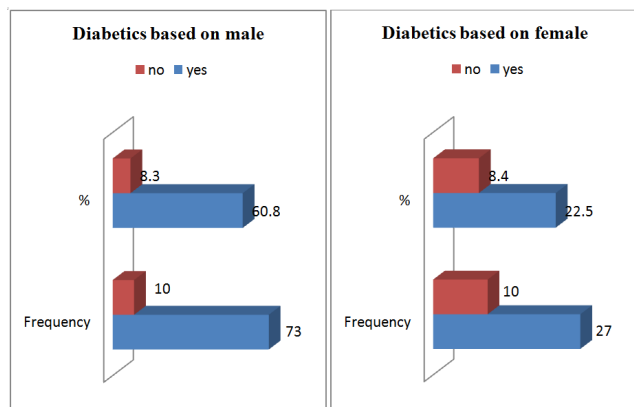


Figure No. 6. Diabetics based on gender.

3.8. Patient's Family History of CHD Based on Gender

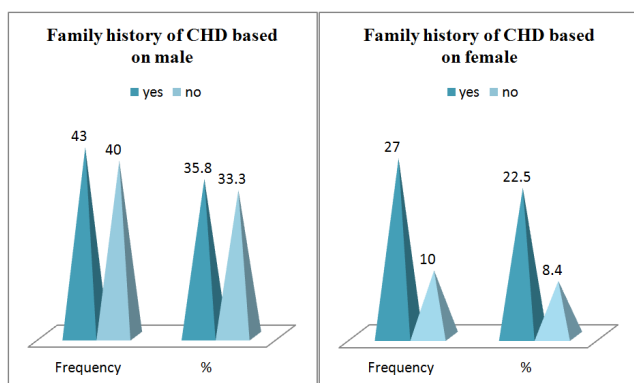


Figure No. 7. Family history of CHD based on gender.

In this table and figure, among 120 respondents, 35.8% male and 22.5% female respondents gain heart disease from family where 33.3% male and 8.4% female respondents did not gain this disease from family (Figure No. 7).

3.9. Patient's High Blood Pressure Based on Gender

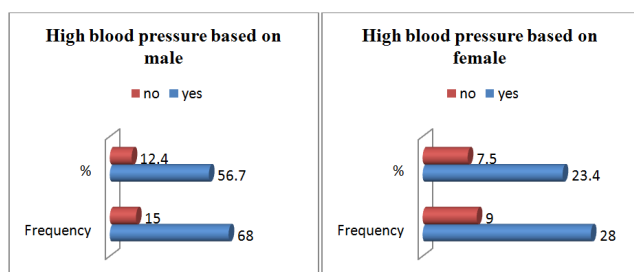


Figure No. 8. High blood pressure based on gender.

Figure 3.9 shows that 56.7% male and 23.4% female respondents have high blood pressure where 12.4% male and 7.5% female respondents have no high blood pressure. So high blood pressure is strongly related to coronary heart disease.

3.10. Smoker Based on Gender

Figure 9 represents that Smoker based on gender. 54.1% male do smoke all time, 9.2% male do not smoke and 5.8% male smoke sometimes where female do not smoke any time.

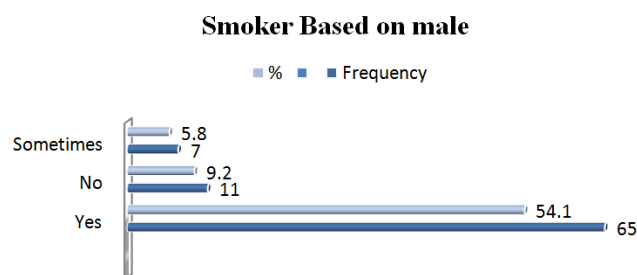


Figure No. 9. Smoker Based on male.

3.11. Intake Excess Cholesterol Based on Gender

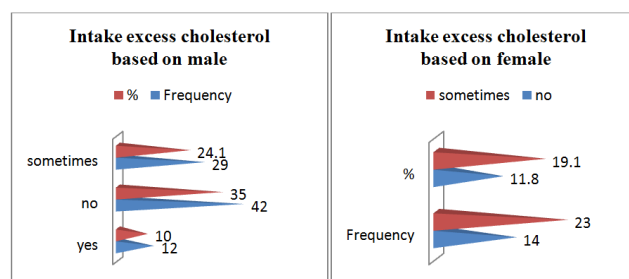


Figure No. 10. Intake excess cholesterol based on gender.

