

# "A STUDY ON LIFESTYLE DISEASES AND IT'S HEALTH RISK"

DISSERTATION SUBMITTED TO MAHATMA GANDHI  
UNIVERSITY, KOTTAYAM

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE AWARD OF THE DEGREE OF

**BACHELOR OF SCIENCE IN ZOOLOGY**



DEPARTMENT OF ZOOLOGY

BHARATA MATA COLLEGE

THRIKKAKARA

2018-2021

**SUBMITTED BY:** GOKUL. K. R

**REG. NO.** : 180021043807

**EXAMINERS** : 1.

2.

**DEPARTMENT OF ZOOLOGY**  
**BHARATA MATA COLLEGE**  
**THRIKKAKARA**

DATE:

**CERTIFICATE**

This is to certify that the project entitled " **A STUDY ON LIFESTYLE DISEASES AND IT'S HEALTH RISK** " is a bonafide work done by **GOKUL. K. R** with **Register No: 180021043807** under the supervision of **Dr.SHERIN ANTONY** during 2018-21 in partial fulfilment of the requirement for the award of the **Bachelor of Science in Zoology** of Mahatma Gandhi University, Kottayam.

**HEAD OF THE DEPARTMENT**

**DR. PRIYALAKSHMI G**

## **ACKNOWLEDGEMENT**

First of all, I would like to thank the Almighty for showering his blessings to fulfil my project without any obstacles and for giving me strength to complete my work.

Then I would like to express my sincere gratitude to Dr. Priyalakshmi G., head of the department of Bharat Mata College, Thrikkakara and Dr. Sherin Antony; guide and Ancy V A; co-guide, for their constant support, guidance and inspiration throughout my project.

I am extremely grateful to Dr. Shiny Palatty, Principal, Bharata Mata College, Thrikkakara for providing me such a wonderful platform to complete my project.

I would like to appreciate faculties especially Dr. Simi Joseph P., Department of Zoology, Bharata Mata college for their critical support and guidance and constant encouragement.

And I would also like to express my gratitude to Mr. Joshy for providing appropriate necessities throughout my work

Lastly, I owe my parents and friends for their moral support, encouragement and co-operation throughout my work.

## CONTENTS

CONTENTS	PAGE NO.
• <b>SYNOPSIS</b>	<b>5</b>
• <b>INTRODUCTION</b>	<b>6</b>
• <b>AIM AND OBJECTIVE</b>	<b>10</b>
• <b>REVIEW OF LITERATURE</b>	<b>11</b>
• <b>MATERIALS AND METHODS</b>	<b>17</b>
• <b>RESULTS</b>	<b>19</b>
• <b>DISCUSSION</b>	<b>26</b>
• <b>CONCLUSION</b>	<b>30</b>
• <b>REFERENCES</b>	<b>31</b>
• <b>KEYWORDS</b>	<b>36</b>

## **SYNOPSIS**

Rapid development of mankind has led to progress but has also been enduring uncountable lifestyle diseases. Emerging technologies has drastic change in day-to-day routines of people, consequences being multiple life-style diseases. Reports suggest high mortality worldwide owing to lifestyle diseases. The main objective of the survey is to examine the increasing incidence of lifestyle disorders among Indians are largely attributed by unhealthy lifestyle practices like poor dietary pattern, inadequate physical activity, smoking, alcohol consumption and stress.

In a cross-sectional study the data from sample size of 102 by random sampling was considered for the study and a well validated questionnaire was administered. The survey was conducted among adults with the objective to determine the effectiveness of the lifestyle management program in terms of gain in knowledge on lifestyle disorders and change in self-reported lifestyle practices. The survey focuses in detail on diet, exercise, smoking and alcohol consumption, and attempts to assess the prevalence of particular patterns of health-related behaviour in different groups of the population and their associations with fitness and health. Data collected relating to lifestyle risk factors and diseases were analysed. Over the collected data we observed that, gastrointestinal complications, followed by diabetes, hypertension, cholesterol, etc. are the most common lifestyle diseases reported, and also a significant association of other risk factors were studied along with lifestyle diseases is reported.

