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Dietary Practices of the Working Group of Persons as Compared to the Non-Working Persons in Relation to the Prevalence of Hypercholesterolemia at the West Demerara Regional Hospital

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Abstract

Objective: *To investigate whether the working or the non-working group of individuals have higher blood cholesterol as a result of an unhealthy dietary lifestyle.*

Design and Methods: *In 1000 adults (240 males and 760 females) aged 18-75 years were randomly selected for this study, and all subjects would have visited the WDRH. The total cholesterol levels were measured using a ChemWell chemistry analyzer and the eating habits were assessed by self-administered questionnaires.*

Results: *The results indicated that 64% of the working as compared to 69% non-working respondents was hypercholesterolemic. The non-working respondents (26%) snacked more for 5 times or more a week and consumed higher amounts of high dietary animal fats and proteins daily (21%). However, more working respondents ate out (10% for breakfast 5-6 times a week, 33% for lunch and 13% for dinner once a week), skipped meals (for breakfast 13% and lunch 5%) and were also greatly affected. Further, the working respondents also consumed more alcohol frequently (16%), increasing the anti-atherogenic effects and they were also more fairly knowledgeable (51%) about hypercholesterolemia.*

Conclusion: *The non-working respondents had higher levels of total cholesterol than the working respondents. Hypercholesterolemia in both the working and non-working respondents was favorably associated with eating habits and partially knowledge of respondents. There should be further research to assess the dietary lifestyle risk factors associated with this condition.*

Introduction

Non communicable diseases (NCD), and specifically cardiovascular disease, are the leading cause of morbidity and mortality burden worldwide, and are strongly related to some lifestyles and physiological risk factors. Such harmful lifestyles comprise unhealthy nutrition, which mostly refers to a high intake of saturated fats, salt and a low intake of vegetables and fruits and sedentary habits. The physiological risk factors are strongly connected to lifestyles, which include high blood pressure, overweight, diabetes and blood lipid disorders (e. g. high blood cholesterol). (1)

Cholesterol is described as a fat-like substance found in the bloodstream that is a key component in the development of atherosclerosis, the accumulation of fatty deposits on the inner lining of arteries, feeding the heart and the brain. This would occur if there is too much Low Density Lipoprotein (LDL) cholesterol circulating in the blood because such lipoproteins are the major cholesterol carrier in the blood. A normal cholesterol level is defined as less than 200 mg of cholesterol per deciliter of blood (mg/dL). Blood cholesterol is considered to be at borderline when it is in the range of 200 to 239 mg/dL. An elevated cholesterol level is 240 mg/dL or

beyond. Elevated blood cholesterol leads to the formation of 'plaque' which ultimately results in blockages and affects the flow of blood through the arteries, depriving cells of oxygen. (3) (4) In many industrialized countries, death rates peaked in the 1960s and early 1970s and would have declined dramatically - by over 50% in some countries. The world's highest rates were then found in eastern and central Europe. Research would have proven time after time that lifestyle was responsible for coronary heart disease. High blood cholesterol levels had contributed to deaths more commonly among women than men. Though the causes could have been genetically based they were more usually related to a diet rich in animal fats. Also, the lack of physical activity was the most prevalent modifiable risk factor in many industrialized countries. (5)

In fact, in the 2002 World Health Organization (WHO) reported that among the leading killings by NCD worldwide 4. 4 million was caused by high cholesterol, 5. 3 were due to unhealthy diet and physical inactivity. For this reason, countries were urged to adopt policies and programs to promote population wide interventions like cutting dietary fat, encourage exercising and higher consumption of fruits and vegetables, reducing salt in processed foods and lowering smoking. These were found to be of great benefit to all groups of elevated risk and normal, and most cost effective in the reduction of cardiovascular disease. Also, a combination of drugs (statin) were introduced for cholesterol lowering in persons at increased risk of heart attack in both the developed and developing world. In addition, there were researches that were carried out that had established many other approaches to reduce Cardiovascular Disease (CVD) risk factor at a less expensive cost. (2)

Many Guyanese are adopting unhealthy lifestyles today as many other developing countries. Due to ineffective health promotion there are not much influences to reinforce lifestyle changes. With a growing population of food out lets, many, on a daily basis consume fast foods instead of home cooked foods. By reason of busy mornings, weight watching or for whatever other reasons many skip breakfast, and even the other meals of the day. Even snacking between meals is becoming habitual for many. It is evident that many individuals are not paying attention to their diet and exercise to fight such harmful conditions that are influenced by their lifestyle.

