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PREVALENCE OF RISK FACTORS FOR NON-COMMUNICABLE DISEASES AND ASSESSMENT OF CARDIOVASCULAR RISK LEVEL USING WHO/ISH RISK PREDICTION CHARTS IN A SOUTH INDIAN DISTRICT

Dr. Praveena Daya A.*[1] and Dr. Karthikeyan G.[2]

[1]Assistant Professor Department of Community Medicine Tirunelveli Medical College.
[2]Assistant Professor Govt. Ramanathapuram Medical College Ramanathapuram.

*Corresponding Author: Dr. Praveena Daya A.

Assistant Professor Department of Community Medicine Tirunelveli Medical College.

ABSTRACT

Introduction: Non-communicable diseases (NCDs) kill around 41 million people, equivalent to 71% of all deaths occurring globally each year and among them mortality due to cardiovascular diseases are high. **Objectives and Methodology:** A cross-sectional study was done among 251 study participants from two urban areas in a South Indian district of Tamilnadu to describe the burden of risk factors for Non-communicable diseases and to assess the cardiovascular risk using WHO/ISH risk prediction chart. **Results:** Forty nine out of 251 participants were tobacco users and 31 (12.4%) of them are daily smokers, 43 (17.1%) consumed alcohol, 99 participants consumed fruits 2 days in a week followed by 59 consuming fruits 3 days in a week and 37 persons consumed 1 day in the past week, 67 (26.7%) consumed vegetables daily while 10 (4%) consumed them only one day in the last week, 26 (10.4%) were involved in vigorous activities and 41 (16.3%) were involved in moderate intensity activities. Among the 251 participants, 123 participants (49%) have a risk of <10% while 8 participants (3.2%) have a risk of >40%. 69 (27.5%) have a risk of 10-<20%, 21 (8.4%) have a risk of 20-<30% and 26 (10.4%) have a risk of 30-<40%. **Conclusion:** Health education and screening campaigns to increase the awareness among the people for prevention and control of the disease can help in reduction of the burden of morbidity and mortality due to non communicable diseases.

INTRODUCTION

Non-communicable diseases (NCDs) kill around 41 million people, equivalent to 71% of all deaths occurring globally each year. Every year more than 15 million people between the ages of 30 to 69 years die from a NCD and 85% of these premature deaths occur in low- and middle-income countries. Among them cardio-vascular diseases account for 17.9 million people annually followed by cancers (9.3 million), respiratory diseases (4.1 million) and diabetes (1.5 million).[1]

In the last few decades, non-communicable diseases have gradually increased to reach epidemic proportions.[2,3] Cardiovascular diseases (CVD) was predicted to be the largest cause of morbidity and mortality in India by 2020.[4] Cardiovascular disease includes a wide spectrum of disorders, namely coronary heart disease, apoplexy, deep vein thrombosis, peripheral vascular disease, pulmonary embolism, congenital heart diseases, rheumatic heart disease, hypertension and congestive cardiac failure.[5] Rising prevalence of adverse risk factors like tobacco use, alcohol intake, physical inactivity, unhealthy diet, stress eventually leads to obesity, hypertension, type 2 diabetes mellitus etc.[5,6] It has been found that nearly 80% of deaths due to non-communicable diseases usually occur in developing countries. Hence there is a need to identify these risk factors and implement measures such as lifestyle modification and pharmacotherapy to reduce the burden of non-communicable diseases especially cardiovascular diseases among the population.[7] It is important to screen and identify the at-risk individuals and classify them as low risk, intermediate risk and high risk for better management and prevention of complications.[8]

OBJECTIVES

1. To describe the burden of risk factors such as tobacco use, alcohol use, dietary behaviours, physical activity, stress levels among individuals aged 40 and above in the urban population in a South Indian district.
2. To assess the cardiovascular risk for the individual using WHO/ISH risk prediction chart.