Results obtained signify the adverse behaviour of the population regarding health necessities. The survey confirmed that the vast majority of people (approximately 72%) (urban and rural) are free from lifestyle diseases in the current situation, and if not properly cared for, they are at risk of health risks. The rest of the respondents who are confirmed with the lifestyle diseases such as blood pressure, diabetes, cholesterol, etc are presently at health risk and need to be treated properly with nutritious diet and medication. A population-based program of screening of lifestyle diseases may be beneficial for the prevention of non-communicable diseases.

## CHAPTER I

# INTRODUCTION

Lifestyle is defined as the set of habits and customs that is influenced, modified, encouraged, or constrained by the lifelong process of socialization. These habits and customs include dietary habits, exercise, use of substances such as alcohol and tobacco which have important implications for health (*Porta M.,2008*). Lifestyle is a way in which an individual cope himself physically, socially, psychologically, and economically through day to day that is incredibly vital.

Lifestyle disturbances results in physical limitations and if are overlooked can develop into non-communicable diseases. Lifestyle diseases are characterized on the basis of prevalence on daily habits of individuals and are fallouts of an inappropriate relationship of individuals with their surroundings. Various factors contribute to lifestyle diseases, most importantly unhealthy food habits, physical inactivity, disturbed biological clock, and inappropriate body posture (*Sharma M., Majumdar PK., 2009*). Lifestyle diseases include diseases such as hypertension, type 2 diabetes mellitus, obesity, stroke and diseases associated with smoking, alcohol, and drug abuse.

India is among the fastest developing country in the world and with this rapid development, it has left behind people with uncountable diseases. These diseases generally are of two type's communicable or non-communicable diseases (NCDs). NCDs can also be called as lifestyle diseases. Few to name are diabetes, cancer, cardiovascular diseases, blood pressure/hypertension, etc. In 2016, 63% of the total death in India was due to NCDs (*World Health Organization, 2018*) and from the total death worldwide, 35 million individuals died of NCDs in 2005 (*World Economic Forum Report of a Joint Event, 2008*).and according to WHO data of 2016 from total death worldwide, 40.5 million individuals died of NCDs, this number of death due to NCDs/lifestyle diseases are increasing year by year, lifestyle diseases. Physical inactivity and consumption of tobacco, cigarettes and alcohol can also lead to lifestyle diseases (*Deepadarshan H., Shweta D., 2017*) .

With increased urbanization and rapid development in the past few years the increase in these diseases has reached disturbing proportion, in the recent years, among Indians (*Pappachan MJ., 2011*). NCDs have not only become a major health problem in urban but also in rural population inhabitants (*Srinath K., Shah B.,2005*). In the general population, NCDs are

common among the poor and young segments. The decline in communicable diseases and increase in chronic NCDs, due to epidemiological transition is occurring in many states of India (Gupta R., Al-Odat NA., et.al, 1996). Recent information collected from several sources show a higher risk of NCDs in rural population and people with weak socioeconomic standing which indicates that the pattern of the disease is changing from wealthy to the deprived (Whiting D., Unwin N., et.al, 2010),( Jeemon P., Reddy KS., 2010).

A significant upward trend has been observed in lifestyle diseases with increase in blood pressure and glucose levels as brought out by the latest research in this field (Lewington S., Clarke R., et.al,2002) (Stratton IM., Adler AI., et.al,2000). In addition, among the borderline normal individuals, i.e., high-normal blood pressure, impaired fasting glucose, and impaired glucose tolerance, there is evidence suggestive of increased vascular risk (Fuller JH., Shipley MJ., et.al, 1980) These individuals with borderline parameters have shown high rate of conversion from at risk status, to disease viz. hypertension and type 2 diabetes mellitus. Lifestyle diseases are part of the metabolic syndrome, which expose vulnerable individuals to twice the risk for future cardiovascular morbidity and mortality (Lorenzo C., Okoloise M., et.al, 2003).

