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Research Article

SOCIOECONOMIC STATUS AND PREVALENCE OF MODIFIABLE RISK FACTORS OF NON-COMMUNICABLE DISEASES AMONG YOUNG ADULTS (AGE 25-40 YEARS) OF BHAWALPUR CITY.

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Abstract:

Introduction: Non-Communicable Diseases are the leading cause of deaths at global, regional and national levels. The changing lifestyles in the country have resulted in a transition in the health profile of the population. During the last decade, there has been a gradual shift from communicable to non-communicable diseases (NCDs) such as Cardiovascular Diseases (including stroke and heart disease), Cancer, Diabetes and Chronic Airway Diseases. Approximately 50% of the population in Pakistan suffers from one or more of these chronic conditions. Deaths due to NCDs now far outnumber the deaths due to communicable diseases.

Objective of Study: The objective of the study was to:

Evaluate the "Socioeconomic Status and Prevalence of Modifiable Risk Factors of Non-Communicable Diseases among Young Adults (Age 25-40 years) of Bahawalpur City."

Study Design: It was a Descriptive Cross-Sectional Epidemiological study.

Setting: The study was conducted in four areas of Bahawalpur City:

1. Model Town A, B
2. Medical Colony
3. Hansra Basti
4. Tibba Badar

Study Population: The study was conducted on Young Adults of Bahawalpur City, ages between 25-40 years.

Sampling Technique: It is a Non-Probability Convenience Sampling.

Sample Size: According to the available time and resources, it was decided to take a sample of 240 young adults, both male and female (ages between 25-40 years).

Data Collection Protocol: The data was collected through a pre-formed questionnaire, which consisted of two parts; section one included the socio-demographic profile of the respondents and section two comprised of questions regarding the well-established modifiable risk factors for NCDs.

Data Analysis: Data was coded and entered into SPSS version 21. Interpretation has been presented in form of tables and figures.

Results: The overall prevalence of all the risk factors was found highest in the respondents belonging to the middle socioeconomic class. The prevalence of tobacco smoking turned out to be (23.3%) of the entire study sample. Nearly (37.1%) of all respondents were exposed to the risk of second hand or passive smoking. Prevalence of risk factors of low dietary intake of fruits and vegetables in all the respondents was (60%) and (24.2%) respectively. About (25.8%) of the respondents were reported to possess inadequate physical activity. Regarding BMI, (5.8%) of respondents were underweight, (29.6%) pre-obese and (9.6%) crossed the borderline for obesity.

Conclusion: A high burden of risk factors of NCDs was observed in the study sample, with almost all of them being most prevalent in the middle socioeconomic class and the youngest age group under study i.e. 25-28 years of age. Variations in the distribution of risk factors based on gender and socioeconomic status argues particular focus on and over individual behaviour, personal choices and personal responsibilities to be highlighted in order to assist in targeting improvement actions. Intentional designing of environments to promote healthy behaviours holds promise to reverse the increase of lifestyle diseases.

Keywords: Cardiovascular Diseases, Cancer, Diabetes, Chronic Airway Diseases.

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INTRODUCTION:

Non-Communicable Diseases (NCDs) refer to the conditions which are slowly evolving, relentlessly progressing and persisting over an extended period of time.² NCDs consist of a vast group of non-infectious medical conditions; however, emphasis has been on Cardiovascular Diseases, Cancer, Diabetes and Chronic Non-Specific Respiratory Diseases,' representing a leading threat to human health and economic development. Contrary to the popular presumption of NCDs as "Diseases of Affluent", the available data demonstrates that 4 out of 5 (80%) deaths resulting from NCDs are in low and middle income countries and in older population. It is, therefore, no exaggeration to describe the situation in developing countries as an impending disaster: a disaster for health, for society and most of all, for national economies.⁴ However, the developed countries are equally sharing in the scourge, but while the developing countries are facing a double burden, the developed and high income countries have experienced a transition in the health term from communicable to non-communicable diseases.' Not only the burden of NCDs is unequally distributed among different social classes; but also, the risk factors show tremendous variations among men, women and between different income groups. Children, adults and elderly are all vulnerable to risk factors that contribute to NCDs. The risk factors been broadly classified as "Modifiable" and "Non-Modifiable" factors.⁶ 7 Modifiable risk factors could be identified and prevented much earlier in life and include direct tobacco use and second hand smoke, harmful use of alcohol, physical inactivity, unhealthy diet and obesity.⁸ 9 All these in combination comprise of behavioural factors that can lead to metabolic and physiological changes within the body, ultimately increasing the risk of NCDs. Raised blood pressure, overweight and obesity, high blood glucose level and raised cholesterol level have all been identified to cause significant contribution to various non-communicable diseases.¹"3 Non-modifiable risk factors include gender, age, genetics, ethnicity and

family history. Clustering of these risk factors significantly increases the risk of morbidity and mortality from NCDs.¹⁴

Non-communicable diseases emerge as the leading cause of deaths, causing 60% of all mortalities around the globe.¹⁵ Out of the 56 million global deaths in 2012; more than 38 million were attributed to NCDs, 48% of which were in low and middle income countries.¹⁶ WHO Global Health Observatory Data (2014) showed that around 8.5% of the adults aged 18 and above had raised blood glucose, 22% had raised blood pressure, 23% had insufficient physical activity and the prevalence of smoking and overweight and obesity was 22% and 39% respectively. 2.8% of all deaths occurring worldwide were attributed to low consumption of fruits and vegetables.¹⁷⁻²³ In Pakistan, the prevalence of tobacco and cigarette smoking in both genders was found to be 22.6% and 14% respectively in the year 2013.²⁴ The National Health Survey of Pakistan, conducted in 2010, estimated that hypertension affects 18% of all adult population. Among them 33% were found to be above 45 years of age.²⁵ According to National Health Survey of Pakistan 2014, Pakistan has been ranked as the 9th country in the world to harbour obesity. The overall prevalence of physical inactivity was 23.6% and total alcohol consumption per capita turned out to be 2.3% in 2010.²⁶

The prevalence of NCDs is showing an upward trend in most countries and for several reasons; this trend is likely to increase. The impact is greatest on the poor countries of subcontinent, of which Pakistan occupies a significant position. This may be attributed to the inaccessibility of the population to the education and services required to prevent and treat NCDs. The little health resources remain focused on reducing the already overwhelmed burden of communicable diseases and other preventable causes of mortality. With the lack of resources, the increased occurrence of NCDs continues to drain the household resources and drive families into poverty. The exorbitant cost often

including lengthy and expensive treatment of NCDs are forcing millions of people into poverty annually and stifling development.²⁷ NCDs thus pose a particular threat to Pakistan where it is estimated that by 2020, two out of three Pakistani deaths will be due to NCDs.²⁸

The global NCD epidemic exacts a massive socioeconomic toll throughout the world. Despite of its rapid growth and inequitable distribution, much of the human and social impact caused each year by NCD deaths could be averted through well-understood, cost-effective and feasible interventions. An efficient and proven strategy for significant reduction of burden of NCDs is served by risk factor modification; ²⁹ needing high levels of commitment, good planning, community mobilization and intense focus on a small range of critical actions.

Until now, very limited and fragmented data is available on the prevalence of risk factors for NCDs in Pakistan, in general and in Bahawalpur City, in particular. In order to effectively address the growing hazard, comprehensive and up-to-date information regarding the risk factors' data is essentially required to evaluate the effectiveness of ongoing public health policies and to develop further NCD prevention and control interventions. The recognition of the impact of non-communicable diseases and reaffirmation of the commitment of the Government to tackle them and their risk factors would be an important herald towards a healthier Pakistan.

LITERATURE REVIEW:

"The Doctor of the future will give no medicine, but will interest his patients in the care of the human frame, in diet, and in the cause and prevention of disease." — Thomas Alva Edison³⁰ Non-Communicable Diseases (NCDs) are the major cause of death and disability globally and are of great concern to the World Health Organization (WHO) and countries alike. Recent trends indicate that NCDs are responsible for almost 60% of deaths and 43% of disease burden and predict that they will be responsible for 73% of deaths and 60% of the global burden of disease by 2020.³¹ An analytical approach, using global, regional and country-specific data to document the magnitude of the problem, project future trends and assess the factors contributing to these trends. As noted, the epidemic of these diseases is being driven by powerful forces now touching on every region of the world i.e. demographic aging, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. While many chronic conditions develop slowly, changes in lifestyles and behaviors are

occurring with a stunning speed and sweep. The consequences for societies and economies are devastating everywhere, most especially so in poor, vulnerable and disadvantaged populations.

In large parts of the developing world, non-communicable diseases are detected late, when patients need extensive and expensive hospital care for severe complications or acute events. Most of this care is covered through out-of-pocket payments, leading to catastrophic medical expenditures. For all these reasons, non-communicable diseases deliver a two punch blow to development causing billions of dollars in losses of national income, and pushing millions of people below the poverty line, each and every year. In order to effectively address this growing problem, accurate information regarding the risk factors that contribute to the development of NCDs becomes a necessity.

In 2015, a cross sectional study was conducted in a working population of 350 participants (aged 18 years and above) in 10 public institutions to find out the prevalence of risk factors for non-communicable diseases.³² The overall prevalence of risk factors was found as physical inactivity (51%), alcohol consumption (36%), ³³ overweight (33.1%), hypertension (32.6%), tobacco use (23.4%) ³⁴ and obesity as (6%). About 33% of the participants were consuming more than five servings of fruits and vegetables per day.³⁵ Researchers suggested that there should be healthier lifestyles to reduce non-communicable disease incidence rates and delay the age of onset of non-communicable diseases.

A cross sectional study was conducted in the slums of Hyderabad in the year 2014 to determine the risk factors for non-communicable diseases among young adults of age group 20 years and above.³⁶ The prevalence of risk factors for non-communicable diseases among study population was found as sedentary habits (53.6%), abdominal obesity (35.7%), positive family history (26.8%), overweight and obesity (21.7%), alcohol consumption (19%), high salt intake (18.5%), and tobacco use (15.4%).³⁷⁻⁴⁰ The percentage for irregular and inadequate intake of fruits and vegetables (58.8%) was highest among the study population. Suggested recommendations were health promotion programs, healthy dietary practices and adequate physical activity.

