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# Prevalence of modifiable risk factors of non-communicable diseases in selected rural locality of Chamarajanagar District

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**Abstract**
**Background:** "Many of the deaths from NCD's could be presented through simple lifestyle related changes" the present levels of risk factors exposure will be useful in predicting future risk and also it is useful in implementation of needed health measures and health policies for the prevention of NCD's among risk population. So this study was planned to measures the prevalence of risk factors of NCD's in a selected rural location of Chamarajanagar.
**Objective:** The main objective of the study is to measure the prevalence of modifiable risk factors of non - communicable diseases in selected rural locality of Chamarajanagar.
**Methodology**: This study was done with 120 individuals aged 20-60 years in selected rural locality of Chamarajnagar. Questionnaire was used to collect the information on socio-demographic characteristics and behavioural risk factors (tobacco use, alcohol consumption, diet and physical activity) followed by physical measurements (height, weight, waist circumference and blood pressure).
**Results:** Tobacco use and alcohol consumption were observed in 20% and 26.66% of the study population respectively. Low levels of physical activity were recorded among 46.66% respondents inadequate consumption of fruit and vegetables was observed among 98.33% of respondents. Prevalence of general and central obesity in study population was 26.33% and 28.33% respectively. Hypertension was prevalent among 31.66% respondents.
The survey demonstrated gender differences in prevalence of risk factors with higher prevalence in male than females for tobacco use, alcohol consumption, inappropriate dietary intake and hypertension, while lower prevalence for males regarding physical inactivity, general and central obesity. It was also observed that risk factors were more prevalent in the age group of 51-60 years as compared to other age group.
**Conclusion:** High prevalence of NCD risk factors was observed among study population. So occurrence of NCD can be prevented among population by implementation of awareness programme on healthy lifestyles. Prevention of NCD for public and population based approach using the primary health care system for risk reduction, early detection and treatment is wanted.

**Keywords:** Non - communicable diseases, Risk factors, Prevalence, Chamarajnagar

## Introduction
Noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors [1].
The main types of NCD are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes [1].
The rising prevalence of non-communicable diseases (NCDs) poses a major clinical, economic, and societal burden around the world. The cost of NCDs care is high and is rising worldwide. For centuries, infectious diseases were the main cause of mortality around the world. NCDs were emerging as major health problem in industrialized countries after the Second World War. By 2020, it is anticipated that NCDs will accounts for 80% of the world-wide burden of diseases [1].
The risk factors for many of these conditions are connected with lifestyle related behaviours, environmental and genomic factors. NCDs are the leading causes of death universally, killing more people each year than all other causes combined. A total of 57 million deaths occurred in the world during 2008, 36 million (63%) were due to NCDs [2].
According to WHO NCDs are caused by four key risk factors: tobacco use, harmful use of alcohol, unhealthy diet, and physical inactivity.

Alternatively, the NCD risk factors have been categorised as modifiable behavioural, non-modifiable factors (mainly age, gender, family history, and ethnicity) and metabolic risk factors [3].

Timely intervention, through lifestyle modification, will avert or delay the progression of the disease in at-risk individuals or those affected by pre-diabetes, T2DM or elevated BP [4].

The benefits of lifestyle modification, such as smoking cessation, a healthy diet, moderate physical activity, and moderate alcohol use for the prevention and control of T2DM and hypertension have been well documented. Kontis *et al.* [5]. Reported, in their modelling study, that mortality due to CVDs and T2DM can be reduced by lowering the prevalence of six risk factors, which includes smoking and the harmful use of alcohol, with LMICs expected to reap most of the benefits. Studies have demonstrated the effectiveness of lifestyle modification in delaying the onset of pre-diabetes or its progression to T2DM [6, 7], as well as the control of T2DM mainly through healthy diets [8].