Cardiovascular disease is reported to be the leading cause of death in world. In 1998, 12.4 million people died of heart attack and stroke. Of these 78% were low a middle-class population of the world. Though, several clinical and biochemical risk factors have been identified, the role of psychological factors are also gaining importance during the past few decades. Several risk factors have been identified to be associated with the coronary heart disease (CHD) which include causative risk factors (hypertension, cholesterol and diabetes), condition risk factors, and predisposing risk factors (obesity, physical activity, sex, family history, socioeconomic factors, and psychological factors etc.). Evidences of various studies has shown a strong association in psychological stress and CHD. Cardiovascular disorders pose a major problem for industrialized societies in terms of excess of morbidity and mortality. It is evident from the review of literature that the there is a strong relationship between the coronary heart disease and some psychological factors. Psychological variables like stress, personality, anxiety and lifestyle are contributing along with high blood pressure, obesity, lack of exercise, cigarette smoking and high blood cholesterol to the development of CHD.

## **Characteristics of NCDs**

**Complex etiology (causes):** Non communicable diseases are driven by seemingly unrelated causes such as rapid unplanned urbanization, globalization of unhealthy lifestyles and population ageing. Apparent causes such as raised blood pressure, increased blood glucose, elevated blood lipids and obesity may be representations of deep lying lifestyle habits.

**Multiple risk factors:** There are a number of risk factors that lead to the onset and development of NCDs. The various types of risks can be divided into three primary risk sets: modifiable behavioural risk factors, non-modifiable risk factors and metabolic risk factors, many of which are common for a number of diseases.

**Long latency period:** The latency period of NCDs is generally long, often stretching from many years to several decades.

**Non-contagious origin (noncommunicable):** NCDs are not communicated from one person to another, so it is a given that these diseases develop in a person from non-contagious origins.

**Prolonged course of illness:** NCDs are chronic in nature and thus the course of illness is often prolonged and takes years before a patient may be forced to opt for medical care or intervention.

**Functional impairment or disability:** NCDs usually give rise to circumstances that make it difficult for the patients to lead a normal life. Patients with chronic NCDs may not be able to take part in regular physical activity, go to the office or eat normally.

A significant proportion of this morbidity and mortality could be prevented through population-based strategies, and by making cost-effective interventions accessible and affordable, both for people with established disease and for those at high risk of developing disease. To address the rising burden of noncommunicable diseases, in May 2000 the 53rd World Health Assembly adopted the WHO Global Strategy for the Prevention and Control of Noncommunicable Diseases. In doing so, it placed noncommunicable diseases on the global public health agenda. Since then, WHO has strengthened its efforts to promote population-wide primary prevention of noncommunicable diseases, through the Framework Convention on Tobacco Control and the Global Strategy for Diet, Physical Activity and Health. These activities target common risk factors that are shared by CVD, cancer, diabetes and chronic respiratory disease, and their implementation is critical if the growing burden of noncommunicable diseases is to be



controlled. These measures should make it easier for healthy people to remain healthy, and for those with established CVD or at high cardiovascular risk to change their behaviour. However, population wide public health approaches alone will not have an immediate tangible impact on cardiovascular morbidity and mortality, and will have only a modest absolute impact on the disease burden. By themselves they cannot help the millions of individuals at high risk of developing CVD or with an established CVD. A combination of population-wide strategies and strategies targeted at high-risk individuals is needed to reduce the cardiovascular disease burden. The extent to which one strategy should be emphasized over the other depends on achievable effectiveness, as well as cost-effectiveness and availability of resources.

This study was conducted to assess the various correlates of lifestyle diseases among the population of rural and urban area.

## **AIM AND OBJECTIVES**

The present investigation entitled “**LIFESTYLE DISEASES AND HEALTH RISK SURVEY**” was carried out with the following objectives

- The project seeks to collect data on the nutritional intake of the population.
- The project seeks to collect data on the dietary pattern of the population.
- The project seeks to integrate physical activity into the daily routines of the population.
- The project seeks to gather information about diabetes as a risk factor for lifestyle diseases.
- The project seeks to gather information about cholesterol as a risk factor for lifestyle diseases.
- The project seeks to gather information about cardiovascular diseases and other non-communicable diseases as a risk factor for lifestyle diseases.
- The project seeks to know the health status of the population.
- The project is aimed at improving general health and raising awareness among the population.