In the year 2014, a survey was conducted on 2000 undergraduate students from 4 universities, ranging in ages from 20 to 23 years, in order to determine the prevalence of modifiable risk factors for non-

communicable diseases among them in and around Kampala⁴¹ 42. In males, the prevalence of risk factors was found as alcohol consumption (49%), smoking (20%), physical inactivity (12%), drug abuse (11%) and low intake of fruits and vegetables (7%).⁴³ 44 Whereas in females, the prevalence was found out as alcohol consumption (40%), physical inactivity (14%), drug abuse (13%), smoking (10%) and low fruit and vegetable intake (7%).⁴⁵, 46

In June 2013, a cross-sectional study was conducted on 6532 employees (with private health insurance presenting for health risk appraisal), to determine the prevalence of clustering of risk factors for non-communicable diseases among them.⁴⁷ Participants were within age group 26-46 years and the most prevalent risk factors were physical inactivity (67%) and a basal metabolic index as 62%. Employees who were insufficiently active also had a greater number of other risk factors for NCDs, compared to those meeting recommended physical activity.⁴⁸ 49 The researchers suggested balanced diet and regular exercise to the study population.

A national representative cross-sectional survey was conducted from January to June 2013 on 4,200 respondents (aged 15 to 69 years) to study the prevalence of risk factors for non-communicable diseases using the WHO NCD STEPS instrument.⁵⁰ Insufficient dietary intake of fruits and vegetables was found as the most prevalent risk factor in almost the entire population (99%) with variable ranges of Hypertension (26%), increased cholesterol (23%), overweight/obesity (21%) and smoking (19%). Harmful use of alcohol, low physical activity and raised blood glucose levels were observed as the least frequent risk factors in Nepal.⁵¹-53

A cross-sectional study that included a random sample of 200 adults⁵⁴ 55 was conducted from August 2011 to January 2012 based on the WHO STEPS questionnaire⁵⁶ for the assessment of non-communicable diseases and their risk factors in urban field practice areas of a Medical College in Central District of Delhi.⁵⁷ Out of the 200 participants, 26% were consuming alcohol⁵⁸ and 17% were using tobacco products⁵⁹ while 77.5% were either overweight or obese.⁶⁰ More than one third of the participants had raised values of systolic and diastolic blood pressures and abnormal lipid profiles.⁶¹ 62 More males as compared to females were found to be overweight, in contrast to obesity and raised waist circumference, which were more common in females.

In 2013, data was collected from electronic data basis including Pub Med, Medline and Google Scholar to rule out the conceptual framework for managing modifiable risk factors for CVDs in Indigenous-Fijian and Indo-Fijian population.⁶³ Comparison of prevalence of risk factors for non-communicable diseases was done between the two with the results as decreased vegetable intake (48% versus 56%),⁶⁴-⁶⁶ smoking (45% versus 24%),⁶⁷-⁶⁹ increased cholesterol level (33% versus 39%),⁷⁰ 71 hypertension (21% versus 16%),⁷² 73 alcohol consumption (17% versus 15%),⁷⁴ 75 low fruit consumption as (17% versus 15%), obesity (17% versus 11%),⁷⁶ 77 and diabetes as (12% versus 21%).

A cross sectional study was conducted from December 2011 to March 2012 to evaluate non-communicable diseases in adult population of urban areas in Kabul City, Afghanistan and included a total of 1169 respondents (aged 40 years and above).⁷⁸ The resultant prevalence of the risk factors found in men was hypertension (45.2%), mouth snuff (24.4%), obesity (19.1%), diabetes (16.1%) and smoking at (14.7%). In women, the prevalence of risk factors was hypertension (46.5%), obesity (37.3), diabetes (12%), low dietary consumption of fruits and vegetables (3.37% and 2.96% respectively) and smoking at (0.3%).⁷⁹

A cross-sectional survey was carried out in a sample population (N = 230); between the months of May and June, 2010 in representative of medical and surgical out-patient population of Korle-Bu Teaching Hospital, to determine the prevalence of certain risk factors of non-communicable diseases (NCDs).⁸⁰ The proportion of obesity as a risk factor in the study population was observed as 40.4% with 54% being overweight.⁸¹ Alcohol consumption in the respondents was 64.8%,⁸² physical inactivity 54.3% with 4.8%⁸³-⁸⁶ of the study population a tobacco abuser. Around 48% and 70.9% of the participants consumed fruits and vegetables on less than three days in a week, respectively. The prevalence of hypertension was 33.6% for men and 35.2% for women.⁸⁷ Almost 62% of the participants had a combination of three or more risk factors. Researchers called out for cessation of smoking, intake of well-balanced diet and regular physical exercise.

In January 2008, a study was carried out in Gujarat (India) to identify the distribution of risk factors for non-communicable diseases among 1805 urban and 1684 rural people with ages between 15-64 years.⁸⁸ The prevalence of smoking was higher among rural men (direct tobacco use- 22.8% and consumption of

smokeless tobacco products- 43.4%) as compared to urban men (direct tobacco use- 12.8% and smokeless tobacco consumption- 23.1%) along with an evidence of low dietary intake of fruits and vegetables in the rural areas. Prevalence of overweight, obesity and lack of physical activity was found higher in the urban population.⁸⁹

From September 2008 to January 2009, a cross-sectional study was conducted at Gilgit Gibe Field Research Center of Jinnah University, on individuals aged between 15-64 years (both genders inclusive).⁹⁰ The prevalence of risk factors for non-communicable diseases in population under study was inadequate per day consumption of fruits and vegetables 27% (rural 25.3%, urban 28.2%), smoking 18% (rural 10.6% and urban 5.3%), low levels of physical activity 16.9% (rural 18%, urban 24.8%) and alcohol consumption 8.7% (rural 2.9% and urban 19.6%).⁹¹ The magnitude of prevalence of all risk factors for non-communicable diseases was higher among males as compared to females; physical activity being an exception.⁹²

A survey was conducted on non-communicable diseases' risk factors among physicians and tertiary care hospitals in Mangalore on a total of 100 physicians with a clinical experience of 5 years.^{93- 94}

The prevalence of risk factors was found as overweight (69%), low physical activity (20%), high triglyceride level (9%), alcohol and tobacco use (6% and 1%), high cholesterol level (3%) and hypertension and diabetes mellitus (2%).⁹⁵ The risk factor with the highest prevalence in physicians stood out to be inadequate physical activity and they were concluded to be at a higher risk for cardiovascular diseases.

"Your lifestyle- how you live, eat, emote, and think- determines your health. To prevent disease you may have to change How You Live." -- Brian Carter.⁹⁶

OBJECTIVES:

The objective of the study was to evaluate the "Socioeconomic Status and Prevalence of Modifiable Risk Factors of Non-Communicable Diseases in Young Adults (Age 25-40 Years) Of Bahawalpur City"

OPERATIONAL DEFINITIONS:

Modifiable Factors:

These are the factors which are liable to be altered in order to prevent the occurrence of disease or to change the course of the disease.

It includes smoking, physical inactivity, fruit and vegetable consumptions and Body Mass Index (BMI).

Monthly Family Income (In Rs.)	Score
>100000	7
75000-100000	6
60000-74999	5
45000-59999	4
30000-44999	3
15000-29999	2
<15000	1

Socio-Economic Status:

Socio-economic status is to be assessed on the basis of 3 parameters i.e. education, occupation and monthly family income (in Rs):

Education	Score
Post-Graduation (M.S, M-Phil, PhD, FCPS, DS)	7
Graduation (MBBS, BS Hons, LLB)	6
Intermediate or Post High School Diploma	5
Higher Secondary School	4
Middle School or Matriculation	3
Primary School	2
Illiterate	1

Socio-Economic Class	Score
Upper Class	18-21
Middle Class	7-17
Lower Class	3-3

Occupation	Score
Businessmen	7
Professionals (Doctors, Engineer, Lawyers, Educationists)	6
Government Employee (Gazetted/Private Employee Enjoying Equal Salary Status) Government Employee (Non-Gazetted (Grade 5-16))	5
Private Employee Enjoying Equal Salary Status)	4
Government Employee (Grade 4)/Laborer	3
Students	2
Home Makers	1

Tobacco User/ Smoker

A person with a current smoking status of more than 5 cigarettes per day or one who has been chewing tobacco from last six months.

Low Physical Activity

It refers to less than 150 minutes of sports per week such as jogging or 10 minutes or less of any type of physical activity per day. such as walking to reach the work place, doing physical activity during work or at home, riding bicycle or other similar activity.

Low Fruit and Vegetable Consumption

It refers to less than or equal to 2 servings of fruits or vegetables per day.

One Serving of Fruit

It comprises of one medium sized piece of apple, banana or orange/ half cup of chopped, canned fruit or half cup of fruit juice not flavored artificially.

One Serving of Vegetable

It comprises of one cup of raw green leafy vegetable/ half cup of other vegetable (cooked or chopped raw) or half cup of vegetable juice.

Body Mass Index (BMI)

Weight in kilogram

$BMI = \frac{Weight}{Height^2}$

Underweight < 18.5

Normal 18.5-24.9

Pre-obese 25-29.9

Obese I 30-34.9

Obese II 35-39.9

Obese III > 40

METHODOLOGY:

Study Design:

It was a Descriptive Cross-Sectional Epidemiological study. Study Area:

The study was conducted in four areas of Bahawalpur City:

- 1) Model Town A, B
- 2) Medical Colony
- 3) Hansra Basti
- 4) Tibba Badar Sher

Study Population:

The study was conducted on Young Adults of Bahawalpur City, ages between 25-40 years.

Sampling Technique:

It is a Non-Probability Convenience Sampling.

Ethical Issues:

Informed consent was taken from all participants.

Sample Size:

According to the available time and resources, it was decided to take a sample of 240 young adults, both male and female (ages between 25-40 years).

Inclusion Criteria:

All young adults, males and females between ages 25-40 years, whether single or married were included in the study; who had no prior history of a well-established non-communicable disease.

Exclusion Criteria:

Young adults who were not willing to participate in the study were excluded. **Data Collection Protocol:**

The data was collected through a pre-formed questionnaire, which consisted of two parts; section one included the socio-demographic profile of the respondents and section two comprised of questions regarding the well-established modifiable risk factors for NCDs.