MATERIALS AND METHODS

This was a cross-sectional study conducted among 251 participants **ag**ed 40 and above belonging to two urban areas in a South Indian district during May-July 2017. The study tool used was a pre-designed, pre-tested structured questionnaire. The initial part of the questionnaire was framed to obtain the demographic characteristics of the individual such as name, age,

gender, education, occupation and income of the individual and family members and their accessibility to a health care facility. The next part contains questions pertaining to the individual's personal habits such as usage of alcohol and tobacco, dietary habits and physical activities. The last part assesses the individual's knowledge on NCDs and the importance of regular health check-ups. World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction charts have been developed using information from WHO Comparative Risk Assessment study on the population distribution of risk factors in different sub-regions focusing on non-western developing countries.[9,10] The chart helps in the estimation of the total risk of developing both fatal and non-fatal cardiovascular diseases (coronary artery disease and stroke) in following 10 years among those people whose CVD risk were not manifested clinically and it categorizes an individual according to the particular risk group so that the person can be managed either by lifestyle modification or drug therapy if the need arises.[11] The chart is simple to use and can be utilized by physicians and health care workers from all levels of health care. This risk prediction chart helps make a clinical decision and also helps in the estimation and prediction of CVD risk among different population groups.[9,11]

Procedure
Approval from the Ethical Committee was obtained and individuals aged 40 and above visiting the outpatient departments of 2 urban health centres in a south Indian district were approached for participation in the study. Individuals with an established cardiovascular disease were excluded from the study. The purpose of the study was explained to the participants and consent was obtained. Data was collected using the questionnaire. The blood pressure of the participants measured using a mercury sphygmomanometer. WHO/ISH chart for SEAR D of WHO epidemiological sub-region was used to estimate the total 10-year risk of CVD of all participants. Age, gender, presence or absence of diabetes mellitus, smoking status and systolic blood pressure were used to assess the risk level for that individual.

Method of analysis
Data were entered in Microsoft Excel sheet and analyzed using SPSS software version 22. Results were interpreted in prevalence percentages and chi-square test was applied to test the significance between proportions.

RESULTS
Table 1: Demographic characteristics of the study participants.

Variables	Number (251)
Age distribution	
≥70	35
60-69	61
50-59	66
40-49	89
Gender distribution	
Females	103
Males	147
Educational status	
Graduate	5
Higher Secondary level	32
High School level	58
Middle school level	37
Primary level	70
Illiterate	49
Occupational status	
Technicians	1
Clerks	1
Service Workers	1
Farmers	23
Trade Workers	6
Machine Operators	1
Elementary workers	175
Non-classified	11
Homemakers	32

In our study, out of 251 participants, 147 participants (58.6%) were males and 103 were females. Majority of the study population (89 participants) belonged to the age group 40-49 years constituting 35.5% followed by 66 participants (26.3%) in the age group 50-59 years, 61 participants (24.3%) in the age group 60-69 years and 35 participants (13.9%) were 70 and above. Regarding the education status of the responders, 70 (27.9%) have completed primary education followed by 58 (23.1%) with high school education, 37 (14.7%) with middle school education and 32 (12.7%) with higher secondary education as calculated by Kuppusamy scale. Out of 251 participants, 175 (69.7%) are elementary job workers such as coolies and beedi workers. Majority of the study population- 160 participants (63.7%) belong to socioeconomic class 4 as per Kuppusamy scale for urban population.

Tobacco and alcohol use in the study population
Forty nine out of 251 participants were tobacco users and 31 (12.4%) of them are daily smokers. Among the smokers, only 36 were aware of the harmful effects of smoking. The age at which the usage of tobacco products was started ranges from 14 years to 25 years. Majority of the users of tobacco products started using them at the age of 20 years. Out of the 21 users of smokeless products, only 5 were aware of its harmful effects.

Out of our 251 participants, 43 (17.1%) consumed alcohol while 208 (82.9%) did not. Out of the 43 users, 36 admitted to have consumed alcohol in the past 1 year. The age at which alcohol consumption was first started ranges from 12 years to 40 years. Among the users of alcohol, majority of them (12 members) started consuming alcohol at the age of 20 years. Only 35 persons among alcohol users were aware of the harmful effects of alcohol.