**People at risk of NCDs**

People of all age groups, regions and countries are affected by NCDs. These conditions are often associated with older age groups, but evidence shows that more than 15 million of all deaths attributed to NCDs occur between the ages of 30 and 69 years. Of these "premature" deaths, 85% are estimated to occur in low- and middle-income countries. Children, adults and the elderly are all vulnerable to the risk factors contributing to NCDs, whether from unhealthy diets, physical inactivity, and exposure to tobacco smoke or the harmful use of alcohol [9].

**Modifiable behavioural risk factors**

Modifiable behaviours, such as tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol, all increase the risk of NCDs [9].

Tobacco accounts for over 7.2 million deaths every year (including from the effects of exposure to second-hand smoke), and is projected to increase markedly over the coming years

- 4.1 million annual deaths have been attributed to excess salt/sodium intake
- More than half of the 3.3 million annual deaths attributable to alcohol use are from NCDs, including cancer
- 1.6 million Deaths annually can be attributed to insufficient physical activity [9].

**Need for the study**

The epidemic of NCDs cannot be halted simply by treating the sick, healthy persons have to be protected by addressing the root causes. Reducing the major risk factors for NCDs is the key focus of MOHFW to prevent deaths from NCDs. Tackling the risk factors will therefore not only save lives; it will also provide a huge boost for the economic development of the country [10].

As a result of industrialization, socio-economic development, urbanization, changing age-structure, changing lifestyles, India is facing a growing burden of non-communicable diseases.

The third UN High-Level Meeting on Non-Communicable Diseases (NCDs) on Sept 27, 2018, will review national and global progress towards the prevention and control of NCDs, and provide an opportunity to renew, reinforce, and enhance commitments to reduce their burden. NCD Countdown 2030 is an independent collaboration to inform policies that aim to reduce the worldwide burden of NCDs, and to ensure accountability towards this aim. In 2016, an estimated 40·5 million (71%) of the 56·9 million worldwide deaths were from NCDs. Of these, an estimated 1·7 million (4% of NCD deaths) occurred in people younger than 30 years of age, 15·2 million (38%) in people aged between 30 years and 70 years, and 23·6 million (58%) in people aged 70 years and older. An estimated 32·2 million NCD deaths (80%) were due to cancers, cardiovascular diseases, chronic respiratory diseases, and diabetes, and another 8·3 million (20%) were from other NCDs. Women in 164 (88%) and men in 165 (89%) of 186 countries and territories had a higher probability of dying before 70 years of age from an NCD than from communicable, maternal, perinatal, and nutritional conditions combined. Globally, the lowest risks of NCD mortality in 2016 were seen in high-income countries in Asia-Pacific, Western Europe, and Australasia, and in Canada. The highest risks of dying from NCDs were observed in low-income and middle-income countries, especially in sub-Saharan Africa, and, for men, in central Asia and Eastern Europe. Sustainable Development Goal (SDG) target 3.4-a one-third reduction, relative to 2015 levels, in the probability of dying between 30 years and 70 years of age from cancers, cardiovascular diseases, chronic respiratory diseases, and diabetes by 2030-will be achieved in 35 countries (19%) for women, and 30 (16%) for men, if these countries maintain or surpass their 2010-2016 rate of decline in NCD mortality. Most of these are high-income countries with already-low NCD mortality, and countries in central and Eastern Europe. An additional 50 (27%) countries for women and 35 (19%) for men are projected to achieve such a reduction in the subsequent decade, and thus, with slight acceleration of decline, could meet the 2030 target. 86 (46%) countries for women and 97 (52%) for men need implementation of policies that substantially increase the rates of decline. Mortality from the four NCDs included in SDG target 3.4 has stagnated or increased since 2010 among women in 15 (8%) countries and men in 24 (13%) countries. NCDs and age groups other than those included in the SDG target 3.4 are responsible for a higher risk of death in low-income and middle-income countries than in high-income countries. Substantial reduction of NCD mortality requires policies that considerably reduce tobacco and alcohol use and blood pressure, and equitable access to efficacious and high-quality preventive and curative care for acute and chronic NCDs [11].