A pre-test assessment was done prior to study to look for any ambiguities in the questionnaire.

Data Analysis:

The data was encoded and entered into SPSS Version 21. Frequencies were run and percentages were calculated. The results were presented in the form of frequency distribution tables. The interpretations were summarized in the form of bar charts and pie charts for an easy comprehension of the statistical data.

RESULTS:

The study analyzed several demographic indicators including socioeconomic status, gender, age, education and occupation of the respondents in relation to the prevalence of risk factors of NCDs. Among the 240 subjects studied by far, 72.5% (N=174) were males and 27.6% (N=66) were females (Table 2). Age distribution showed that 48.33% (N=116) of the respondents belonged to ages 25-28 years, followed by 10.83% (N=26) falling into the age group 29-32 years, 14.17% (N=36) within 33-36 years and 26.67% (N=64) in 37-40 years of age (Figure 4). The mean age of the respondents was calculated as 31.55. Regarding socio-demographic profile of the study sample, more than half 58.3% (N=140) of the participants belonged to the middle socioeconomic class, 22.1% (N=53) to the upper socioeconomic class and 19.6% (N=47) to the lower socioeconomic class (Table 1). Data regarding occupation of the respondents showed a higher percentage of Laborers 33.8% (N=81), followed by Homemakers 19.6% (N=47), Businessmen 10.8% (N=26), Professionals 9.6% (N=23), Students 6.7% (N=16), Govt. Employees (grade 5-16) 4.6% (N=11) and Govt. Employees (Gazetted) 4.2% (N=10) (Table 4). Regarding education, majority of the participants were Graduate 22.1% (N=53), followed by Post-Graduates 21.3% (N=51), then Illiterates 17.1% (N=41) and others 39.5% (N=85) with some level of education (Table 3). About 28.33% (N=68) had a monthly family income of Rs. >100000, 28.33% (N=68) had Rs. <15000 and 43.32% (N=104) had an income ranging between Rs.100000 and Rs.15000 (Figure 2).

The overall prevalence of tobacco smoking was found to be 23.3% (N=56), of which only 0.8% (N=2) were

females and 22.5% (N=54) were males (Table 5) (Figure 14). Majority of the tobacco smokers belonged to the middle socioeconomic class 11.3% (N=27) (Figure 13).

with characteristic prevalence (15%) in the youngest age group under study i.e. 25-28 years (Figure 15); most of them being Graduates 7.1% (N=17) (Figure 16). Tobacco smoking was found most prevalent in the Laborers 8.3% (N=20) (Table 17) and in respondents with a total monthly family income of Rs. <15000 6.67% (N=16) (Table 18). Majority 56.6% (N=124) of the smokers smoked 11-20 cigarettes each day (Figure 3).

None of the female subjects was found to use smokeless tobacco products while males using these constituted 6.7% (N=16) of all respondents (Figure 44); majority of them 3.33% (N=8) belonged to the lower socioeconomic class (Figure 43) and the youngest age group 25-28 years 2.92% (N=7) (Figure 45). Nearly half 3.33% (N=8) of all smokeless tobacco product users were Illiterate (Figure 46) and most of them 5.42% (N=13) were Laborers (Figure 47) with a monthly family income of Rs. <15000 4.58% (N=16) (Figure 48).

The prevalence of passive smoking in the study sample was 37.1% (N=89) (Figure 5). Participants who were exposed to the risk of passive smoking comprised about 29.6% (N=71) males and 7.5% (N=18) females (Figure 20). The middle socioeconomic class constituted most of the passive smokers 19.6% (N=47) (Figure 19). Passive smoking prevailed high in the youngest age group 25-28 years and in Graduates 10.4% (N=59) (Figure 22). The risk factor was found most prevalent in the Laborers constituting 11.7% (N=28) of total passive smokers followed by Businessmen 5.8% (N=14) (Figure 23) in the same order.

Out of 60% (N=144) of all respondents consuming low dietary fruits (Table 7), 50% (N=120) with low dietary intake of fruits fell in youngest age group 25-28 years (Figure 27). Highest percentage was found among the Illiterate comprising 15% (N=36) of all participants with low dietary fruit intake, followed by Graduates 10.8% (N=26) (Figure 28). 27.9% (N=67) of the respondents with low dietary intake were reported to be Laborers (Figure 29). Respondents with a monthly family income of Rs. <15000 constituted a huge majority of sample with low fruit intake 24.2% (N=58) (Figure 30).

Dietary intake of vegetables was reported to be low in 24.2% (N=58) of the respondents (Figure 6); of which

15.4% (N=37) were males and 8.8% (N=21) were females (Figure 32). Majority 12.5% (N=30) of them belonged to the middle socioeconomic class followed by the upper socioeconomic class 8.8% (N=21) (Figure 31). Age wise distribution of low dietary intake of vegetables showed that it was most prevalent in the youngest age group 25-28 years 10.8% (N=26) (Figure 33) and among Graduates 7.9% (N=19) (Figure 34). Out of 24.2% (N=58) of the respondents with low dietary intake, 5% (N=12) were Professionals, 3.3% (N=8) were Businessmen, 2.9% (N=7) Students and 3.3% (N=8) Laborers in the same order (Figure 35). Majority 10.8% (N=26) of the study sample consuming low dietary vegetables had a monthly family income of Rs. >100000, followed by 4.2% (N=10) with an income between Rs. 75000-100000 (Figure 36).

25.8% (N=62) of all the respondents were found to have less than adequate physical activity (Table 8), of which 12.9% (N=31) were males and 12.9% (N=31) females (Figure 38); most of them 18.3% (N=44) belonged to the middle socioeconomic class (Figure 37). Low physical activity was found equally prevalent 10% (N=24) in the youngest as well as the oldest age group under study i.e. 25-28 years and 37-40 years (Figure 39). Education wise distribution of low physical activity showed that out of all the

respondents with low physical were males and 10% (N=24) were females (Figure 26) and most of them were found to come from the middle socioeconomic class (Figure 25). Most of the study sample 32.1% (N=77) activity 8.75% (N=21) were Post-Graduates, followed by 7.9% (N=19) Graduates and then 5.83% (N=14) Intermediates in the same order (Figure 40). Low physical activity was found most prevalent in Home Makers constituting 10% (N=24) of all the respondents with insufficient physical activity followed by Businessmen 4.58% (N=11) (Figure 41).

Regarding BMI, more than half 55% (N=132) of the respondents were categorized to be normal, 5.8% (N=14) underweight, 29.6% (N=71) pre-obese and 9.6% (N=23) obese (Table 10). Majority of the obese respondents came from the middle socioeconomic class i.e. 7.5% (N=18) (Figure 7) and more than half 5.42% (N=13) of them were females (Figure 8). Obesity was found to be most prevalent in the oldest age group (37-40 years) at 4.2% (N=10) followed by 3.8% (N=9) in the youngest age group (25-28 years) (Figure 9). Home Makers constituted about half 4.2% (N=10) of the all obese respondents, followed by Students 2.5% (N=6) (Figure 11). Majority 2.92% (N=26) of the respondents with obesity had a monthly family income of Rs. >100000 (Figure 12).

Table No. 1. Frequency Distribution of Socioeconomic Status among the Respondents

Socioeconomic	Class Frequency	Percent %
Lower Class	47	19.6
Middle Class	140	58.3
Upper Class	53	22.1
Total	240	100.0

Table No. 2. Frequency Distribution of Gender among the Respondents

Gender	Frequency	Percent %
Male	174	72.5
Female	66	27.5
Total	240	100.0

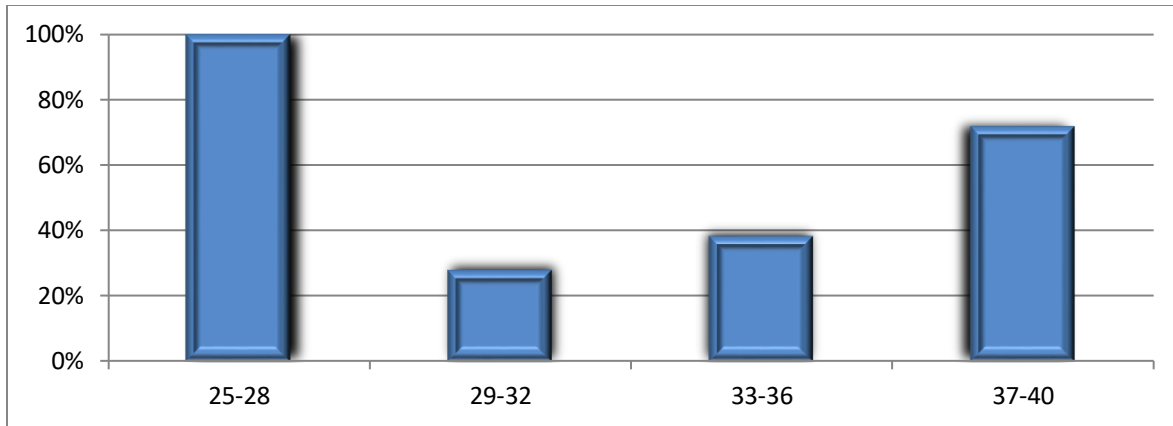


Figure No-1 Age Distribution among the Respondents.