## CHAPTER II

# **REVIEW OF LITERATURE**

Lifestyle is a way in which an individual cope himself physically, socially, psychologically, and economically through day to day that is incredibly vital. Lifestyle disturbances results in physical limitations and if are overlooked can develop into NCD's. Lifestyle diseases are characterized on the basis of prevalence on daily habits of individuals and are fallouts of an inappropriate relationship of individuals with their surroundings. According to *Mukesh Sharma and P K Majumdar* (2003), various factors contribute to lifestyle diseases, most importantly unhealthy food habits, physical inactivity, disturbed biological clock, and inappropriate body posture.

### **2.1 NUTRITION**

According to *World Health Organization* (2003), the importance of nutrition for the prevention and management of chronic disease is well known. As per the study of *L. Nicholas, D. Roberts, and D. Pond* (2003), inadequate or overnutrition has been proposed to account for up to two-thirds of risk for certain chronic problems like type 2 diabetes and cardiovascular disease and a significant proportion of other chronic ailments. Health problems have been related to both specific nutrients and overall meal patterns, with inflammatory biomarkers generally accompanying those foods/eating patterns associated with disease risk in the presence and the absence of obesity was studied by *G. Egger and J. Dixon* (2010) and *J. Barbaresko, M. Koch, M. B. Schulze, and U. Nothlings* (2013).

*J. H. O'Keefe, N. M. Gheewala, and J. O. O'Keef* (2003), studied that excessive energy intake, particularly of high energy-dense, but low nutrient-dense products, is a major problem of industrialised societies. Still, excessive intake of even healthy foods can increase postprandial (and potentially chronic) metaflammation, suggesting negative long-term outcomes. At the other extreme, chronic energy restriction is now well documented as being associated with increased longevity and improved health was propose by *C. W. Bales and W. E. Kraus* (2013).

In relation to nutrition quality, studies conducted by *P. C. Calder, N. Ahluwalia, F. Brouns et al.* (2011) have reported increased risk and elevated metaflammation from excessive amounts of sugars, salt, alcohol, and (saturated and trans) fats, as well as inadequate levels of fibre, fruit, vegetables, grains, and certain nutrients. Levels of processing have been proposed by *C. A. Monteiro* (2009), *L. Cordain* (2012) and *T. C. Campbell and T. M. Campbell* (2008), in their

studies as a general indication of risk, and there appears to be a clear postprandial “metaflammatory” trail from processed versus whole foods, suggesting an evolutionary role in nutritional health. Although individual and genetic factors influence outcomes, the worst-case scenario for obesity and chronic disease based on current evidence would be an excessive amount of a modern, western diet made up of highly processed foods was observed by *D. M. Minich and J. S. Bland* (2013). While there may be controversy over an ideal diet (Mediterranean, anti-inflammatory, paleo, etc.), *M. Pollan* (2008), dictum to “Eat food. Mostly plants. Not too much”, provides a simple, concise, and accurate long-term nutritional goal.

## **2.2 PHYSICAL ACTIVITY**

*D. Dunstan, H. Howard, et.al.*, (2012), inactivity, as well as sedentary activities like sitting, in contrast to insufficient physical activity, is an independent risk factor for disease. It is one of the major unhealthy anthropogens of our times with links to over 35 different diseases. Movement, physical activity, and exercise can be conceived of as gradations along a scale and all have a role, to different degrees, in primary prevention of a range of diseases and, in some cases, treatment and reversal of risks and/or disease entities (namely, type 2 diabetes). This is mainly through the modems of aerobic capacity and/or muscle strength and integrity. Flexibility and balance provide musculoskeletal integrity that can enhance quality of life.

Poor nutrition and inactivity are the best-known inducers of weight gain. Several studies however now show that either poor nutrition or inactivity can independently modify metaflammation without significant changes in weight was the observation as a result of studies conducted by *M. D. Phillips, R. M. Patrizi, et.al.* (2012) and *M. D. Phillips, R. M. Patrizi, et.al.*(2011) .