Non-communicable diseases (NCDs) encompass a vast group of diseases such as cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. NCDs contribute to around 38 million (68%) of all the deaths globally and to about 5.87 million (60%) of all deaths in India. Four NCDs mainly responsible for the total NCD mortality and morbidity are cardiovascular diseases, chronic respiratory disease, cancers and diabetes, contributing to about 82% of all NCD deaths (World Health Organization - WHO, 2014) [12].

India being a populous country of about 1.3 billion, contributes to more than 2/3rd of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO (WHO, 2014; United Nations Statistics Division). As per

the 2011 report on NCD status in SEAR, raised BP, raised blood glucose and tobacco use were the three major risk factors responsible for majority of deaths annually in this region. The prevalence of raised BP was greater in Myanmar (highest – 42%), Indonesia, Sri Lanka, Bhutan and Thailand as compared to that in India (about 35%); however, Nepal, Maldives, Bangladesh and Democratic Republic of Korea (lowest -19%) showed a relatively lesser prevalence of the same. For raised blood glucose (diabetes), Bhutan showed the highest prevalence i.e. 12-13% and India, second highest i.e. 11%, among the SEAR countries. The prevalence of smoked tobacco products use was slightly lesser in Sri Lanka (14.1%) while it was much higher in Thailand (24%), Bangladesh (24%), Myanmar (24%), Maldives (27%), Nepal (32%) and Indonesia (highest - 33%), as compared to in India (15%). The prevalence of smokeless tobacco (SLT) products usagewas higher in India (25.9%) as compared to that in Thailand (1.3%), Sri Lanka (15.8%), Nepal (18.6%) and Bhutan (19.4%); however, Bangladesh (27.2%) and Myanmar (51.4%) showed relatively higher SLT consumption than in India (WHO, 2011) [12].

**Karnataka - Health Statistics**

According to a study published in the Lancet, projections indicate that by 2030 NCDs will account for almost 75% of all deaths in India and the years of life lost due to coronary heart disease will be greater in that country than in China, the Russian Federation and the United States of America combined.

The latest statistics from the health ministry shows that the lifestyle diseases are rampant in Bangalore and Chennai. In Bangalore, 14% and 21% people are suffering from diabetes and high blood pressure.

A report of 2006 showed 1, 03,000 bypass surgeries were carried out in Karnataka. In India Cardiovascular mortality is likely to rise by 103% in men and 110% in women during the period of 1985 -2015 and the cardiovascular disease will be the greatest killer by the year 2020.

In 2005, from a total of 23,312 available death records at Bangalore Mahanagara Palike, 1,690 (7.5%) deaths could be categorized as probably due to stroke In a case study carried out in 2006 in Bangalore, out of 1,174 cases 18% of all stroke patients were below 40 years of age.

A greater prevalence was seen among men (67%) with a male to female ratio of 2:1. Higher proportion of women below 30 year was due to cortical venous thrombosis (CVT).

13% reported a previous history of stroke, 48% were hypertensive, 23% reported to be diabetic, 33% used tobacco and 25% consumed alcohol. Nearly 1 in 5 patients had both hypertension and diabetes (18.5%).

A family history of stroke was reported by 7.3% of patients. While 23% did not have any risk factor, 29% had one risk factor and 30.0 and 11.6%, had 3 or more than 3 risk factors, respectively.

A study carried out by Department of Community Medicine, Bio-statistics, Kasturba Medical College revealed that in 2006, the overall prevalence of diabetes in coastal Karnataka was 16%.

In 2000, The prevalence of impaired glucose tolerance (IGT) was 16.8% in Chennai, 14.9% in Bangalore, 29.8% in Hyderabad, 10% in Kolkata, 10.8% in Mumbai and 8.6% in New Delhi.