Figure 10 analysis that 10.0% male respondents intake excess cholesterol where 35.0% male and 11.8% female respondents do not intake excess cholesterol and 24.1% male and 19.1% female intake excess cholesterol in sometimes.

3.12. Different Types of Oil Used by Patient According to Gender

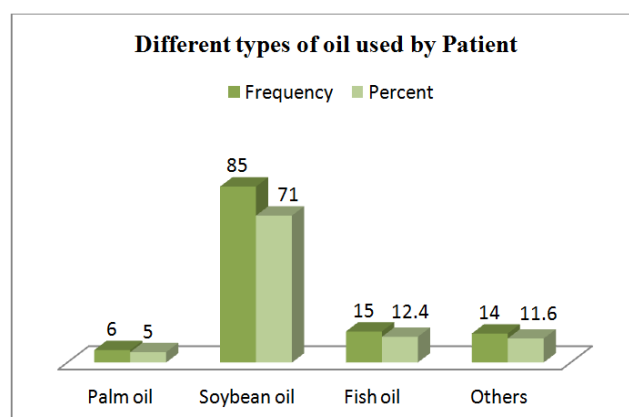


Figure No. 11. Different types of oil used by Patient according to gender.

Figure 11 illustrates that among 120 respondents, 5.0% male and female respondents used palm oil, 71.0% respondents used soybean oil, 12.4 % respondents used fish oil and 11.6% male and female respondents used other type of oil.

3.13. Different Types of Meat Taken by Patient According to Gender

Figure 12 illustrates that among 120 respondents, 36.6% male and 10.8% female respondents are used to intaking beef, 10.0% male and 18.4 % female are used to intaking chicken and 9.2% male and 1.75 female are used to intaking mutton where 13.3 % male are used to intaking others type of meat.

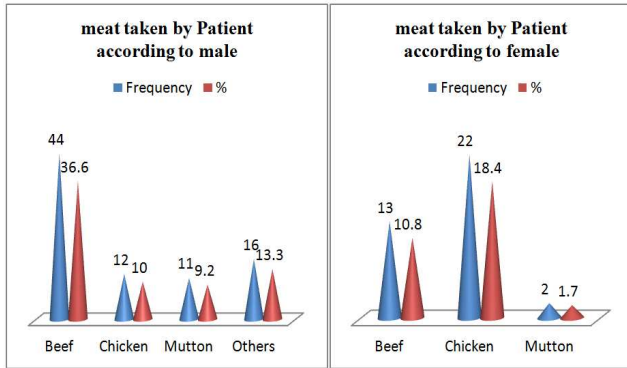


Figure No. 12. Different types of meat taken by Patient according to gender.

3.14. Patients Tend on Coconut Based on Gender

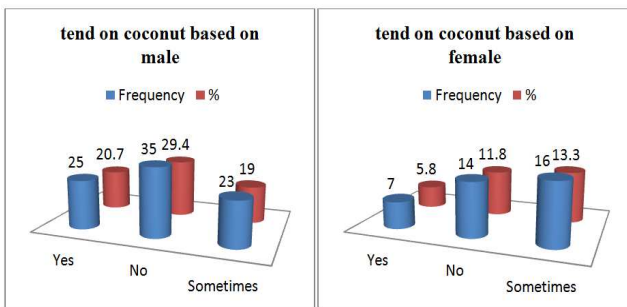


Figure No. 13. Patient's tend on coconut based on gender.

The below data reveals that, 20.7% male and 5.8% female have to tend on coconut where 29.4% male and 11.8% female have no tend on coconut and 19.0% male and 13.3 % female have tend on coconut for sometimes (Figure No. 13).

3.15. Patients Tend on Uncooked Salt Based on Gender

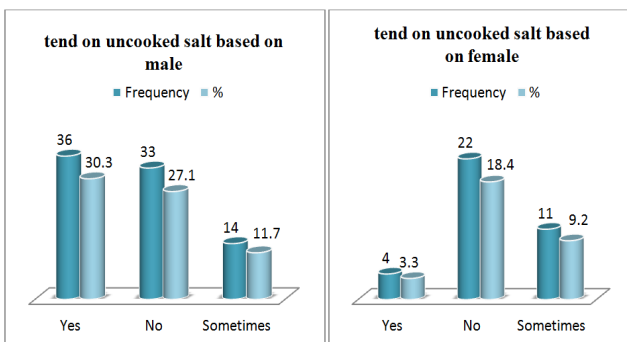


Figure No. 14. Patient's tend on uncooked salt based on gender.