Table No. 3. Frequency Distribution of Education among the Respondents

Level of Education	Frequency	Percent %
Illiterate	41	17.1
Primary	6	2.5
Middle	32	13.3
High School	26	10.8
Intermediate	31	12.9
Graduate	53	22.1
Post Graduate	51	21.3
Total	240	100.0

Table No. 4. Frequency Distribution of Occupation among the Respondents

Occupation	Frequency	Percent %
Businessmen	26	10.8
Professionals	23	9.6
Govt. Employee (Gazetted)	10	4.2
Private Employee Enjoying Equal Salary Status of Gazetted	4	1.7
Govt. Employee (Grade 5-16)	12	5.0
Private Employee Enjoying Equal Salary Status of Grade 5-16	11	4.6
Govt. Employee (Grade 4)	10	4.2
Laborers	81	33.8
Student	16	6.7
Home Maker	47	19.6
Total	240	100.0

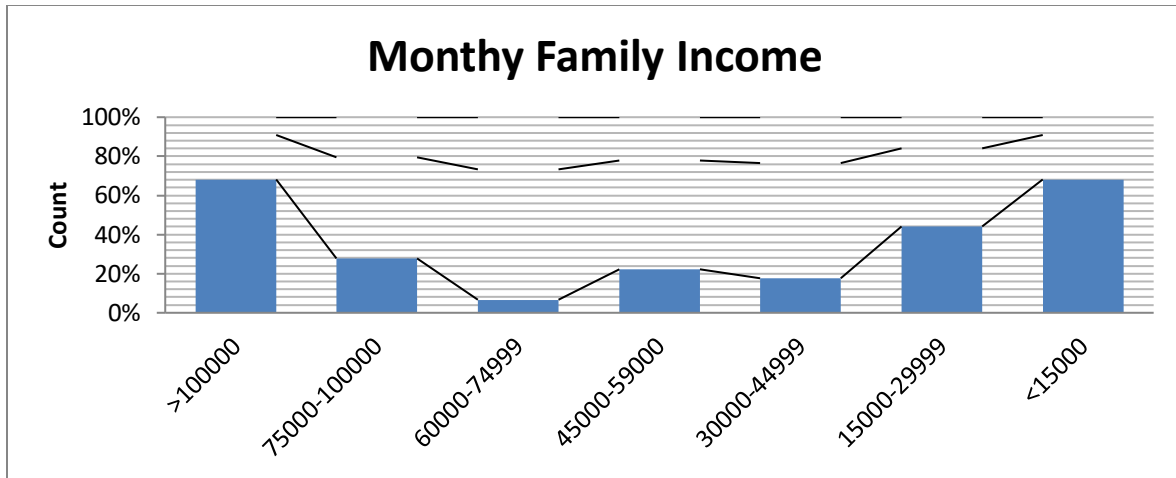


Figure No.2. Distribution of Monthly Family Income among the Respondents.

Table No. 5. Prevalence of Tobacco Use among the Respondents

Tobacco Use	Frequency	Percent %
Smokers	56	23.3
Non-Smokers	184	76.7
Total	240	100.0

Table No. 6. Frequency Distribution of Duration of Tobacco Use among the Smokers

Duration	Frequency	Percent %
In Years	55	98.3
In Months	1	1.78
Total	56	100

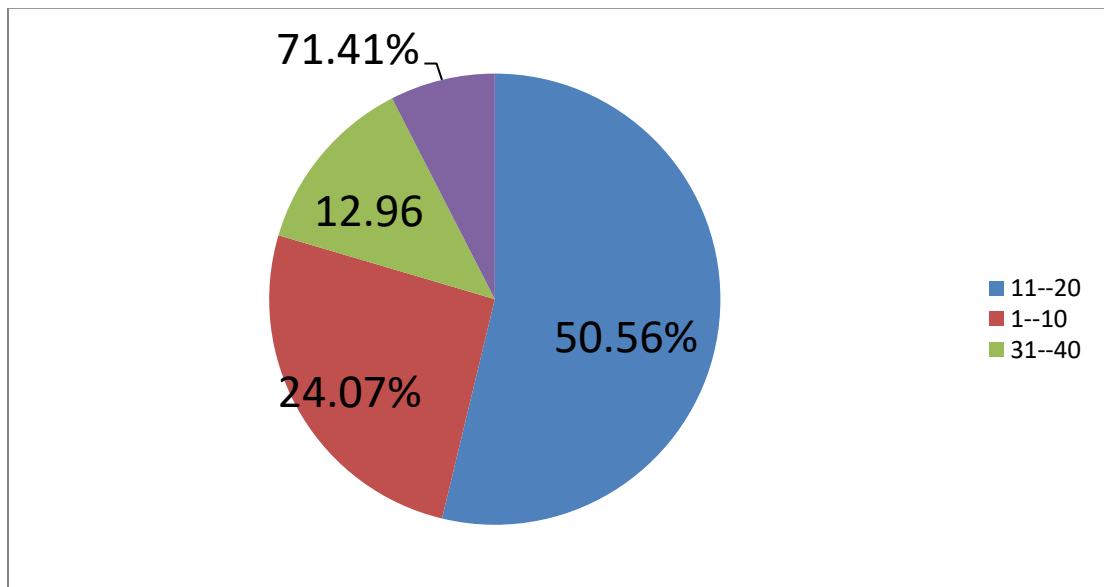


Figure No.2. Distribution of Daily Cigarette Consumption among the Smokers

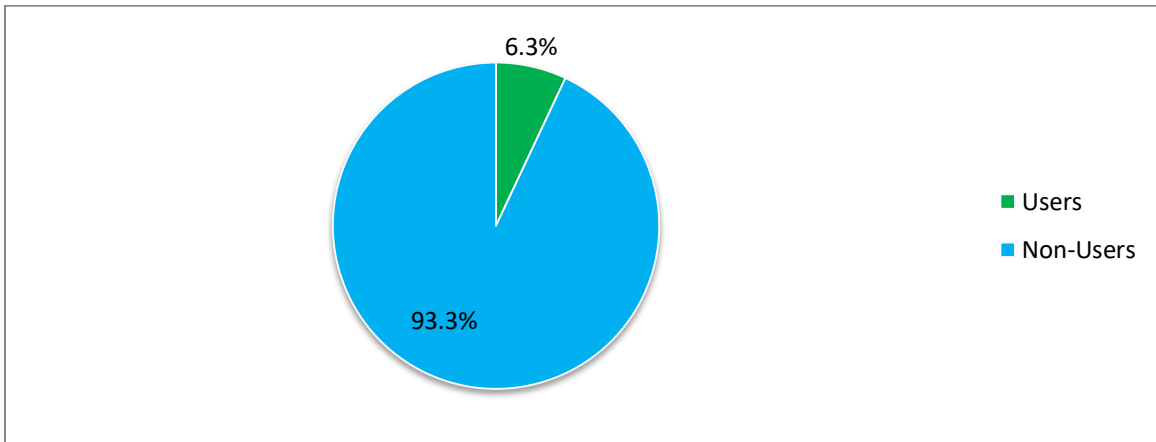


Figure No.4.Prevalence of Use Smokeless Tobacco Products among Respondents.

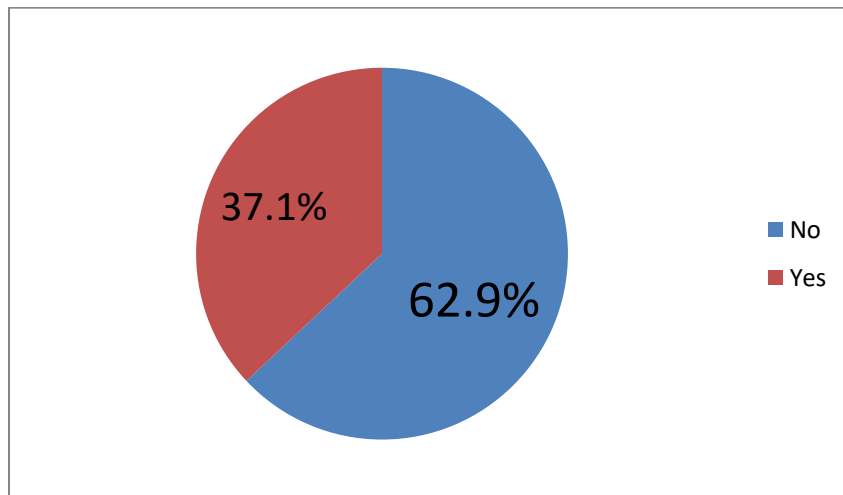


Figure.5.Prevalence of Passive Smoking among the Responders.

Table No. 6. Frequency Distribution of Dietary Intake of Fruits among the Respondents

Fruit Intake	Frequency	Percent 0%
Low	144	60.0
Normal	96	40.0
Total	240	100.0

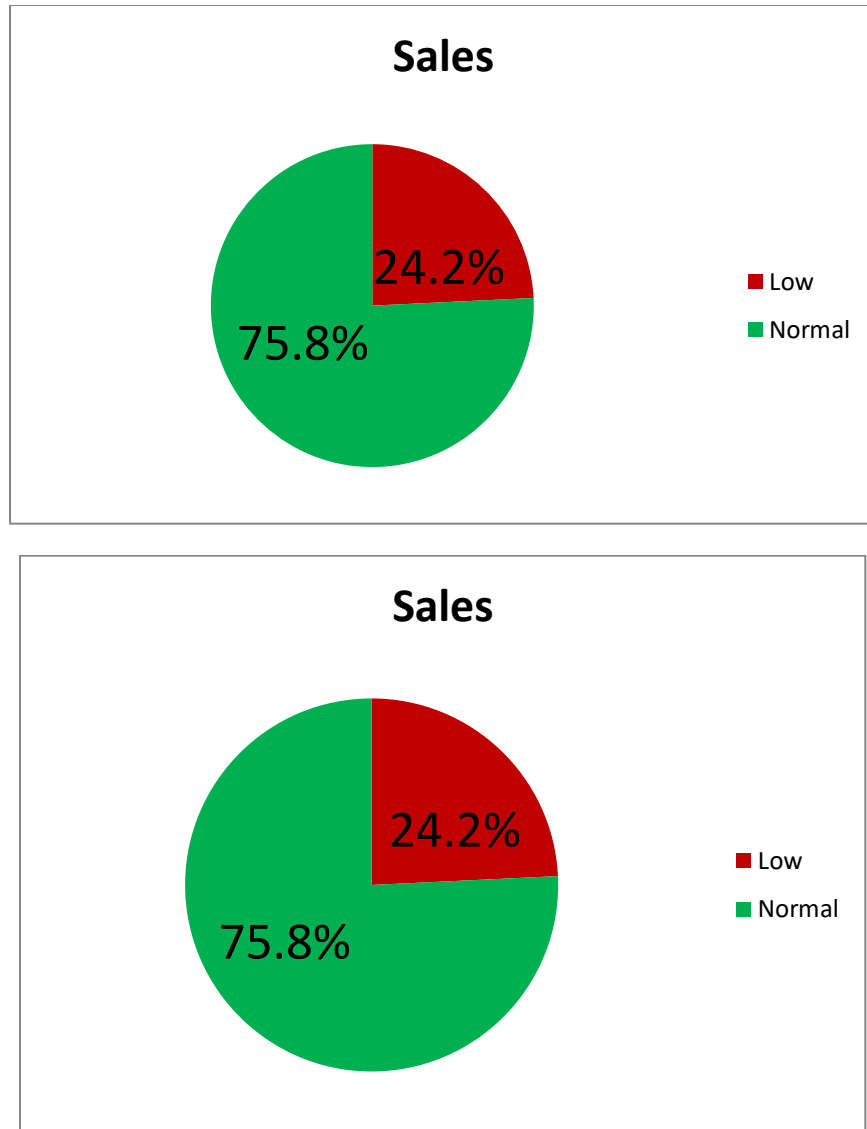


Figure No.6. Distribution Dietary Intake of Vegetable among the Respondents.