## **2.3 MENTAL HEALTH** (Stress, Anxiety, and Depression)

*K. Gémes, S. Ahnve, et.al.*, (2008) and *T. Almadi, I. Cathers, et.al.*,(2013) studied that the nature of stress has changed in recent times from an acute warning signal to a chronic strain on physiological adaptation. Typically, the body’s reaction to a stressor has been “flight” or “fight,” but these options are less viable in the modern environment, leading to chronic effects such as elevated adrenocortical hormone concentrations, activation of the sympathetic nervous system, ailments like heart disease, and accompanying vascular, metabolic, and inflammatory processes. Of itself, stress is not a health issue, and a certain amount within the coping capacity of the individual is vital for a healthy life. It is the “strain,” resulting from excessive stress,

outside the limitations of the stressed to cope, and resulting in anxiety and depression that can lead to allostasis and chronic disease.

Anxiety is a form of “feared helplessness” defined as “...*a thin stream of fear trickling through the mind. If encouraged, it cuts a channel into which all other thoughts are drained*” by *M. E. Seligman* (1975). Anxiety occurs while an individual is striving to adapt and the association of this with ill-health is diffuse. However, it is when striving ceases that depression or “learned helplessness” can result, with more defined channels into a range of chronic diseases. High levels of depression have been shown to be related to a range of chronic diseases from type 2 diabetes to Alzheimer’s was the result of the studies conducted by, *J. B. Dixon, J. L. Browne, G. W. Lambert et al.* (2013) and *P. Gracia-García, C. de-la-Cámara, J. Santabárbara et al.* (2015). A consistent finding is a link between stress, anxiety, and depression and increased inflammatory markers, which can be associated with or independent of body weight.

## **2.4 SLEEP**

According to *W. C. Dement* (2000), healthy sleep is the anchor for a healthy life, thus interacting with other chronic disease determinants discussed here. From the studies of *M. E. Wells and B. V. Vaughn* (2012), we see that together with inactivity, inadequate sleep is one of the most underrated lifestyle risk factors for chronic disease. Poor sleep is associated with an increase in inflammatory markers, as well as more classic risk factors and significant social impacts was an important result of studies by *J. E. Ferrie, M. Kivimäki, T. N. Akbaraly et al.* (2013) and *G. G. Alvarez and N. T. Ayas* (2004). The cumulative long-term effects of sleep deprivation and sleep disorders are observed in the studies of *H. R. Colten and B. M. Altevogt, Eds.* (2006), where these sleep disorders are associated with a wide range of deleterious health consequences including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke. *M. A. Carskadon and W. C. Dement* (2010), studies observed that as many as 80% of people in western countries will suffer from a sleep problem at some stage in their life, 30–50% will have difficulty in sleeping. According to the *US National Sleep Foundation*, the average of eight to nine hours sleep per night in previous years has now dropped to around seven hours per night, with 37% of young adults getting <7 hours in 2002 compared to less than half that (16%) in 1960.

## **2.5 OBESITY**

Obesity is a world-wide health problem across the lifespan that also affects the elderly in developed and emerging countries. In these countries, their populations have proportionally greater numbers of older adults living to older ages, and the prevalence of obesity is increasing rapidly even at these oldest ages.

*Villareal, D. T., Banks, et.al (2004)* and *Chumlea, W. M., & Sun, S. S. (2004)* studies suggested that, absolute and relative fat redistribution, sarcopenia, limited physical activity, poor fitness, chronic inflammation and hormonal changes occur frequently in the latter stages of the aging process. These are all clinical markers and risk factors for obesity, and overweight, obesity and abdominal obesity are risk factors for numerous chronic diseases and premature mortality throughout adulthood. These clinical determinants and their interactions are important in the aetiology, onset, duration, health management and consequences of obesity in old age. Combinations of these risk factors accelerate senescence and increase the cost of acute and chronic rehabilitation and palliative care in the elderly was suggested from the studies of *Stevens J, Cai J, et.al (1998)*. However, epidemiological data suggest that obesity among the elderly is protective against some health risks and morbid conditions such as hip fractures. Nevertheless, an increasing proportion of obese elderly in a population is a significant health concern, and its impact on the treatment and financial aspects of a health-care system must be carefully examined.