The above data reveals that, 30.3% male and 3.3% female have tend on uncooked salt where 27.1% male and 18.4%

female have no tend on uncooked salt and 11.7% male and 9.2 % female have tend on uncooked salt for sometimes (Figure No. 14).

3.16. Legume Intake in a Week of Patient Based on Gender

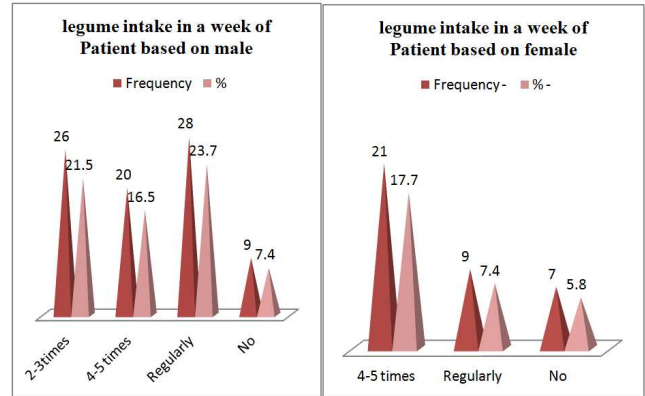


Figure No. 15. Legume intake in a week of Patient based on gender.

The above data shows that, in a week 21.5% male intake legume for 2-3 times basis, 16.5% male and 17.7% female intake legume for 4-5 times basis and 23.7% male and 7.4 % female intake legume regularly where 7.4% male and 5.8 % female do not intake legume(Figure No. 15).

3.17. Acceptance of Dense Legume Based on Gender

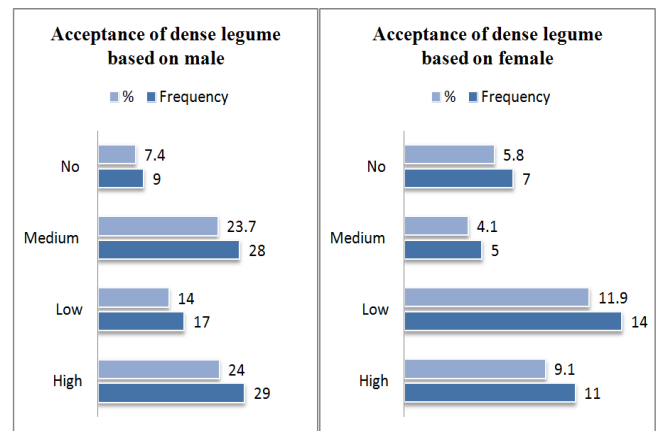


Figure No. 16. Acceptance of dense legume based on gender.

The above data reveal that, Acceptance of dense legume based on gender. 24.0% male and 9.1% female intake high dense legume, 14.0% male and 11.9% female intake low dense legume and 23.7% male and 4.1 % female intake medium dense legume where 7.4% male and 5.8 % female do not intake legume (Figure No. 16).

3.18. Taking Egg in a Week of Patient Based on Gender

The above data reveals that, in a week 20.9% male and 10.9% female intake egg for 2-3 times basis, 21.5% male and 7.5% female intake egg for 4-5 times basis and 19.2% male intake egg regularly where 7.5% male and 12.5 % female do not intake egg(Table No.2.).

Table No. 2. Taking egg in a week of Patient based on gender.

		Gender				Total (%)
		Male		Female		
Egg intake In a week		Frequency	%	Frequency	%	
	2-3times	25	20.9	13	10.9	31.8
	4-5 times	26	21.5	9	7.5	29
	Regularly	23	19.2	-	-	19.2
	No	9	7.5	15	12.5	20
Total		83	69.1	37	30.9	100

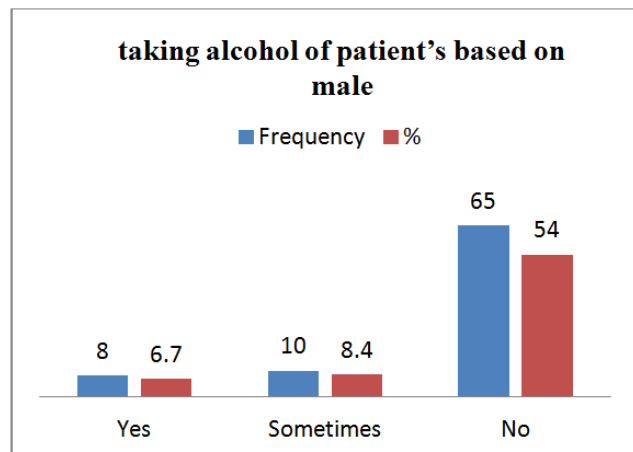
3.19. Kind of Milk Intake Based on Gender

Table No. 3. Kind of milk intake based on gender.