A recent population-based cancer registry data of the Indian Council of Medical Research (ICMR) shows that Bangalore has 113 male and 139 female cancer patients per 100,000.

The Cancer Atlas published by the ICMR indicates that thyroid cancer is more prevalent in the coastal areas of Karnataka and Kerala.

According to ICMR statistics breast cancer figure in Bangalore has increased from 16 in 1998 to 34.1 per 100,000 in 2008.

In the hospital based cancer registries (HBCRs), cancer of the cervix is the leading site of cancer in Bangalore and Chennai.

In a study carried out by Centre for Survey Research & Management Services, the two major risk factors observed among males were smoking and alcohol consumption. About two fifths (40%) of them were current smokers as well as current users of alcohol (41%).

The median age at initiation was 21 year for both smoking habits and for alcohol consumption. Nearly a quarter of the target population were inactive (23% males and 22% females) based on work and leisure time activities. More than one-fifth of them (23%) reported stress.

Obesity was found more among females (33%) than males (17%). Low socio-economic background was found to be a high predictor (high risk group) for habit of smoking, alcohol consumption, stress and unhealthy diet.

As many as 3 crore Indians are overweight, and obesity continues rise, says statistics revealed by the National Family Health Survey (NFHS). Around 20% of school-going children are overweight.

In Bangalore obesity is reaching epidemic proportions, with around 25% of city children between the age group of four to 12, suffering from obesity [13].

**Objectives**

1. To measure the prevalence of modifiable risk factors of Non-communicable diseases in rural locality of Chamarajanagar.

**Methodology**

**Materials and method**

**Source of data**

The data was collected in the selected rural locality of Chamarajanagar through house to house survey

**Research Approach**

Quantitative approach was used for the present study

**Research Design**

Descriptive cross-sectional design

**Settings**

Study was conducted in rural locality of Chamarajanagar.

**Population**

**Method of data collection**

The study population included members aged between 20–60 years

**Sampling Technique**

Convenient Sample technique was selected

**Sample**

In this study the sample was Adolescent and Adult aged between 20-60 years.

**Sampling Size**
The sample size consists of 90 members aged between 20–60 years

**Inclusion Criteria**
The study included:
- The age group between 20 to 60 years of males and females

**Exclusion Criteria**
The study excluded:
- Those who aged between below 20 years
- Those who aged above 60 years

**Instrument Used**
**Tool I:** Demographic data
**Tool II:** An adapted questionnaire for this survey was developed using steps I and II of WHO
STEPs questionnaire. All the core components of the questions were incorporated. The questionnaire was
Designed in English.

**Description of the tools**
**Tool-I**
Tool I consist of demographic data which includes age in years, sex, educational status, religion, marital status, occupation, people older than 18 years, family income.

**Tool-II:**
Tool II consist of an adapted questionnaire for this survey was developed using steps I and II of WHO
STEPs questionnaire. All the core components of the questions were incorporated. The questionnaire was
Designed in English.

**Results**
**Demographic Data**

**Table 1:** Age representation of respondents n=120

| S. No | Age in years | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | 20-30 | 34 | 28.33% |
| 2 | 31-40 | 40 | 33.33% |
| 3 | 41-50 | 36 | 30% |
| 4 | 51-60 | 10 | 8.33% |
| | Total | 120 | 99.99% |

**Table 2:** Sex representation of respondents n=120

| S. No | Gender | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Male | 70 | 58.33% |
| 2 | Female | 50 | 41.66% |
| | Total | 120 | 100% |

**Table 3:** Religion-wise distribution of respondent n=120

| S No | Religion | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Hindu | 112 | 91.66% |
| 2 | Muslim | 05 | 4.166% |
| 3 | Christian | 03 | 2.56% |
| | Total | 120 | 100% |

**Table 4:** Marital status of respondents n=120

| S. No | Marital Status | Frequency | Percentage |
|---|---|---|---|
| 1 | Married | 104 | 86.66% |
| 2 | Unmarried | 16 | 13.33% |
| | Total | 120 | 100% |