Table No. 8. Frequency Distribution of Duration of Physical Activity among the Respondents.

Physical Activity Per Day	Frequency	Percent %
Low (<10 minutes)	62	25.8
Adequate (>10 minutes)	178	74.2
Total	240	100.0

Table No. 9. Frequency Distribution of Respondents involved in Sports Activiti

Sports Activity (In a	Frequency	Percent %
Yes	68	28.3
No	172	71.7
Total	240	100.0

Table No. 10. Frequency Distribution of BMI among the Respondents.

BMI	Frequency	Percent %
Underweight	14	5.8
Normal	132	55.0
Pre Obese	71	29.6
Obese I	19	7.9
Obese II	3	1.3
Obese III	1	0.4
Total	240	100.0

Table No. 11. Prevalence of Risk Factors of NCDs according to Socioeconomic Status

Risk Factors		Socioeconomic Status			
		Lower Class	Middle Class	Upper Class	Total
BMI	Underweight	7	7	0	14
	Normal	25	84	23	132
	Pre Obese	12	31	28	71
	Obese I	3	14	2	19
	Obese II	0	3	0	3
	Obese III	0	1	0	1
Tobacco Smoking	Yes	11	27	18	56
	No	36	113	35	184
Use of Smokeless Tobacco Products	Users	8	6	2	16
	Non-Users	39	134	51	224
Passive Smoking	Yes	20	47	22	89
	No	27	93	31	151
Fruit Intake	Low	42	80	22	144
	Normal	5	60	31	96
Vegetable Intake	Low	7	30	21	58
	Normal	40	110	32	182
Physical Activity	Low(<10 Minutes)	0	44	18	62
	Adequate (<10 Minutes)	47	96	35	178

Table No. 12. Gender Wise Prevalence of Risk Factors of NCDs

Risk Factors		Gender		
		Male	Female	Total
BMI	Underweight	14	0	14
	Normal	99	33	132
	Pre Obese	51	20	71
	Obese I	9	10	19
	Obese II	1	2	3
	Obese III	0	1	1
Tobacco Smoking	Yes	54	2	56
	No	120	65	184
Use of Smokeless Tobacco Products	Users	16	0	16
	Non-Users	158	66	224
Passive Smoking	Yes	71	18	89
	No	103	48	151
Fruit Intake	Low	120	24	144
	Normal	54	42	96
Vegetable Intake	Low	37	21	58
	Normal	137	45	182
Physical Activity	Low(<10 Minutes)	31	31	62
	Adequate (<10 Minutes)	143	35	178

Table No. 13. Age Wise Prevalence of Risk Factors of NCDs

Risk Factors		Class interval (Age)				Total
		25-28	29-32	33-36	37-40	
BMI	Underweight	9	1	2	2	14
	Normal	71	16	21	24	132
	Pre Obese	27	8	8	28	71
	Obese I	8	0	2	9	19
	Obese II	1	1	0	1	3
	Obese III	0	0	1	0	1
Tobacco Smoking	Yes	36	5	8	7	56
	No	80	21	26	57	184
Use of Smokeless Tobacco Products	Users	7	2	3	4	16
	Non-Users	109	24	31	60	224
Passive Smoking	Yes	59	10	9	11	89
	No	57	16	25	53	151
Fruit Intake	Low	77	15	21	31	144
	Normal	39	11	13	33	96
Vegetable Intake	Low	26	3	11	18	58
	Normal	90	23	23	46	182
Physical Activity	Low(<10 Minutes)	24	4	10	24	62
	Adequate (<10 Minutes)	92	22	24	40	178

Risk Factors		Education							Total
		Illiterate	Primary	Middle	High School	Intermediate	Graduate	Post Graduate	
BMI	Underweight	5	0	4	4	0	1	0	14
	Normal	23	4	24	12	15	29	25	132
	Pre Obese	10	2	3	7	8	18	23	71
	Obese I	3	0	1	3	5	5	2	19
	Obese II	0	0	0	0	3	0	0	3
	Obese III	0	0	0	0	0	0	1	1
Tobacco Smoking	Yes	10	2	11	5	4	17	7	56
	No	31	4	21	21	27	36	44	184
Use of Smokeless Tobacco Products	Users	8	1	0	3	1	0	3	16
	Non-Users	33	5	32	23	30	53	48	222
Passive Smoking	Yes	18	2	12	7	10	25	15	89
	No	23	4	20	19	21	28	36	151
Fruit Intake	Low	36	6	26	17	18	26	15	144
	Normal	5	0	6	9	13	27	36	96
Vegetable Intake	Low	5	1	5	2	7	19	19	58
	Normal	36	5	27	24	24	34	32	182
Physical Activity	Low(<10 Minutes)	0	1	3	4	14	19	21	62
	Adequate (<10 Minutes)	41	5	29	22	17	34	30	178

Risk Factors		Occupation											Total
		Business Men	Professionals	Govt Employ	Private Employ	Govt Employ	Private Employee Grade	Govt Employ	Laborers	Students	Home Makers		
BMI	Underweight	0	0	0	0	0	1	1	11	1	0	14	
	Normal	12	10	6	3	7	7	8	48	7	24	132	
	Pre Obese	14	12	3	1	4	3	0	19	2	13	71	
	Obese I	0	1	1	0	1	0	1	3	5	7	19	
	Obese II	0	0	0	0	0	0	0	0	1	2	3	
	Obese III	0	0	0	0	0	0	0	0	0	1	1	
Tobacco Smoking	Yes	14	4	3	2	3	4	3	20	2	1	56	
	No	12	19	7	2	9	7	7	61	14	46	184	
Use of Smokeless Tobacco Products	Users	1	1	0	0	0	1	0	13	0	0	16	
	Non-Users	25	22	10	4	12	10	10	68	16	47	224	
Passive Smoking	Yes	14	6	6	2	6	4	3	28	8	12	89	
	No	12	17	4	2	6	7	7	53	8	35	151	
Fruit Intake	Low	13	9	5	1	4	3	10	67	13	19	144	
	Normal	13	14	5	3	8	8	0	14	3	28	96	
Vegetable Intake	Low	8	12	2	2	1	2	2	8	7	14	58	
	Normal	18	11	8	2	11	9	8	73	9	33	182	
Physical Activity	Low(<10 Minutes)	11	5	3	1	3	4	5	0	6	24	114	
	Adequate (<10 Minutes)	15	18	7	3	9	7	5	81	10	23	126	

Risk Factors		Occupation							Total
		>100000	75000-100000	60000-74999	45000-59000	30000-44999	15000-29999	<15000	
BMI	Underweight	0	0	0	1	0	4	9	14
	Normal	29	12	7	10	7	20	47	132
	Pre Obese	32	9	1	5	2	12	10	71
	Obese I	6	1	0	1	4	5	2	19
	Obese II	1	0	0	1	1	0	0	3
	Obese III	0	1	0	0	0	0	0	1
Tobacco Smoking	Yes	12	6	5	4	3	10	16	56
	No	56	17	3	14	11	31	52	184
Use of Smokeless Tobacco Products	Users	1	1	0	0	1	2	11	16
	Non-Users	67	22	8	18	13	39	57	224
Passive Smoking	Yes	24	5	5	8	8	11	28	89
	No	44	18	3	10	6	30	40	151
Fruit Intake	Low	23	12	4	8	7	32	58	144
	Normal	45	11	4	10	7	9	10	96
Vegetable Intake	Low	26	10	1	3	5	6	7	58
	Normal	42	13	7	15	9	35	61	182
Physical Activity	Low(<10 Minutes)	32	10	1	5	4	8	2	62
	Adequate (<10 Minutes)	36	13	7	13	10	33	66	178

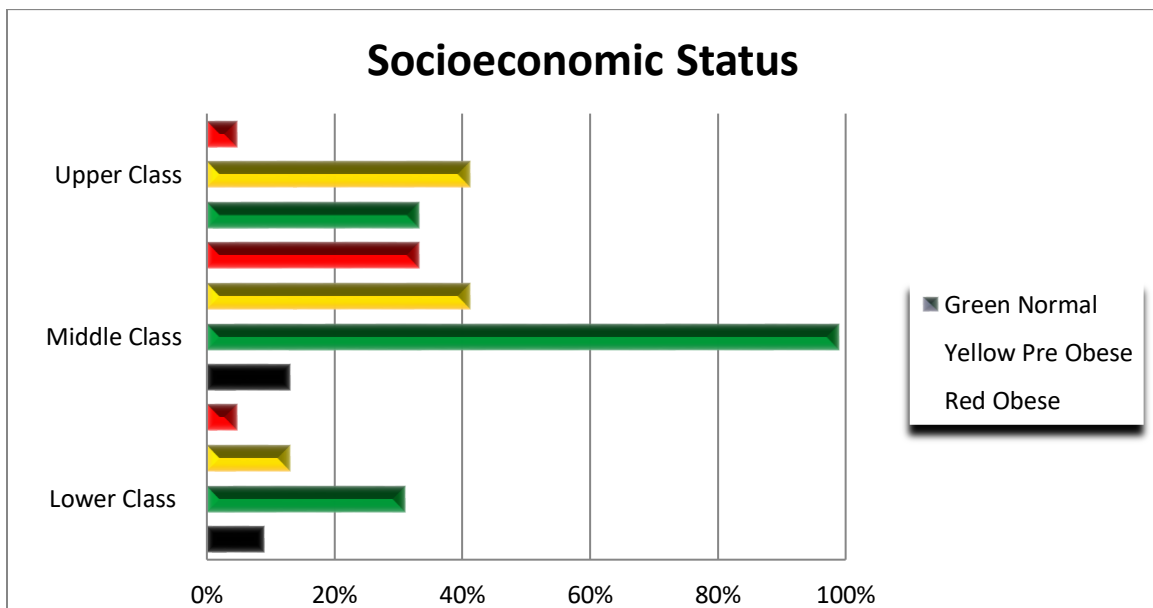


Figure No.7. Prevalence of Obesity among the Respondents according to Socioeconomic.