Consumption of fruits and vegetables among the study participants
Majority of the participants (99 persons) consumed fruits 2 days in a week followed by 59 consuming fruits 3 days in a week and 37 persons consuming them 1 day in a week. Among our study subjects, 67 members 26.7%) consumed vegetables daily while 10 members (4%) consumed them only one day in a week.
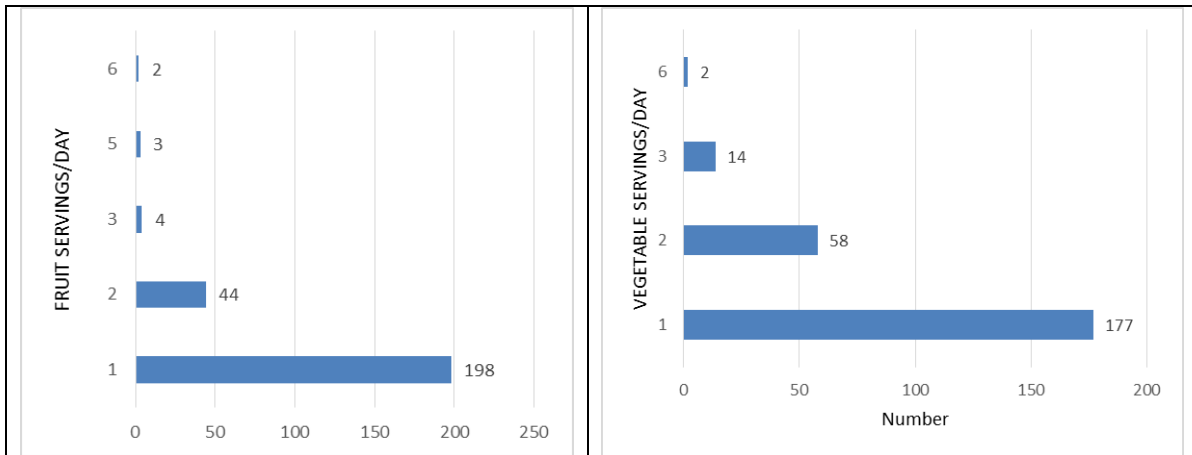

Figure 1: Servings of fruits and vegetables consumed among the study population (n=251).

Out of our 251 study subjects, 198 (78.9%) consumed only one serving of fruits in a day while 2 persons had 6 servings of fruit in a day. Among the study participants, 177 participants (70.5%) had only one serving of vegetables in a day followed by 58 (23.1%) having 2 servings of vegetables in a day. Out of our 251 participants, 154 (61.4%) were not aware of the importance of consuming fruits and vegetables.

Level of physical activity among the study participants
Among the 251 participants, 26 (10.4%) were involved in vigorous activities in the past week. Forty one (16.3%)

out of 251 participants was involved in moderate intensity activities.