**Table 5:** Educational status of respondents n=120

| S. No | Education status | Frequency | Percentage |
|---|---|---|---|
| 1 | No formal schooling | 12 | 10% |
| 2 | Primary and middle school | 56 | 46.66% |
| 3 | High School | 36 | 30% |
| 4 | Higher Secondary | 06 | 5% |
| 5 | Graduate and above | 10 | 8.33% |
| | Total | 120 | 100% |

**Table 6:** Occupation-wise distribution of respondents n=120

| S. No | Occupation | Frequency | Percentage |
|---|---|---|---|
| 1 | Unemployed | 24 | 20% |
| 2 | Government employee | 04 | 3.33% |
| 3 | Non-government employee | 10 | 8.33% |
| 4 | Self-employed | 60 | 50% |
| 5 | Student | 01 | 0.83% |
| 6 | Skilled Workers | 01 | 0.83% |
| 7 | Homemaker | 18 | 15% |
| 8 | Retired | 02 | 1.66% |
| | Total | 120 | 100% |

**Table 7:** Socio-economic status of respondents n=120

| S. No | Socio-economic status | Frequency | Percentage |
|---|---|---|---|
| 1 | Upper | 42 | 35% |
| 2 | Upper Middle | 20 | 16,66% |
| 3 | Middle | 20 | 16.66% |
| 4 | Lower | 38 | 31.66% |
| | Total | 120 | 100% |

**Behavioural Risk Factors For NCDs**

**Table 8:** Behavioural Risk Factors for NCDs among respondents n=120

| S. No | Variable | Frequency | Percentage |
|---|---|---|---|
| **I. Tobacco Use** | | | |
| i | Non-users | 96 | 80% |
| ii | Users | 24 | 20% |
| iii | Among tobacco users | | |
| iv | Smokers | 18 | 75% |
| v | Smokeless tobacco users | 6 | 25% |
| II. Alcohol Use | | | |
| i | Non-Users | 88 | 73.33% |
| ii | Users | 32 | 26.66% |
| III. Physical activity | | | |
| i | Strenuous | 64 | 53.33% |
| ii | Non-Strenuous | 56 | 46.66% |
| IV Fruits and Vegetables intake | | | |
| i | Appropriate | 2 | 1.66% |
| ii | Inappropriate | 118 | 98.33% |

**Table 9:** Distribution of behavioural risk factors according to age of respondents n=120

| S. No | Variables | Age in years | | | | Total |
|---|---|---|---|---|---|---|
| | | 20-30 | 31-40 | 41-50 | 51-60 | |
| 1 | Smokers | 03 (16.66%) | 05 (77.77%) | 03 (16.66%) | 07 (38.88%) | 18 (100%) |
| 2 | Smokeless tobacco users | 02 (33.33%) | 01 (16.66%) | 02 (33.33%) | 01 (16.66%) | 06 (100%) |
| 3 | Alcohol use | 07 (21.87%) | 05 (15.62%) | 08 (25%) | 12 (37.50%) | 32 (100%) |
| 4 | Physically Inactive | 03 (5.35%) | 06 (10.71%) | 11 (19.64%) | 36 (64.28%) | 56 (100%) |
| 5 | Inappropriate dietary intake | 23 (19.49%) | 20 (16.94%) | 36 (30.50%) | 39 (33.05%) | 118 (100%) |

**Table 10:** Distribution of behavioural risk factors according to sex of respondents n=120

| S. No | Variables | SEX | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| 1 | Smokers | 18 (100%) | 00 | 18 (100%) |
| 2 | Smokeless tobacco Users | 6 (100%) | 00 | 06 (100%) |
| 3 | Alcohol use | 32 (100%) | 00 | 32 (100%) |
| 4 | Physically inactive | 18 (32.14%) | 38 (67.85%) | 56 (100%) |
| 5 | Inappropriate dietary intake | 66 (55.93%) | 52 (44.06%) | 118 (100%) |