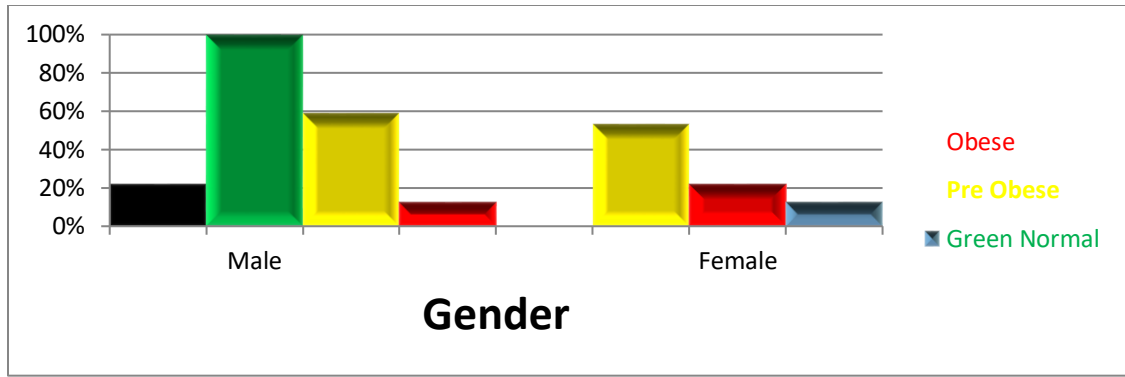


Figure No .8. Gender Wise Prevalence of Obesity among the Respondents

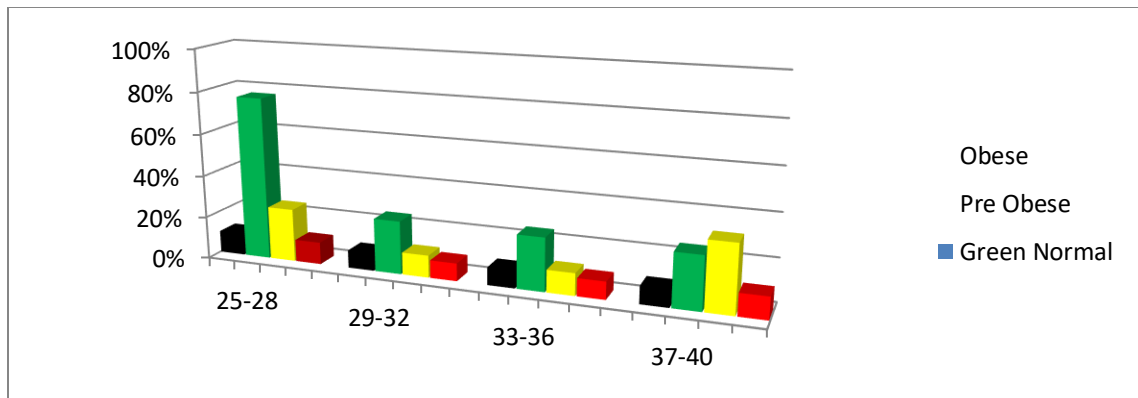


Figure No.9. Age Wise Prevalence of Obesity among the Respondents.

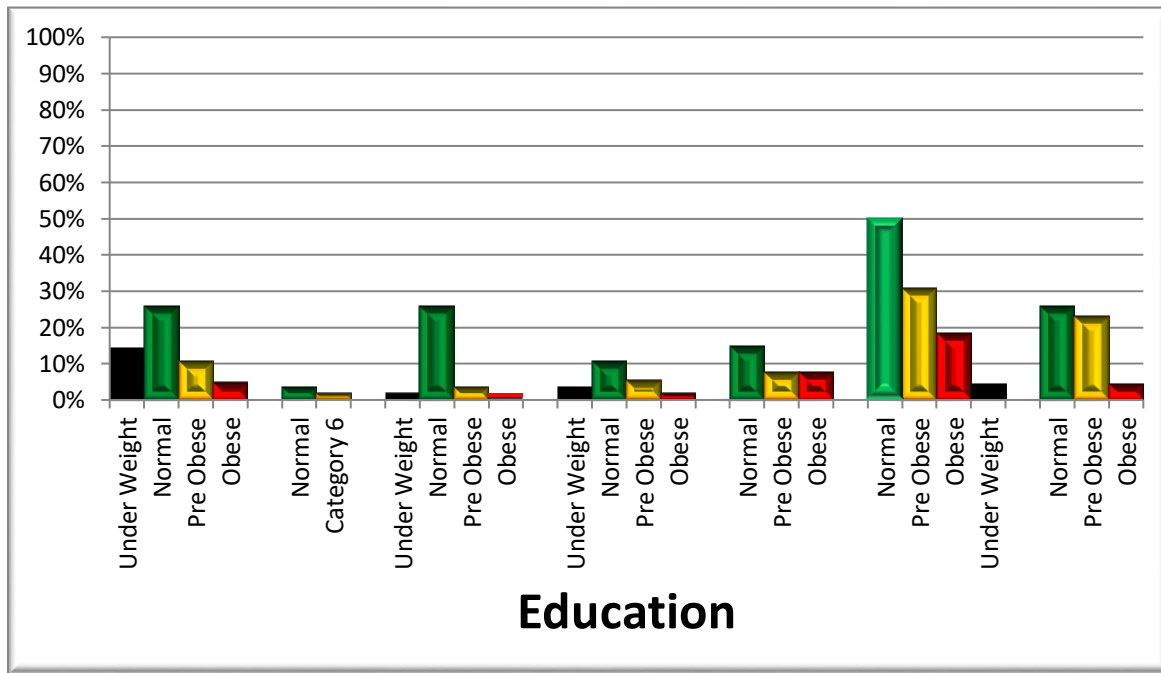


Figure No.10. Prevalence of Obesity among the Respondents according to Education

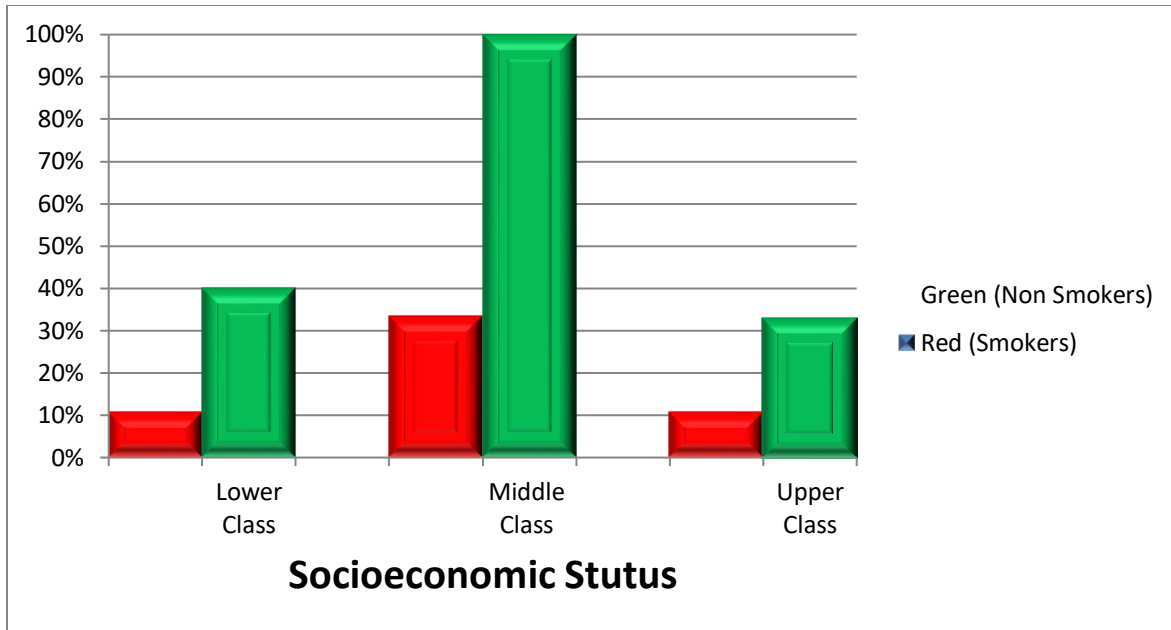


Figure .No11. Prevalence Tobacco Smoking among the Respondents according to Socioeconomic Status.

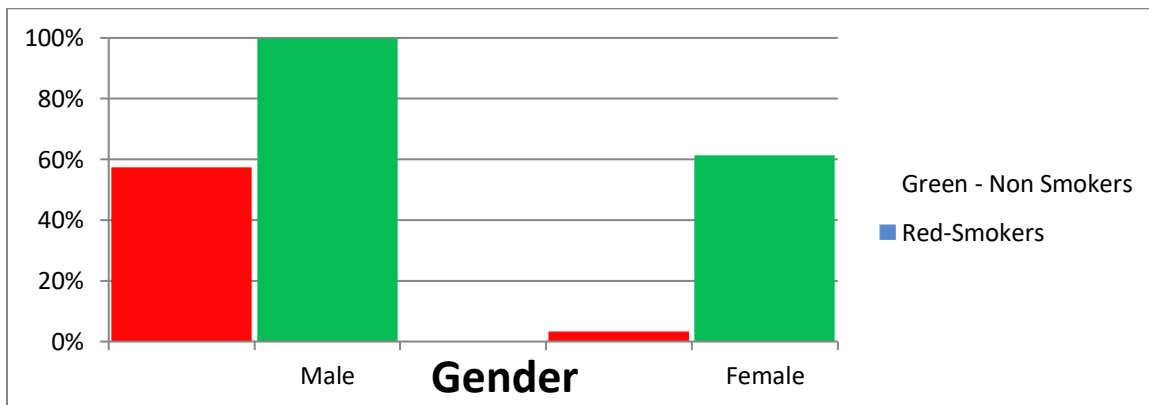


Figure No.14. Gender Wise Prevalence Tobacco Smoking among Respondents.