The intense causal role of hypercholesterolemia on the progression of atherosclerosis and subsequently on the development of CVD was well reported, the WHO estimated that each year among the leading killings by NCD worldwide 4. 4 million is caused by high cholesterol, 5. 3 are due to unhealthy diet and physical inactivity. This condition may be inherited or influenced by lifestyle, and individuals developing such have a high risk of developing coronary artery disease (CAD) mainly. For this reason studies would have been continued to relate hypercholesterolemia and CAD, revealing approximately a 2% reduction in disease for each 1% reduction in total cholesterol. The differences in cholesterol levels between certain population groups are less consistent than some other health indicators. For instance, a 5% of employed adults aged 18-64 years reported having high cholesterol compared with 6% of unemployed adults. (7) (8) (9) (10) (11)

Studies have examined the relationships between cholesterol and stress, major depression, cigarette smoking, physical activity, excess body weight and a dietary lifestyle. The research**,** *Quantitative Analysis of Stress and Cholesterol levels in University teachers and Housewives of Hyderabad-Pakistan*, discovered that housewives had high levels of total cholesterol. Also, the environment, psychological and physiological stresses were also significantly high in housewives as compared to university teachers. Therefore, high levels of total cholesterol or lipid components in housewives correlated to their stressful lifestyle. In addition, the increased levels of cholesterol in housewives were considered to be in association with physical inactivity and lack of knowledge about their foods. (12)

A similar study conducted among college teachers, lady health visitors and housewives of Hyderabad-Pakistan to examine the Estimation and correlation of stress and cholesterol levels

revealed that housewives had high levels of total cholesterol, LDL cholesterol and triglyceride (TG)and low levels of high density lipoprotein (HDL) cholesterol were found in college teachers. Environmental, psychological and physiological stresses were significantly higher in housewives as compared to college teachers. Also, Housewives were under more stress than the college teachers, and the main contributory factor was their confinement in the house. (13)

Also, the Effect of stress on serum lipid levels in lady health visitors and housewives revealed that Environmental, psychological and physiological stresses were significantly higher in housewives as compared to lady health visitors. The serum lipid concentrations were similar to that of the previous study. (14)

Also, the relationship between lifestyle and serum lipid and lipoprotein levels in middle-aged Japanese men highlighted that among lifestyle factors (cigarette smoking, alcohol intake, overall obesity indicated by BMI, eating breakfast, snacking between meals, considering nutritional balance, coffee drinking, physical exercise, and hours of work and sleep) Snacking between meals appeared as a significant factor for LDL cholesterol level and HDL cholesterol level (negative). Utilizing stepwise regression analyses, by which body mass index (BMI) is excluded as a factor in the model. The results of this study proposed that BMI had the strongest association with serum lipid and lipoprotein levels and good daily lifestyles may have an anti-atherogenic effect by altering serum lipid and lipoprotein levels in middle-aged Japanese men. (15)

Moreover, the associations of BMI and percentage body fat with cardiovascular risk factors in Japanese male office workers was examined and it was revealed that obesity indicated by BMI was particularly associated with increased LDL/HDL ratio and TG level and reduced HDL level. (16)

Cigarette smoking also has negative effects on the lipid and lipoprotein profile, and can lead to changes in critical enzymes of lipid transport, which acts to lowering of Lecithin cholesterol acyltransferase (LCAT) activity and altering Cholesteryl ester transfer protein (CETP) and Hepatic lipase(HL) activity that ultimately favor the progression of atherosclerosis. Cigarette smoking was actually confirmed to have effects on dyslipidemia, and HDL cholesterol had increased after consumption of alcohol, of which would protect against coronary heart disease. Furthermore, there was another investigation of middle-aged Japanese men and the association of alcohol intake with risk for increased LDL cholesterol over a 5 years period and it was observed that the Slopes of LDL cholesterol level decreased significantly as alcohol intake increased. (17)(18)(19)