**Table 11:** Distribution of behavioural risk factors according to religion of respondents n=120

| S. No | Variables | Religion | | | Total |
|---|---|---|---|---|---|
| | | Hindu | Muslim | Christian | |
| 1 | Smokers | 07 (38.88%) | 05 (27.77%) | 06 (33.33%) | 18 (100%) |
| 2 | Smokeless tobacco users | 03 (50%) | 01 (16.66%) | 02 (33.33%) | 06 (100%) |
| 3 | Alcohol use | 10 (31.25%) | 08 (25%) | 14 (43.75%) | 32 (100%) |
| 4 | Physically Inactive | 26 (46.42%) | 14 (25%) | 16 (28.57%) | 56 (100%) |
| 5 | Inappropriate dietary intake | 70 (59.32%) | 30 (25.42%) | 18 (15.25%) | 118 (100%) |

**Table 12:** Distribution of behavioural risk factors according to marital status of respondents n=120

| S. No | Variables | Marital Status | | Total |
|---|---|---|---|---|
| | | Married | Unmarried | |
| 1 | Smokers | 14 (77.77%) | 04 (22.22%) | 18 (100%) |
| 2 | Smokeless tobacco users | 04 (66.66%) | 02 (33.3%) | 06 (100%) |
| 3 | Alcohol use | 24 (75%) | 08 (25%) | 32 (100%) |
| 4 | Physically Inactive | 43 (76.78%) | 13 (23.21%) | 56 (100%) |
| 5 | Inappropriate dietary intake | 90 (76.27%) | 18 (15.25%) | 118 (100%) |

**Table 13:** Distribution of behavioural risk factors according to socio-economic status of respondents n=120

| S. No | Variables | Socio-economic status | | | | Total |
|---|---|---|---|---|---|---|
| | | Upper | Upper Middle | Middle | Lower | |
| 1 | Smokers | 03 (16.66%) | 05 (27.77%) | 08 (44.44%) | 02 (11.11%) | 18 (100%) |
| 2 | Smokeless tobacco users | 03 (50%) | 01 (16.66%) | 01 (16.66%) | 01 (16.66%) | 06 (100%) |
| 3 | Alcohol use | 04 (12.5%) | 08 (25%) | 07 (21.87%) | 13 (40.62%) | 32 (100%) |
| 4 | Physically Inactive | 10 (17.85%) | 22 (39.28%) | 18 (32.14%) | 06 (10.71%) | 56 (100%) |
| 5 | Inappropriate dietary intake | 08 (6.77%) | 28 (23.72%) | 32 (27.11%) | 50 (42.37%) | 118 (100%) |

**Biological risk factors for NCDS**

**Table 14:** Biological Risk Factor of NCD'S Among Respondent n=120

| S. No | Variable | Frequency | |
|---|---|---|---|
| | | N | % |
| **Body mass index (Kg/m$^2$)** | | | |
| 1 | Normal | 88 | 73.33% |
| 2 | Obese | 32 | 26.33% |
| 3 | Total | 120 | 100% |
| Waist circumference | | | |
| 1 | Normal | 78 | 65% |
| 2 | Above normal | 34 | 28.33% |
| 3 | Pregnant | 08 | 6.66% |
| | Total | 120 | 100% |
| Blood pressure | | | |
| 1 | Normal | 82 | 68.33% |
| 2 | Hypertensive | 38 | 31.66% |
| | Total | 120 | 100% |

**Table 15:** Biological Risk Factors According to age of respondent n=120

| S. No | Variables | Age in years | | | | Total |
|---|---|---|---|---|---|---|
| | | 20-30 | 31-40 | 41-50 | 51-60 | |
| 1 | Obese | 04 (12.5%) | 08 (25%) | 11 (34.37%) | 09 (28.12%) | 32 (100%) |
| 2 | Central obesity | 04 (11.76%) | 08 (23.52%) | 09 (26.47%) | 13 (38.23%) | 34 (100%) |
| 3 | Hypertensive | 02 (5.2%) | 09 (23.68%) | 10 (26.31%) | 17 (44.73%) | 38 (100%) |