		Gender				Total (%)
		Male		Female		
kind of milk		Frequency	%	Frequency	%	
	Skimmed Milk	12	10.0	1	.8	10.8
	Whole Milk	27	22.5	29	24.3	46.8
	No	44	36.6	7	5.8	42.4
Total		83	69.1	37	30.9	100

Table No. 3 shows different kinds of milk intake based on gender. 10.0% male and .8% female intake skimmed milk, 22.5% male and 24.3% female intake whole milk and 36.6% male and 5.8% female do not intake milk (Table No. 3).

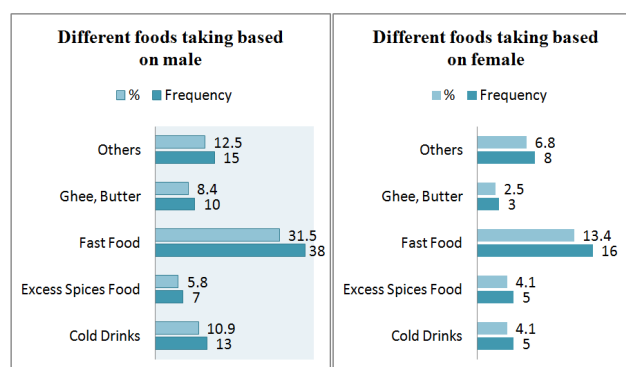
3.20. Quantity of Taking Alcohol of Patient'S Based on Gender

**Figure No. 17.** Quantity of taking alcohol of patient's based on gender.

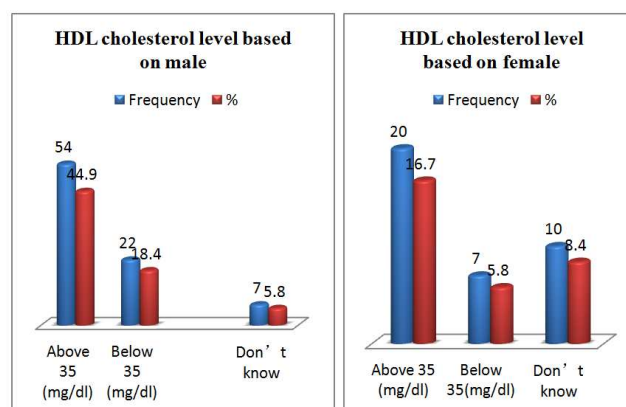
Above data indicates that 6.7% male are usually drink alcohol, 8.4% male are sometimes and 54% male and 30.9% female do not drink alcohol (Figure No. 17).

3.21. Different Foods Taking Based on Gender

Figure 18 illustrates Different foods taking based on gender. 10.9% male and 4.1% female are taking cold drinks, 5.8% male and 4.1% female are taking excess spices food item, 31.5% male and 13.4% female are taking fast food, 8.4% male and 2.5% female are taking ghee, butter and 12.5% male and 6.8% female are taking others foods.

**Figure No. 18.** Different foods taking based on gender.

3.22. HDL Cholesterol Level Based on Gender

**Figure No. 19.** HDL cholesterol level based on gender.

In this table and figure, among 120 respondents, 44.9% male and 16.7% female respondents gain HDL cholesterol level above 35 mg/dl where 18.4% male and 5.8% female respondents gain HDL cholesterol level below 35 mg/dl and

finally 5.8% male and 8.4% female don't know their HDL cholesterol level (Figure No. 19).

3.23. LDL Cholesterol Level Based on Gender

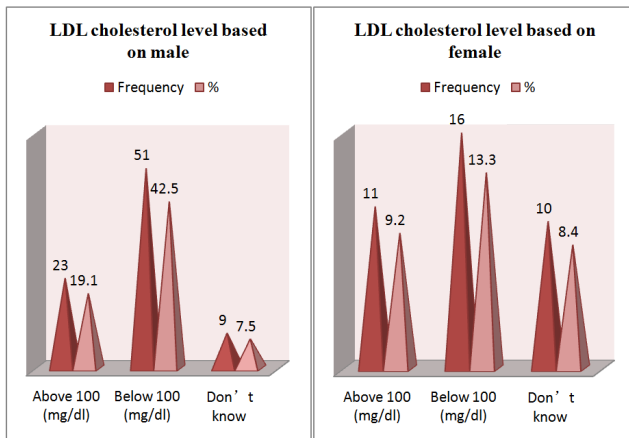


Figure No. 20. LDL cholesterol level based on gender.