## **2.6 DRUGS, CIGARETTES, AND ALCOHOLISM**

Drugs, both licit and illicit, are responsible for a significant and increasing degree of morbidity and mortality in modern societies. The stand-out amongst licit products is cigarette smoking and its links with cancers, heart disease, and respiratory problems was studied by *J. Rehm, B. Taylor, and R. Room (2006)*. Legal medications form another category of drug related mortality and morbidity. *B. Shapiro, D. Coff, et al. (2013)* categorise problematic drug use into hazardous use, substance abuse, or substance dependence. Unfortunately, some of the most effective medications for disorders such as schizophrenia, depression, and certain forms of epilepsy increase hunger, weight gain, and cardio-metabolic risk. Illicit drug use (and the accompanying health effects) appears to increase with increased urbanization, economic prosperity, and inequality.

Its more ambiguous outcomes make alcohol a more diverse problem. Some health and social benefits of moderate consumption are difficult to weigh up against the severe health and social disruption of excessive consumption, binge drinking, social and economic costs, and other

chronic disease outcomes was studied by *D. Huang, Z. Hunter, and L. H. Francescutti (2013)*. Overuse of alcohol is also known to have deleterious effects on several forms of disease including cancers, although this literature is not expanded on here. While excessive alcohol intake is inflammatory, moderate intake has an anti-inflammatory effect was the result of a studies conducted by *J. H. O'Keefe, K. A. Bybee, and C. J. Lavie (2007)*.

## **2.7 DIABETES MELLITUS**

The study of *Hu, F. B. (2011)* shows that type 2 diabetes mellitus (T2DM) has now spread to every country in the world, with Asia accounting for 60% of the world's diabetic population. Obesity and T2DM have become a central medical problem among immigrants and minorities.

There are three patterns of increase in diabetes prevalence: gradual, rapid and accelerated. The prevalence rates today are 4%-9% in Europeans and reach 14%-20% among Asian immigrants to India, Arabs, Chinese, individuals of African descent and Hispanics. Particularly high rates of diabetes, up to about 50%, are found in native populations in the United States, Canada, Australia and the Pacific region. Explanations for the increasing prevalence of diabetes in Europe include changes in lifestyle and obesity was given in the studies conducted by *Bhattarai, M. D. (2009)*. Several hypotheses have been proposed by *Candib, L. M. (2007)* and *Vaag, A. A., Grunnet, et.al, (2012)* was conducted over recent years to explain the rapid and accelerated rise in diabetes among developing nations. One of the explanations, known as the "thrifty phenotype" or "fatal origins of disease", assumes that malnutrition during pregnancy and infancy can lead to a process of adaptation and more "efficient" metabolic production that facilitates the anabolic processing of energy sources when the individual has an unrestricted intake of calories later on. Conversely, the "drifty genotype" hypothesis contends that the prevalence of thrifty genes is attributable to a genetic drift resulting from the disappearance of predate selection pressures.

## **2.7 DIETARY CHOLESTEROL AND CARDIOVASCULAR DISEASES**

Dietary cholesterol has been suggested to increase the risk of cardiovascular disease (CVD), which led to the 2010 *Dietary Guidelines Advisory Committee* recommendations of no more than 300 mg/d of cholesterol for healthy populations. The International Atherosclerosis Society also recommends decreasing dietary cholesterol as a strategy for lowering LDL cholesterol. The 2010 dietary cholesterol recommendations were derived from guidelines established in the 1960s, when little scientific evidence was present, other than the possible association between

saturated fat and dietary cholesterol, as well as animal studies, in which cholesterol was fed in amounts that exceeded typical or normal intakes. In contrast to dietary guidelines in the United States, other developed and developing countries do not have an upper limit on cholesterol intake but focus on controlling the intake of saturated and *trans* fat, which are major determinants of blood cholesterol concentrations.