**Table 16:** Biological risk factors according to sex of population n=120

| S. No | Variables | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| 1 | Obese | 24 (75%) | 08 (25%) | 32 (100%) |
| 2 | Central obesity | 10 (29.4%) | 24 (70.58%) | 34 (100%) |
| 3 | Hypertensive | 26 (68.42%) | 12 (31.57%) | 38 (100%) |

**Table 17:** Biological risk factors according to religion of respondents n=120

| S. No | Variables | Religion | | | Total |
|---|---|---|---|---|---|
| | | Hindu | Muslim | Christians | |
| 1 | Obese | 14 (43.75%) | 10 (31.25%) | 8 (25%) | 32 (100%) |
| 2 | Central obesity | 14 (41.17%) | 12 (35.29%) | 08 (23.52%) | 34 (100%) |
| 3 | Hypertensive | 20 (52.63%) | 16 (42.10%) | 02 (5.26%) | 38 (100%) |

**Table 18:** Biological risk factor according to marital status of respondents n=120

| S. No | Variables | Marital status | | Total |
|---|---|---|---|---|
| | | Married | Unmarried | |
| 1 | Obese | 26 (81.25%) | 06 (18.75%) | 32 (100%) |
| 2 | Central obesity | 25 (73.57%) | 09 (26.47%) | 34 (100%) |
| 3 | Hypertensive | 30 (78.94%) | 08 (21.05%) | 38 (100%) |

**Table 19:** Biological risk factor according to socio economic status of respondents n=120

| S. No | Variables | Socio-economic status | | | | Total |
|---|---|---|---|---|---|---|
| | | Upper | Upper middle | Middle | Lower | |
| 1 | Obese | 09 (28.12%) | 08 (25%) | 06 (18.75%) | 09 (28.12%) | 32 (100%) |
| 2 | Central obesity | 08 (23.57%) | 10 (29.41%) | 12 (35.29%) | 04 (11.76%) | 34 (100%) |
| 3 | Hypertensive | 07 (18.42%) | 11 (28.94%) | 14 (36.84%) | 06 (15.78%) | 38 (100%) |

**Socio-demographic characteristics of respondents**

Table 1-7: Provides information on socio-demographic profile of respondent's. A total of 120 participants, majority of respondents (33.33%) were between the age group of 32-40 years (30%), 20-30 years (28.33%) and51-60 years (8.33%).Among total respondents majority of them were male (58.33%) and remaining 41.66 of female were included. Among total respondents 91.66 were Hindu, followed by Muslim (4.16%) and Christian (2.56%). Majority of the respondents (86.66%) were married. According to educational status 10% were illiterate, 46.66 have completed their primary education, 5% have their completed their higher secondary education and 8.33 of respondents were graduates. Majority of the respondents (50%) were self employed followed by unemployed (20%), home maker (15%), non govt employs (8.33%), govt employs (3.33%), retired employs (1.66%), students (0.83), skilled workers (0.83%). Among total respondents majority of them were upper class (35%), followed by lower class (31.66%), upper middle class (16.66%) and middle class (16.66%)

**Behavioural risk factors for NCD**

Table 8-13: Provides information on prevalence of behavioural risk factors for NCD among study participants

**Tobacco use**

Prevalence of current tobacco use (smoking as well as smokeless form) among study population was found to be 24% overall current tobacco smoking 75% was more prevalent than smokeless tobacco consumption (25%) (Table -8). Majority of tobacco users (smoking as well as smokeless form) were found in the age group of 51 – 60 years (Table -9) and all tobacco users were male (100%) (Table -10). According to religion 38.88% tobacco users were Hindu, 33.33% Christians and 27.77% were Muslim (Table – 11) 75% tobacco users were married (Table – 12) and 37.5% tobacco users were from the middle class group (Table – 13)