Family history of NCDs among the study participants
Among the 251 participants, 49 (19.5%) had a positive family history for non-communicable diseases. Among the study population, only 41 (16.3%) were aware about the harmful effects of being obese. Among the 251 participants, 129 were diagnosed to have high blood pressure levels and 117 were diagnosed to be diabetic. Out of our 251 study participants, 59 (23.5%) admitted that they feel stressed.
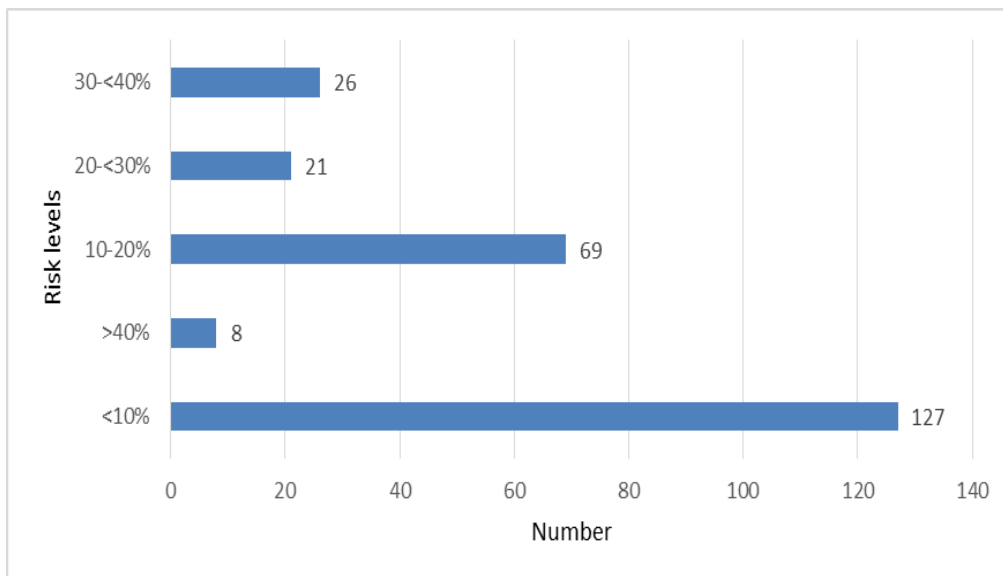

Figure 2: Risk levels observed among the study population using WHO/ISH risk prediction chart (n=251).

Among our 251 participants, 123 participants (49%) have a risk of <10% while 8 participants (3.2%) have a risk of >40%. 69 (27.5%) have a risk of 10-<20%, 21 (8.4%) have a risk of 20-<30% and 26 (10.4%) have a risk of 30-<40%.

DISCUSSION

The present study has identified the prevalence of risk factors for non-communicable diseases among urban population aged 40 years and above and has also assessed and the cardiovascular risk using WHO/ISH Risk prediction chart. The risk factors assessed include usage of tobacco products and alcohol, dietary behaviours, physical activity levels and family history of cardiovascular disease. Behaviours related to visits to a health care facility and regular assessment of their blood sugar levels and

Behaviours regarding tobacco and alcohol usage
Tobacco usage

Out of 251 participants, 49(19.5%) were smokers and all 49 are men. Out of these 41 participants, 31(12.4%) are daily smokers which is in accordance with the study conducted by Aswin et al in Puducherry where the prevalence of current smokers was found to be 12.3%.[7] Similarly another study conducted by Sharma D et al among employees working at AIIMS showed the prevalence of current smokers to be 12.8%.[12]

Smokeless tobacco products are used by 21 (8.4%) of the participants and all 21 are men. The age of onset of smoking ranges from 12 to 40 years and a majority of the participants- 17 (6.8%) started smoking at the age of 20 years. This implies to need to educate the teenagers about the harmful effects of smoking and to prevent them from cultivating this habit. Out of the 49 tobacco users, only 13(5.2%) know about the harmful effects while among the 21 users of smokeless tobacco products, only 5(2.0%) are aware of its harmful effects. Hence health education must be intensified to sensitize the people about the harmful effects of tobacco products usage.

Alcohol usage

Out of 251 participants, 43 (17.1%) are alcohol users and all 43 are men. Out of these 43 responders, 40 (15.9%) reported that they have consumed alcohol in the past 12 months. This prevalence is less when compared to the study done by Aswin et al among 400 participants where 108 men (33.2%) reported the usage of alcohol.[7] Only 8 (3.2%) were aware of the effects of alcohol out of which 6 are elementary job workers and 4 have completed primary education. This may be due to the fact that majority of our study participants belong to these categories. Majority of our responders 19 (7.6%) reported that they consume alcohol 1-4 days in a week. Similar to tobacco users, out of the 43 users, majority of them 12 (4.8%) began consuming alcohol at the age of 20 years.