Figure 20 illustrates that LDL cholesterol level based on gender. 19.1% male and 9.2% female patients gain LDL cholesterol level above 100 mg/dl where 42.5% male and 13.3% female patients gain LDL cholesterol level below 100 mg/dl and finally 7.5% male and 8.4% female don't know their LDL cholesterol level.

3.24. Triglyceride Cholesterol Level Based on Gender

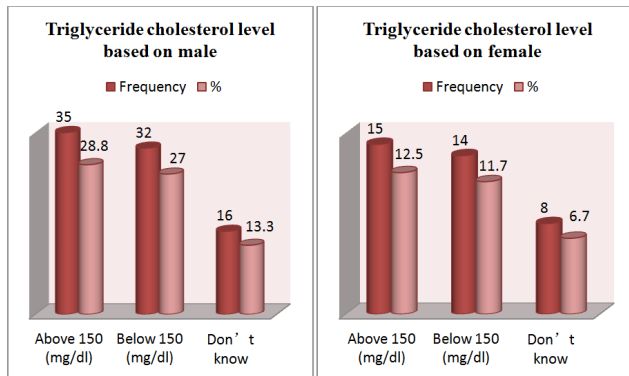


Figure No. 21. Triglyceride cholesterol level based on gender.

In this table and figure, among 120 respondents, 28.2% male and 12.5% female respondents gain Triglyceride cholesterol level above 150 mg/dl where 27.0% male and 11.7% female respondents gain Triglyceride cholesterol level below 150 mg/dl and finally 13.3% male and 6.7% female don't know their Triglyceride cholesterol level (Figure No. 21).

4. Conclusion

For analysis of coronary heart disease I made a questionnaire form and collected information on patient's physical conditions (age, sex, body mass index), socio-economic condition, causes of disease, signs and symptoms, medical history, life style (occupation, smoking, exercise,

mental stress, physical activity), drug administration of the disease, food habit, their knowledge etc through visiting hospitals and clinics. This study demonstrates that increased higher body mass index, previous history of other diseases like diabetes, hypertension, family history of cardiac diseases, smoking habit and sedentary life style are the influential risk factors of coronary heart disease. Generally over weight is risk factor for coronary heart disease but here more patients are of normal weight and suffering from the disease for other factors. Most of the heart patients (59.9% male) are smoker. Between 69.1% male and 30.9% female; 55.8% male and 24.2% female have hypertension and 13.3% male and 6.7% female have not and 60.8% male and 22.5% female are suffer from diabetics and 8.3% male and 8.4% female do not and 6.7% male are usually drink alcohol, 8.4% male are sometimes and 54% male and 30.9% female do not drink alcohol and 19.1% male and 9.2% female patients gain LDL cholesterol level above 100 mg/dl where 42.5% male and 13.3% female patients gain LDL cholesterol level below 100 mg/dl and finally 7.5% male and 8.4% female don't know their LDL cholesterol level. In care of 80.1% patients have excess mental stress and it influencing their heart problem. Major patient do not know about balanced diet for this reason they do not maintained balanced diet. According to compare the coronary heart disease between male and female, aged 30 to upto 60 years, I was find out in my study males are more vulnerable to coronary heart disease than females.

List of Abbreviations

KCC = Khulna City Corporation
 CAD = Coronary Artery Disease
 CVD = Cardiovascular Disease
 CHD = Coronary Heart Disease
 CHF = Congestive Heart Failure
 LDL = Low Density Lipoproteins
 HDL = High Density Lipoproteins
 HBP = High Blood Pressure
 IHD = Ischemic Heart Disease
 IFG = Impaired Fasting Glucose
 T2DM = Type-2 Diabetes Mellitus
 BMI = Body Mass Index
 SFA = Saturated Fatty Acid
 tFA = Trans Fatty Acid
 LDL-C = Low-Density Lipoprotein Cholesterol
 HDL-C = High-Density Lipoprotein Cholesterol
 TG = Triglyceride
 NHDLC = Non-High-Density Lipoprotein Cholesterol
 TIA = Transient Ischemic Attack
 USPSTF = U.S. Preventive Services Task Force
 ECG = Electrocardiography
 ACAD = Asymptomatic Coronary Artery Disease
 ECST = Exercise Cardiac Stress Tests
 MI = Myocardial Infarction
 IBW = Ideal Body Weight
 FFQs = Food-Frequency Questionnaires
 HTN = Hypertension