**Alcohol use**

Overall alcohol consumers were and among them 32 (Table – 8) and all of them (100%) were male (Table – 10). Highest percentage(37.50%) of users were found in the age group of 51- 60years followed by 25% were in 41 -50 years 15.621% were in 31-40 year and 21.87% were in the age group of 20 -30 years (Table – 9). Religion wise majority 43.75% of them were Christian (Table -11). 75% were married (Table-12) and 40.62% were found in the lower class group (Table–13)

**Physical activity**

Low levels of physical activity i.e. activity levels of less than 600MET minutes per week were prevalent among 56 of the participants (Table – 8) and majority 64.28% of them were in the age group of 51-60 years (Table – 9) Among them 67.85.% were female and 32.14 were male (Table – 10) Religion wise46.42% were Hindu, 28.57% were

Christian and 25% were Muslim (Table – 12) and 39.28% were found in upper middle class group (Table – 13)

**Fruits and vegetables**

Low level of fruits and vegetables intake was found among most of the participants (118) (Table – 8) majority 33.05%of them were between the age group of 51- 60 years (Table -9). Among them 55.93% were male and 44.06% were female (Table – 10) According to religion 59.32% were Hindu, 25.42% Muslims and 15.25% were Christians (Table -11). Majority 76.27% of them married (Table-12) and 42.37% were found in lower class group (Table -13)

**Biological risk factors for NCD**

Table 14-19: Provides information on prevalence of biological risk factors for NCD among study participants

**Obesity**

In this study 26.33% (32) participants were found to be obese (Table -14) and among them maximum (34.37%) were in the age group of 41-50 years (Table-15). 75% obese were male (Table-16).43.75% were Hindu followed by 31.25% were Muslim and 2.5% were Christian (Table -17).81.25% of them married (Table -18) and equal 28.12% were in both upper and lower class category (Table- 19)

**Central obesity**

The central obesity was present among 34 (28.33%) participants (Table -14). Prevalence of central obesity was higher (38.23%) among age group 51- 60 years (Table-15). 70.58% participants with central obesity were female (Table -16) and 41.17% were Hindu (Table -17). Majority (73.57%) of them were married (Table-18) and in middle class (35.29%) (Table-19)

**Hypertension**

The overall prevalence of hypertension was found to be 38 (31.66%) (Table -14). Hypertension was more prevalent in the 51-60 years age group (44.73%) as compared to 20 -30 years age group (5.24%) (Table -15) among participants with hypertension 68.42% were males and 31.57% were females (Table -16). 52.63% hypertensive were Hindu, 42.10% Muslim and 5.26% were Christians (78.94%) hypertensive were married (Table -18) and 36.84% were from middle class category (Table-19)

**Recommendations**

Based on the findings of the study the recommendation for the future studies are as follow

1. Similar study can be conducted for larger samples for longer period
2. Comparative study can be conducted among rural and urban population
3. Study recommendation to conduct health education programmes on healthy lifestyles to present the risk of non-communicable disease

**Conclusion**

The result of this study shows that, NCD risk factors are highly prevalent among the study population. Among these risk factors tobacco use inadequate consumption of fruits and vegetables alcohol consumption physical inactivity overweight /obesity and hypertension are the areas of concern. Risk factors were more prevalent in the age group 51-60 years compared to other age groups. Further more survey demonstrated the gender differences with the higher prevalence in males than females for tobacco use, alcohol consumption and inappropriate dietary intake while lower prevalence for males in physical inactivity.

Findings of the study highlight the need for different interventions and approaches for the prevention of risk factors of non-communicable diseases there is need to strengthen the existing primary health care system for risk reduction, early detection and for treatment. There is also a need to education public about the importance of healthy life style in prevention of non-communicable diseases

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