Dietary Behaviours of study participants

Out of our 251 participants, 99 (39.4%) reported that they consume fruits at least 2 days in a week and a majority of them 198 (78.9%) had only one serving per day. When it came to vegetables, 67(26.1%) had vegetables all days of the week followed by 46(18.3%) who had vegetables only 2 days in a week. It has been found that a majority of the people – 177(70.5%) has only 1 serving of vegetables per day. Daily intake of fruits and vegetables has been observed only in 13(5.2%) and 67(26.7%) respectively. This is comparable to the study done by Aswin K et al in 2014 among 400 participants where 58.5% had only one serving of vegetables per day and only 25% had eaten fruits for a week.[7] Daily intake of 400 g of fruits and vegetables has been recommended by WHO to prevent many chronic diseases including cardiovascular diseases. Only 95 participants (37.8%) are aware of the importance of consumption of fruits and vegetables.

Level of Physical activity among study participants

Vigorous-intensity activities include those which involve large increases in respiratory rate and heart rate such as lifting heavy loads. Out of our 251 participants, only 26(10.4%) reported as being involved in vigorous activities and most of them work for 5-6 days in a week and 4-6 hours in a day. Out of these 26, 19 were men and most of them worked elementary jobs. Moderate-intensity activities include those which involve small increases in respiratory and heart rate such as brisk walking and out of 251, 41(16.3%) out of which 17 are females and 24 are males reported as being involved in moderate-intensity activities usually for 5-6 days in a week and 1-3 hours in a day. WHO recommends 150 minutes of moderate-intensity activities or 75 minutes of vigorous-intensity activities throughout the week or a combination of both. Majority of the study population does not follow this recommendation.

Screening for Non communicable diseases

Among 251 participants, 201(80.1%) have checked their blood pressure levels while 174(69.3%) have checked their blood sugar levels which may be lower compared to the former since the procedure is invasive in nature. More number of men had their blood pressure and sugar values checked when compared to women- 114 men have checked their blood pressure and 97 men their blood sugar values followed by 86 and 77 women respectively. This high percentage of health visits among the study population may be due to the fact that Tamil Nadu has developed integrated public health services system which offer comprehensive health benefits to the people.

Awareness regarding NCDs

Among 251 participants, 95 (37.8%) are aware of the importance of consuming fruits and vegetables on a regular basis. A family history of NCD/sudden cardiac death was present in 49(19.5%) of our patients while in the study conducted by Aswin et al,[7] family history of

diabetes mellitus, hypertension and cardiovascular deaths was present in 151, 142 and 37 study participants respectively. The harmful effects of obesity were known by 41(16.3%) of our subjects that were very less when compared to the number of our study subjects.

Assessment of the risk levels among the study population

Most of the study participants had a blood pressure of 140/90 mmHg- 47 subjects (18.7%) followed by 44 subjects (17.5%) who had a blood pressure of 130/80 mmHg at the time of the measurement. Out of our 251 participants, 115 had systolic blood pressure of 140 mmHg and more which is a high prevalence of raised systolic blood pressure. 130 participants had a systolic blood pressure of 90 mmHg and above. While assessing the cardiovascular risk level, gender, presence of diabetes mellitus, smoking status of the participant, age and systolic blood pressure is taken into account. 123 participants (49%) have a risk of <10% while 7 participants (2.8%) have a risk of >40%. This result is comparable to the study done by Mendis S et al in 2011 in eight middle and low income countries where prevalence of high risk was calculated to be 2.2% in Nepal, 1.1% in China, 10% in Pakistan, 1.7% in Iran, 9.6% in Georgia, 5% in Cuba and 2.8% in Cuba.[10] However, a study done by Shrivastava SR in Puducherry identified that nearly 17% of the population falls under the category of moderate to high risk.[6] Classifying the patients helps in planning better intervention strategies and implementing them.

CONCLUSION

The study has emphasized the need for intensified health education campaigns to increase the awareness among the people with regard to prevention and control of emergence of risk factors for non-communicable diseases and early screening and treatment for non-communicable diseases.

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