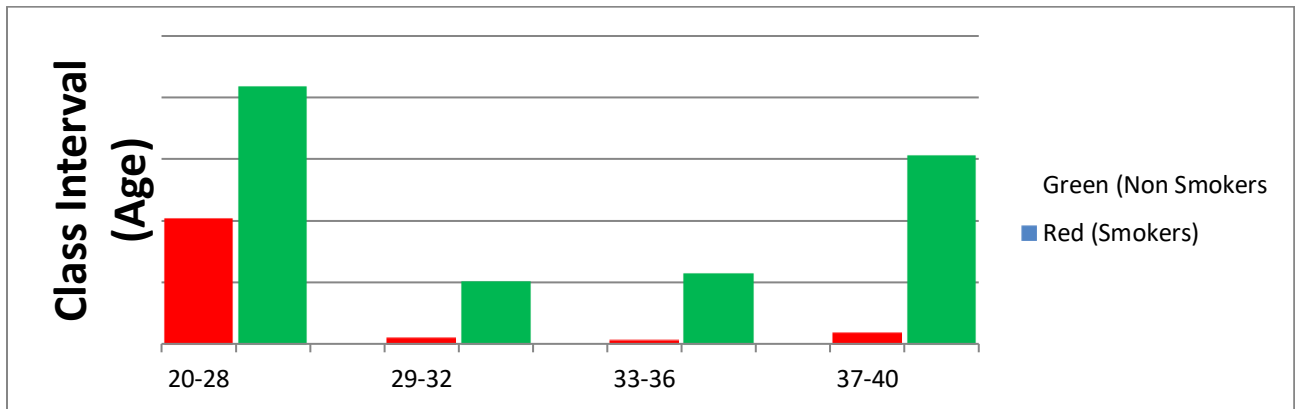
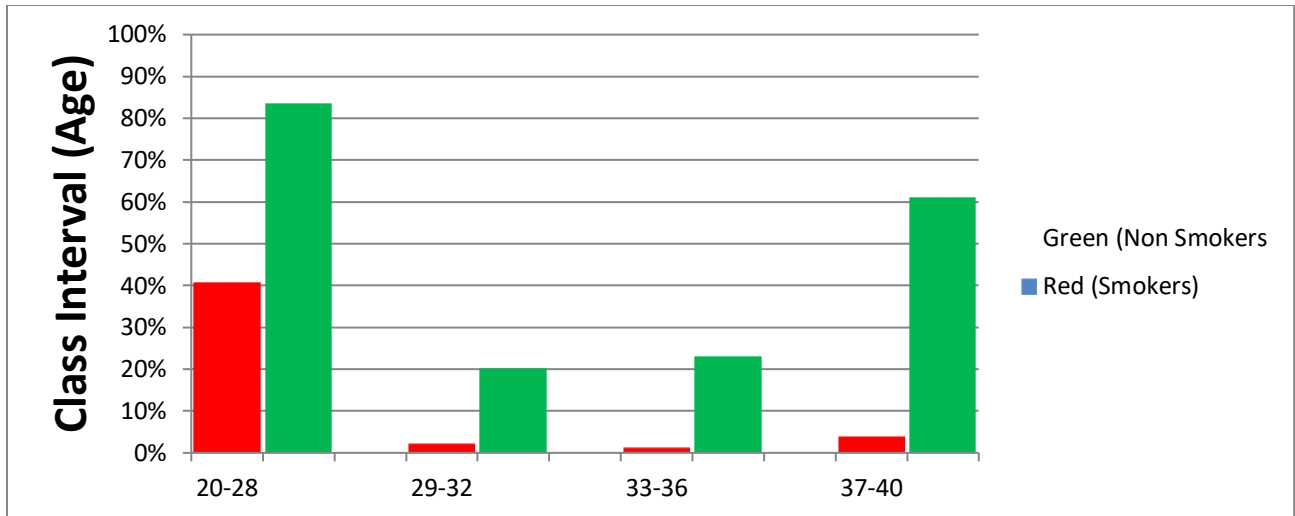
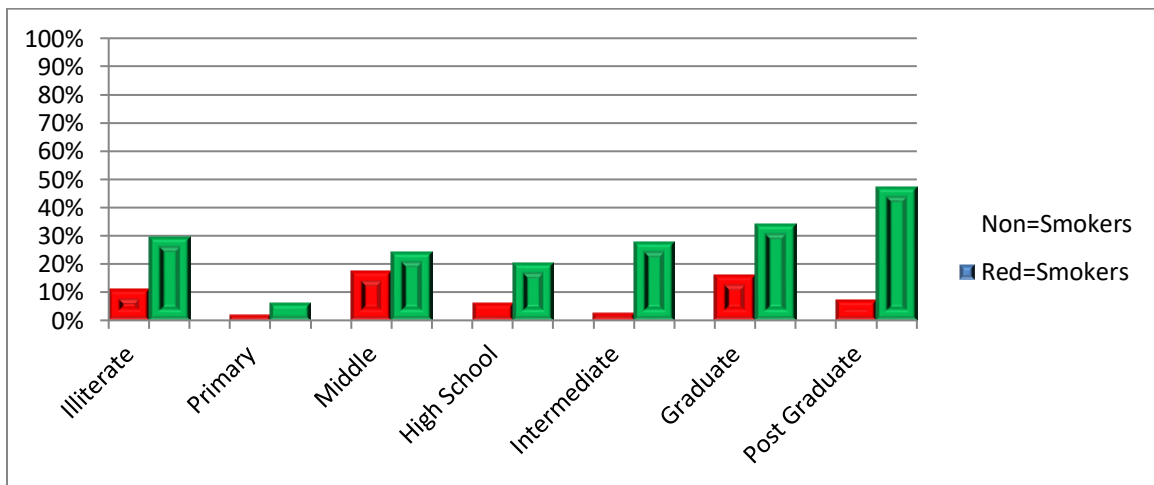
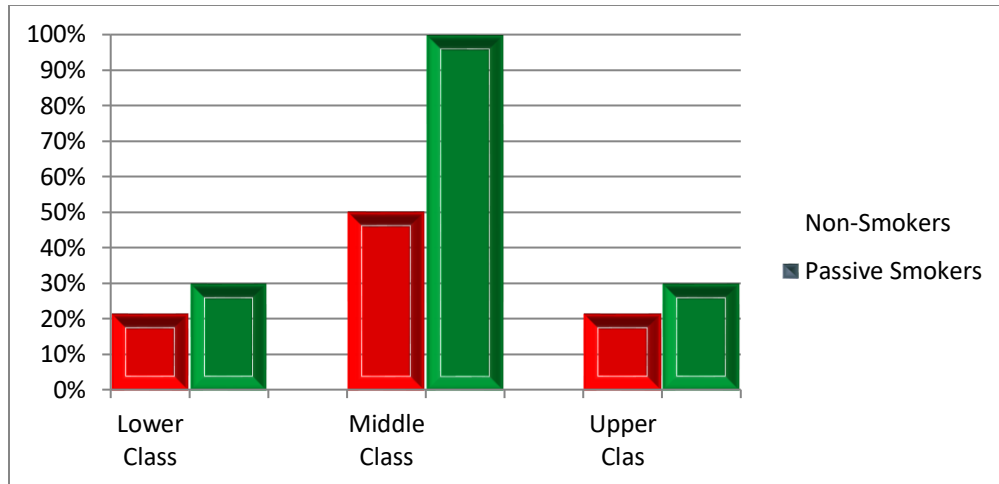


Figure .No15. Age Wise Prevalence of Tobacco Smoking among Respondents.



Education:

Figure No.16. Prevalence of Tobacco Smoking among Respondents According to Educational Class.



Socioeconomic Status
Figure No.19. Prevalence of Passive Smoking among Respondents According to Socioeconomic Status.

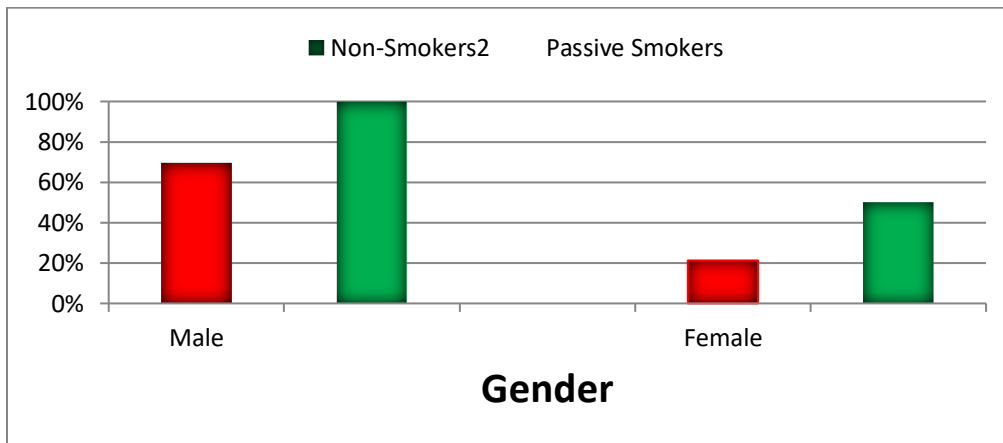


Figure No.20. Gender Wise Prevalence of Passive Smoking among Respondents.