Some working individuals such as the meat industry workers evaluated at the AD Neoplant facility in Novi Sad have specific dietary habits as a result of working practice. Thus, the influence of their hypercaloric diet composing of high dietary animal fat and protein intake due the consumption of certain quantities of these products daily instead of a proper regularly prepared meal. The result showed that hypercholesterolemia was present in 94. 87%, obesity in 82. 05%, positive family cardiovascular anamnesis in 74. 48%, physical inactivity in 69. 33%, continuous alcohol consumption in 69. 23%, excessive consumption of black coffee in 61. 54%, hypertension in 51. 28%, "stress alleviation" with food in 46. 15%, hypertrigly ceridemia in 46. 15% and cigarette smoking in 46. 15% of examinees. Hence, a significantly increase in atherosclerosis index after educational program, of which was said to be of a poor nature. (20)

Among other studies that examined lifestyle factors in workers there were revelations that suggest that amongst other factors snacking between meals every day is closely associated with an increased risk of atherogenic lipid profiles. Dietary habits have been also examined in association with the consumption of fruits, vegetables, and grain products rich in fibers with the reduction in serum LDL cholesterol. (21) (22) (23) In addition, it was observed that while women are becoming more career oriented, along with family responsibilities, they often neglect proper eating practices. With the demands of work, the author went on to say, it was likely for women to

skip meals leading to nutrient deficiencies. Also, there may be a tendency to consume fast foods with high energy content, fat, sugars, salt but a decrease in intake of essential nutrients resulting in high blood cholesterol levels and related conditions. (24)

Also, breakfast consumption can actually result in increased satiety, thus reducing the risk of excessive energy intake at later meals by over eating. Studies showed that breakfast skippers had higher total and low density lipoprotein cholesterol concentrations than those who ate breakfast, larger waist circumferences, and higher levels of fasting or postprandial insulin. (25) (26) (27) The Behavioral Risk Factor Survey (BRFS) in Hong Kong pointed out that 5. 5% of respondents skipped breakfast in the 30 days prior to their interview. The percentage of breakfast skippers was relatively higher among males (5. 8%), those who were never married (5. 8%), service workers (7. 5%) and non-working persons (7. 1%). In addition, the younger and the lower the education attainment of the respondents, the more likely they were to report skipping breakfast. (28)

Another issue apart from skipping breakfast that warrants attention is eating out for breakfast. The convenience and accessibility of several well situated food outlets supply lots of eating out opportunities for individuals who have busy morning schedules for breakfast. In the BRFS three-fifths of the respondents ate out for breakfast at least once a week, and was proportionally higher in blue collar workers, eating out 5 or more times a week. Also, there were four-fifths of the respondents that ate out for lunch, with similar representation as the previous or professional workers. In addition, three-fifths ate dinner out, which was higher in service workers as compared to their counterparts.

When home cooked foods were compared to meals from the restaurant it was observed that restaurant meals are frequently higher in fat, sugar and salt, and was served in larger amounts. Therefore, effective public health education and urgent measures are essential in order to influence lifestyle changes, since lifestyle plays a critical role in the development of hypercholesterolemia. The 2008-2013 global NCD Action Plan targets developing countries, which points out the urgent need to invest in such NCD as this, for socioeconomic development, which is the responsibility of the government. This report further pointed out that without a doubt the way forward for addressing cardiovascular disease amongst other NCD is to address the risk factors. (6) (29)

Methodology

A total of 1000 adults aged 18-75 years (240 males and 760 females) were randomly selected from the general population in the West Demerara Region that has a population of 105 thousand persons and consisting primarily of persons of African and East Indian Origins. All the subjects selected would have visited the West Demerara Regional Hospital and a request would have been made by a doctor cholesterol blood test. The patients would have fasted for 12 hours prior to sample collection.

Study Design: A prospective study was carried out.

Variables The Dependent variable:

1. Cholesterol level- the level of cholesterol measured by the ChemWell chemistry analyzer

The Independent variables:

1. Diet- foods eaten daily
2. Snacking between meals- eating snacks between breakfast and lunch and lunch and dinner
3. Skipping meals- missing one or more meal times.
4. Eating out- eating foods other than that prepared in a home setting
5. Exercise- physical activity for atleast 20 minutes per day

Method of measuring the variables: The variables would have been measured by my means of self- administered questionnaires, and blood samples would have been obtained for the determination of the of total cholesterol level using the Technological Chemwell method.