ICDDR, B = International Center for Diarrheal Diseases in Bangladesh

NICVD = National Institute of Cardiovascular Diseases

SPSS = Statistical Package for Social Scientist

Authors' Contribution

KNL, MRF, FA - participated in experiments, study design, manuscript preparation. KNL, MRF - carried out the study design, participated in experiments, manuscript preparation, and statistical analysis. FA-Supervising and directing the project. MRF, FA -checked the grammatical mistakes and corrected the final manuscript. All authors read and approved the final version of the manuscript.

References

- [1] Badiuzzaman M, Mohammed Fr, Chowdhury Fr, Bari Ms, Alam Mb Ahasan Hamn. Prevalence of Modifiable Risk Factors among Stroke Patients in A Tertiary Care Hospital in Dhaka, *Journal of Medicine*, 2009; 10(1), 18-21.
- [2] Kavita Sharma and Martha Gulati. Coronary Artery Disease in Women: A 2013 Update, *Journal of Global Heart*, 2013; 8(2), 105–112.
- [3] Ma Hussain, A. Nahar. and S Ara. The Dominance Pattern of Coronary Artery of Adult Bangladeshi People- A Postmortem Morphological Study, *Department of Anatomy, Dhaka Medical College, Dhaka* 2008; 1(1), 21-25.
- [4] M Abu Sayeed, Hajera Mahtab, Shurovi Sayeed, Tanjima Begum, Parvin Akter Khanam, Akhter Banu. Prevalence and Risk Factors of Coronary Heart Disease In A Rural Population of Bangladesh, *Ibrahim Med. Coll, Dhaka* 2010; 4(2), 37-43.
- [5] Mohammed K. Ali, K.M. Venkat Narayan & Nikhil Tandon. Diabetes & Coronary Heart Disease: Current Perspectives, *Hubert Department of Global Health, Rollins School of Public Health, Department of Medicine, School of Medicine, Emory University, Atlanta Usa & Department of Endocrinology & Metabolism, All India Institute Of Medical Sciences, New Delhi, India* 2010; 132, 584-597.
- [6] Nazmus Saquib, Juliann Saquib, Tahmeed Ahmed, Masuma Akter Khanam and Mark R Cullen. (2012). Cardiovascular Diseases and Type 2 Diabetes in Bangladesh: A Systematic Review and Meta-Analysis of Studies between 1995 And 2010, *Bmc Public Health*, 12:434.
- [7] Nexhbedin Beadini, Sheqibe Beadini, Albina Ademi, Gazmend Iseni, Hesat Aliu. The Impact of Potential Risk Factors of Cardiovascular Diseases among Patients of Different Age Groups, *Journal of Natural Sciences Research* 2013; 3, 3.
- [8] Rumana Sultana, Sharif Md. Anisuzzaman, Anjuman Ara Begum, Sanchita Sharmin Chowdhury, Taslima Akter, A Y Sk. Feroz Uddin Ahmed Chowdhury. Risk Factors for Ischemic Heart Disorder Patients: Outcome of a Survey Conducted In Dhaka City, Bangladesh, *International Current Pharmaceutical Journal*, 2012; 1(4), 68-70.
- [9] Thomas A. Gaziano, Md, Msc, Asaf Bitton, Md, Shuchi Anand, Md, Shafika Abrahams-Gessel, Ms, and Adrianna Murphy. (2010). Growing Epidemic of Coronary Heart Disease in Low- And Middle- Income Countries, Department of Medicine, Brigham and Women's Hospital, Harvard School of Public Health, Harvard Initiative for Global Health, Harvard University, 35(2), 72–115.
- [10] Virtanen Jk, Nurmi T, Voutilainen S, Mursu J & Tuomainen Tp. Association of Serum 25-Hydroxyvitamin D with the Risk of Death in a General Older Population In Finland, *European Journal of Nutrition*, 2011; 50, 305-312.
- [11] World Health Organization (2011). Diet, Nutrition and the Prevention of Chronic Diseases: Report of A Joint Who/Fao Expert Consultation. WHO Technical Report Series Geneva, Switzerland, 916. <http://www.who.int/dietphysicalactivity/publications/trs916/en/>. Retrive: 03/06/2014.