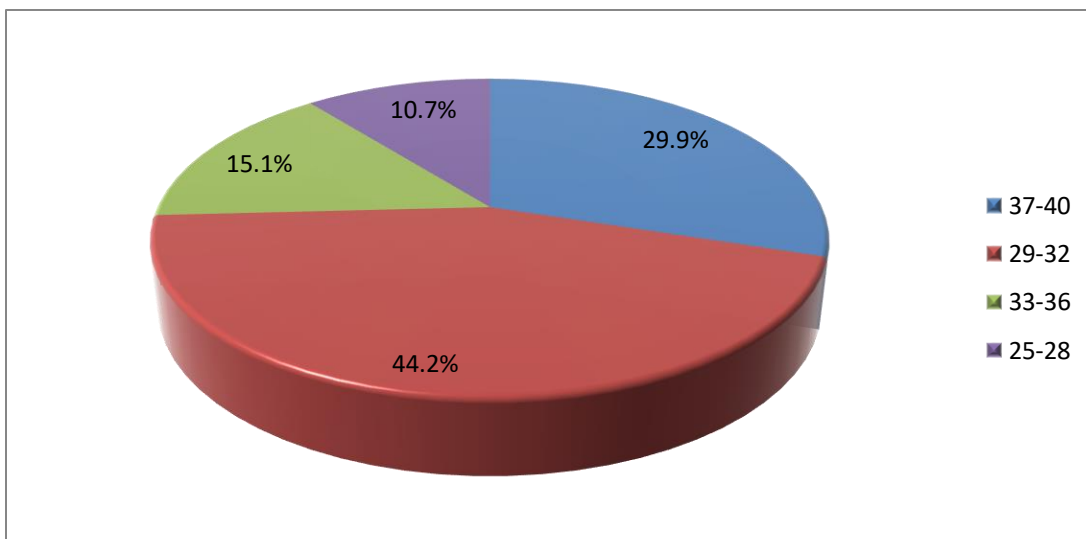


Figure No.21. Age Wise Prevalence of Passive Smoking among Respondents.

DISCUSSION:

The WHO fact sheets (updated in January, 2015) recapitulate non-communicable diseases as a leading threat to human health and human development in today's world. NCDs are related to the interaction of various genetic, environmental and lifestyle factors, including smoking, unhealthy diets, physical inactivity and obesity. They often prevail disproportionately in disadvantaged socio-economic populations and represent a major obstacle to the economic development of many countries.

Our study revealed that the overall prevalence of smoking in the respondents was 23.3%; of which 22.5% were males and 0.8% females. Majority (11.3%) of the smokers belonged to the middle socio-economic class and (15%) were from the youngest age group under study i.e. 25-28 years. The highest proportion (8.3%) of individuals appearing as tobacco users were from the Labor Class and (6.67%) earned a monthly family income of less than Rs. 15000. This is in collaboration with a similar study conducted at Kabul, Afghanistan in 2009. According to which, majority (37.25%) of the males were smokers and only a slight proportion (0.17%) of the females was involved in smoking. The middle socio-economic class earned the highest prevalence (17.23%) of tobacco users. Tobacco smoking was found most prevalent (5.76%) in the respondents with a monthly family income of less than Rs. 15000.⁹⁹ It, therefore, becomes the need of the hour to devise a comprehensive approach to reduce the risks associated with tobacco abuse, as well as promote the interventions to prevent and control it with special reference and concern to the adolescent population.¹⁰⁰ According to our study, none of the female subjects was found to use smokeless tobacco products while 6.7% of the males were reported to consume them. A majority (3.33%) of these males belonged to the lower socio-economic class and (2.92%) came up from the youngest age group under study i.e. 25-28 years. Nearly half (3.33%) of all the smokeless tobacco users were illiterate and most of them (5.42%) were laborers; (4.58%) had a monthly family income of less than Rs. 15000. These results are in consistence with those of a study conducted by WHO in Karnataka, India in 2005.¹⁰¹ The report then stated that the prevalence of use of smokeless tobacco products was almost negligible in the female population. Most (6.35%) of the users of such products belonged to the lower socio-economic class, while a huge majority (6.32%) of users who were laborers by profession. In accordance with our study, the prevalence of passive smoking in all the respondents was 37.1%; of which 26.9% were males and 7.52%

were females. The middle socio-economic class constituted most (19.6%) of the passive smokers and the risk factor yielded high prevalence in the youngest age group of the study 25-28 years and in Graduates (10.4%). Laborers were remarkably exposed to the second hand smoke constituting 11.7% of the total passive smokers followed by Businessmen (5.8%). This is in significance with a study conducted in Brasilia, Brazil in 2015.¹⁰² According to it, more males (28.2%) as compared to females (3.5%) were passive smokers. Most of the passive smokers came up from the middle socio-economic class. On the contrary, a study held in Mogadishu, in 2011¹⁰³ showed that passive smoking had been a high prevailing factor among Students (12.3%) followed by Laborers (5.1%); while our study relates the increased prevalence with the Laborer class (11.7%).

Our study revealed that, out of 60% of the respondents with a low dietary intake of fruits; 50% were males and 10% were females and a majority of them belonged to the middle socio-economic class. Most (32.1%) of the study sample to have a low dietary intake of fruits ranged in ages between 25-28 years. Highest percentage (15%) among all the participants was of Illiterate followed by Graduates (10.8%) in the same order. About 27.9% of the respondents with low fruit consumption were reported to be Laborers. Respondents with a monthly family income of less than Rs. 15000 constituted a vast majority (24.2%) of population with an inadequate dietary intake of fruits. Mass education to increase production and consumption of healthy selections would cause huge benefit to the society.¹⁰⁴ The aforementioned results of our study are consistent with a study conducted in Kathmandu, Nepal in 2011.¹⁰⁵ According to which, majority (52.3%) of the respondents with low fruit intake were males. The risk factor prevailed high in the youngest age group, in Laborers (213%) and in respondents with a total family income of less than Rs. 15000. A study conducted in Maharashtra, India in 2011¹⁰⁶ showed that most of the respondents with low dietary fruit intake came up from the low socio-economic class, whereas, our study revealed that inadequate dietary intake of fruits prevailed in the middle socio-economic class.

In our study, the dietary intake of vegetables was reported to be low among 24.2% of all respondents. Out of which 15.4% were males and 8.8% were females. Majority (12.5%) of these respondents belonged to the middle socio-economic class. Age wise distribution of low dietary intake of vegetables showed that it was most prevalent (10.8%) in the

youngest age group 25-28 years; followed by Graduates (1.9%). Out of 24.2% respondents with low dietary intake; 5% were Professionals; 3.3% Businessmen; 2.9% Students and 3.3% Laborers. A good majority (10.8%) of the study sample with low vegetable intake had a family income of greater than Rs. 100,000; followed by those with an income ranging between Rs. 75000-100,000 (4.2%). This is in collaboration with a study conducted in Hyderabad, India in 2014.¹⁰⁷ According to it, there was a higher percentage of males (17.3%) as compared to females (6.2%) with low vegetable intake. Majority of them belonged to the upper socio-economic class. Age wise distribution showed that low dietary intake of vegetables was most prevalent in the youngest age group. Out of all the respondents with such low intake, (7.2%) were Professionals. Majority of the individuals with a family income greater than Rs. 100,000 consumed inadequate vegetables.

Our study disclosed that 25.8% of all the respondents possess low physical activity, of which 12.9% were males and 12.9% were females. Most (18.33%) of them belonged to the middle socio-economic class. The risk factor prevailed high (10%) in the youngest age group 25-28 years; and similarly (10%) in the oldest age group 37-40 years. Education wise distribution of low physical activity recorded Post Graduates to be least active (8.75%) followed by Graduates (7.9%). These results are in collaboration with a study from Central India, which showed that majority (36.3%) of the respondents with low physical activity were males and (14.2%) were females; most of all belonged to the middle socio-economic class.

Regarding BMI, more than half (55%) of all the respondents were categorized as normal, 5.8% underweight; 29.6% pre-obese and 9.6% crossed the borderline for obesity. Majority (7.5%) of the obese respondents came up from the middle socio-economic class and more than half (5.42%) of them were females. Obesity was found to be most prevalent (4.2%) in the oldest age group under study (37-40 years) followed by (3.8%) of the youngest age group 25-28 years. Homemakers constituted about half (2.92%) of all obese respondents followed by Students. Majority (2.92%) of these had a monthly family income of greater than Rs. 100,000. An overlap between low physical activity and obesity among educated people is

- suggestive of their sedentary lifestyle.¹⁰⁸ '09 This calls for a sound public health approach to promote the need for compulsory sports hours in curriculum of educational institutes. The results of our study are

consistent with a research conducted by University of Kabul in 2010. According to which, among all the respondents, 4.8% were normal; 10.25% were underweight; 30.6% pre-obese; 10.6% obese. Majority (6.4%) of the obese were females. A research conducted in North America in 2014, showed that majority of the obese arose from the upper socio-economic class (7.5%). The risk factor of obesity was found prevailing more in the youngest age groups.

CONCLUSION:

A high burden of the risk factors of NCDs was observed with almost all of them being most prevalent in the middle socioeconomic class and the youngest age group under study (25-28 years). Out of the entire study sample, risk of tobacco smoking and use of smokeless tobacco products was exclusively prevalent in males and was found negligible in females, indicating that females continued to follow the socio-cultural norms.

A very large proportion of study population was exposed to risk factor of low dietary intake of fruits possibly due to illiteracy and poverty. The population was found unaware of the benefits of eating fruits to their health. An overlap between low physical activity and obesity among educated population is suggestive of the sedentary life style and rapid urbanization.

RECOMMENDATIONS:

- Promotion of quality healthcare practices via mass education and sound public health approach to introduce and develop health seeking behaviour among individuals is a high recommendation.
- Clear cut proclamation of the adverse health effects of certain lifestyle habits including direct tobacco use and second hand smoke and imparting knowledge about the health benefits of its cessation.
- Making the healthy selections more accessible by increasing the production, importation and utilization of fruits and vegetables across all age groups as specific targets.
- Instigation of strategies that support and promote weight reduction through modification of the diet and adoption of adequate physical activity.

- Identification and dealing with preventable causes of illnesses by prioritizing primary prevention programs with least cost and higher benefits in national and provincial resource allocation.
- Reversion of focus of policy and planning to become health oriented rather than disease oriented with enhanced improvement in primary care and health promotion.
- Intentional designing and strengthening of environment to improve individual behaviour, personal choices and personal responsibilities, together with metabolic and physiological risk factors. Full-flagged and group specific screening programs for adolescent population are to be endorsed in order to respond to the growing threat posed by NCDs.

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