Ethical considerations: The patients were have been informed of their participation in the study and guaranteed that all the information obtained from the study would have been kept confidentially.

Data analysis: The data obtained for the study was analyzed by Microsoft Office Excel 2007 program.

Results

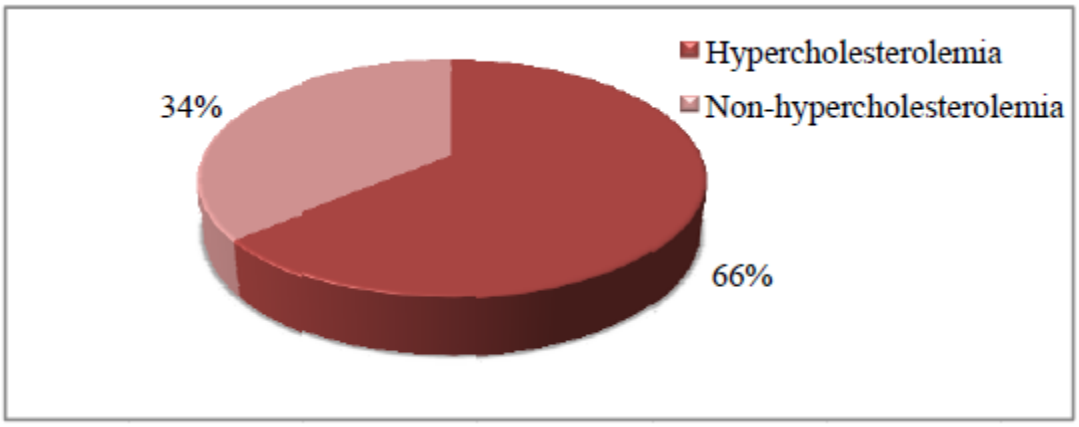

Fig. 3. 1a: Percentage of persons with hypercholesterolemia in this study

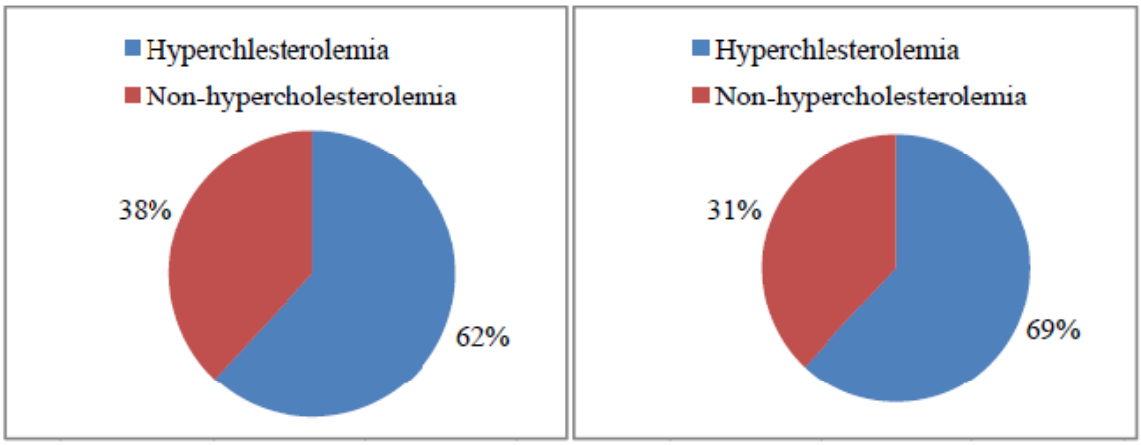

Fig. 3. 1b & Fig. 3. 1c: Hypercholesterolemia in working and non-working respondents Fig. 3. 1b: Working respondents Fig. 3. 1c: Non-working respondents

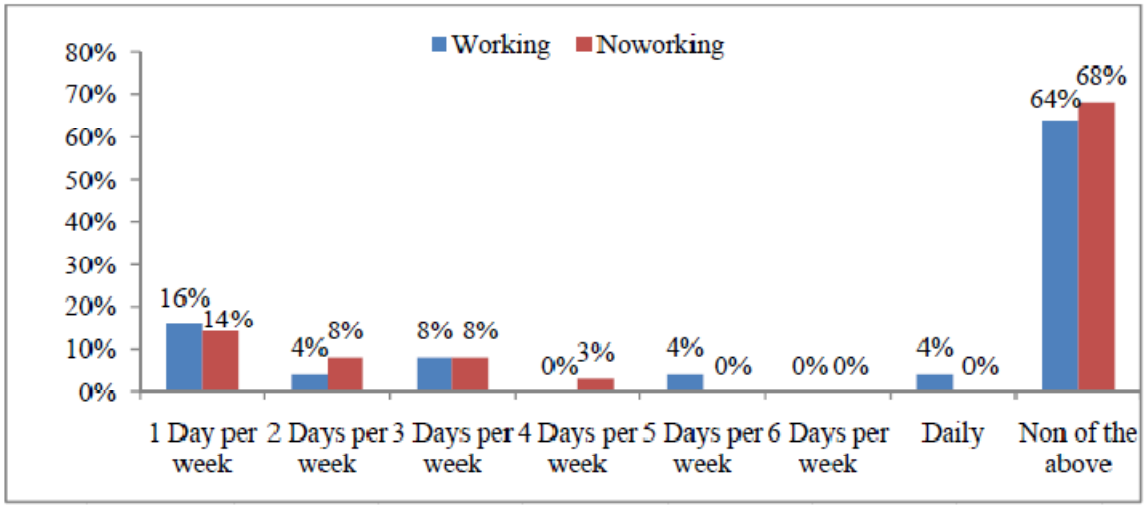

Fig. 3. 3. 2: Frequency of consumption of alcohol per week

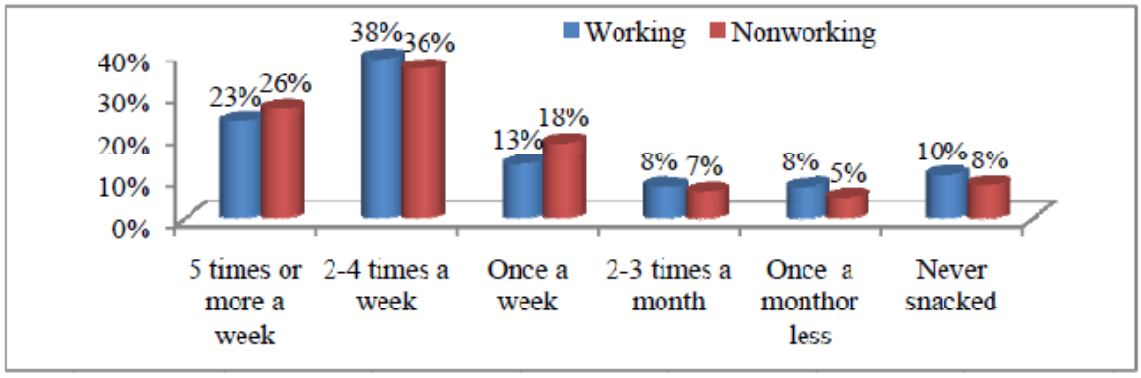

Fig. 3. 5. 1: Frequency of eating /snacking between meals

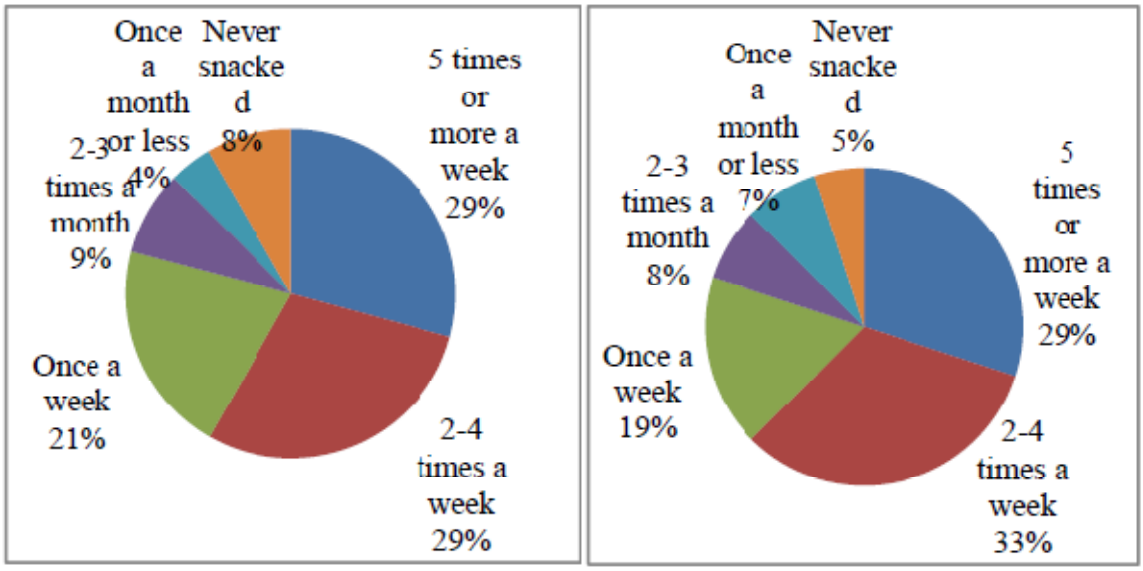

Fig. 3. 5. 2a & Fig. 3. 5. 2b Snacking between meals and the development of hypercholesterolemia Fig. 3. 5. 2a: Working respondents Fig. 3. 5. 2b: Non-working respondents

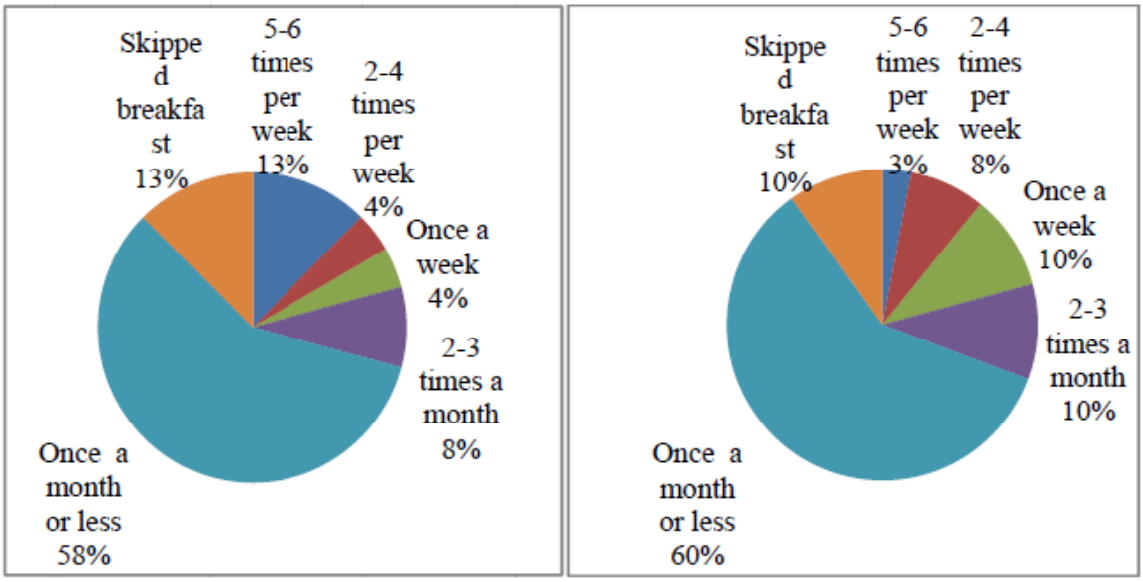

Fig. 3. 6. 1a & Fig. 3. 6. 1b: Frequency of eating out, skipping breakfast and hypercholesterolemiain Fig. 3. 6. 1a: Working respondents Fig. 3. 6. 1b: Non-working respondents

Discussion

In this study it was observed that persons affected by hypercholesterolemia accounted for more than half the sample size (66%)(Fig. 3. 1a). It was also observed that 81% of the respondents were represented by individuals aged 35-64, 13% were below age 35, and 6% were just over age 64. In this study, it was revealed that 62% of the working group is affected by this condition, while 69% of the non-working group is affected (Fig. 3. 1b and Fig. 3. 1c). Such findings might have been due to the sampling size, which would have been also represented by the majority of respondents being of the non-working group. This was due to the fact that many of the persons making visits at the laboratory at the time scheduled for data collection were of the non-working group. Also there might have been poor interpretations of the questions used in the questionnaire.

It was also observed that even though the working group had a larger amount of respondents with at least fair knowledge, an increase in the percentage (51%) of respondents had hypercholesterolemia while 38% of non-working respondents were hypercholesterolemic. (Fig. 3. 2c)

Alcohol consumption has been proven to lower the LDL cholesterol and increasing the HDL cholesterol, which qualifies it to be classed as an anti- atherogenic substance. (23)(28)(29). Almost three quarters (64%) of the working respondents had consumed alcohol occasionally. This indicated that alcohol was not consumed every week for the various categories. In comparison, the non-working respondents had also consumed alcohol occasionally with 68% of the respondents falling into this category, which was greater than the working group(Fig. 3. 3. 2). The results indicated that 4% of the respondents who consumed alcohol daily, (6%) of the respondents were hypercholesterolemic, whereas of the non-working respondents there were none who had a daily consumption of alcohol. However, of the working respondents (64%) in the, “none of the above” category (indicated occasionally) less than half of the respondents (47%) were hypercholesterolemic, while of the non-working respondents (68%) in this same category almost three quarters (71%) were hypercholesterolemic (Fig3. 3. 2). However, such may also be a contributing factor for hypercholesterolemia being greater in the non-working group than the working. Studies had revealed that cholesterol level decreased as the alcohol consumption increased. (23)(28)(29)

In relation to snacking between meals the results indicated that 29% of both the working and non-working who snacked 5 times or more a week had the condition. Also more than three quarters (79%) of the working respondents who snacked at least once a week had an elevation in total cholesterol level, and 8% of those who never snacked were hypercholesterolemic (Fig. 3. 5. 2a). On the other hand, 81% of the non-working respondents who snacked at least once a week were hypercholesterolemic, along with 5% of the respondents who never snacked (Fig. 3. 5. 2b).

Studies showed that breakfast skippers had higher levels of cholesterol concentrations than those who ate breakfast. Also, eating home cooked breakfast is evenly important so as to minimize the high quantity of fats, sugar and salt in food. (42)(43)(44)(45) In this study the working respondents reported that they had eaten out for breakfast more than the non-working for five times or more a week. It was observed that 10% of the working, while 5% of the non-working had eaten out for breakfast 5-6 times a week. Eating out for lunch has been studied and found to have similar effects as eating out for breakfast. (45) The working respondents (10%) reported that they had eaten out for lunch more than the non-working (3%) on a daily basis for the last thirty days prior to study, and the working respondents (5%) skipped lunch more also. Of these 13% of the working, 5% of the non-working and 8% of the working who snacked were hypercholesterolemic. On the other hand, 15% of the non-working respondents had eaten out for lunch at least once a week, and 20% were hypercholesterolemic. It was observed that 90% of the non-working respondents stated that they at least sometimes had considered a nutritional balance and more than three quarters (80%) were still hypercholesterolemic. On the other hand, 76% of the working respondents had at least considered a nutritional balance and more than three quarters (75%) were hypercholesterolemic.

Regular exercise is very important, as it increases the total energy expenditure of the body, also exercising or diet alone can maintain a normal cholesterol level. For this reason, regular exercise and taking into consideration a low fat diet can increase weight loss, improve lipoprotein pattern, and can even further decrease 12-years coronary heart disease risk. (23)(30)(31)(32)(33)(34)(35)

This study showed that working respondents reported that they had exercised more regularly than the non- working respondents. Almost half (46%) of the working respondents stated that they had at least exercised often and 46% of these respondents had elevated blood cholesterol.

Conclusions

Hypercholesterolemia in both the working and non-working respondents was favorably associated with eating habits, physical activity, knowledge and other lifestyle related factors. There should be further research to assess the dietary lifestyle risk factors associated with this condition. The study highlighted some key areas of concern and hope that the strengthening of health education and health promotion strategies in order to combat the epidemiology of hypercholesterolemia and other chronic ailments in our population.

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