Since the US dietary cholesterol recommendations were first promulgated, a large number of longitudinal observational studies and intervention trials have been published on the relation between cholesterol intake and cardiovascular outcomes. Some studies have reported dietary cholesterol to increase CVD risk, whereas others reported a decreased risk or no change with higher cholesterol intake was also studied by *Harman, N. L., Leeds, A. R., & Griffin, B. A.* (2008). Given these inconsistencies among studies, the purpose of this systematic review is to determine the potential effect of dietary cholesterol on incident CVD and on serum concentrations of total cholesterol, LDL cholesterol, HDL cholesterol, LDL to HDL ratio, and triglycerides in adults was obtained as a result of study conducted by *Iso, Hiroyasu, et al.* (2001).



CHAPTER III  
**MATERIALS AND MEATHODS**

3.1. STUDY PERIOD & AREA

The present study is a cross-sectional study, conducted in urban and rural areas of Ernakulam district, Kerala, India, during the period of 4 months from December 2020 to April 2021.

3.2. SAMPLE SIZE

Data were collected from 102 respondents of urban and rural population, mainly belonging to the age group of 18-35 years.

3.4. STUDY TOOL

After detailed study about the topic – **LIFESTYLE AND HEALTH RISK**, and also to gain comparative information about population among locality. Then survey material was developed i.e., questionnaire-preparation of questionnaire is based on lifestyle diseases. The questionnaire is strictly dependent on the parameters that are the nutshell of the project and length of Questionnaire is around 30 questions as there are evidences that longer surveys can diminish response rates. The questionnaire was prepared in English. Ethics were prime concern of our project and hence we promise not to leak or share anyone's personal information. Before going to start the main survey, we conducted a pilot survey to test the significance of the questions prepared.

The complete random survey stands on the following parameters physical status, nutritional habits, diseased population, appropriate and inappropriate lifestyle and alcohol/caffeine/tobacco consumption etc. These parameters were considered and further tried to evaluate for most common disease, people prone to lifestyle diseases, comparison of lifestyle diseases in the local population. Hence, to obtain unbiased result different subjects of the survey topic were selected at random and assessed based on certain parameters. The main reason behind choosing this study was almost all the parameters which were selected for study were sophisticatedly covered in this study.

### 3.5. DATA COLLECTION

Random sampling was conducted by taking sample through an online form (google form) and the age group of the samples are above 18 years only. Data regarding socio-demographic profile (personal data), nutritional habits, medical issues (cross verified by taking doctor's prescription), alcohol/cigarette/tobacco consumption, and regular physical activity was collected. The data was entered in MS Excel spreadsheet as well as in SPSS spreadsheet and analysed based on the framed objectives and set parameters using mean and proportion.

### 3.5. MEASUREMENTS

Body mass index (BMI) is a value derived from the mass and height of a person. The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m<sup>2</sup>, resulting from mass in kilograms and height in metres.

$$\text{Body Mass Index (BMI)} = \frac{\text{WEIGHT in Kg.}}{(\text{HEIGHT in metre})^2}$$

## CHAPTER IV

# RESULTS

By considering the survey methodology, the lifestyle diseases vary in different age group and the result can be concluded that life style diseases or disorders are not age dependent disorder. It was observed that the rural population suffers less from lifestyle diseases when compared to urban population. Urban population has more appropriate nutritional habits when compared to rural population.

### 4.1. SOCIO-DEMOGRAPHIC PROFILE

The socio-demographic profile of society (both rural and urban) (Table 4.1), suggests out of the 102 study participants, 37 (36.3%) were male and 65 (63.7%) were females. Mean age of the participants was  $35.03 \pm 2$  years. There was almost equal distribution of age groups.

VARIABLES	SUBJECT (%)	
Mean Age	35.03	0
Sex	Male	37 (36.3%)
	Female	65(63.7%)
BMI	Underweight	7 (6.9%)
	Normal	61 (60.4%)
	Overweight	26 (25.8%)
	Obese	7 (6.9%)

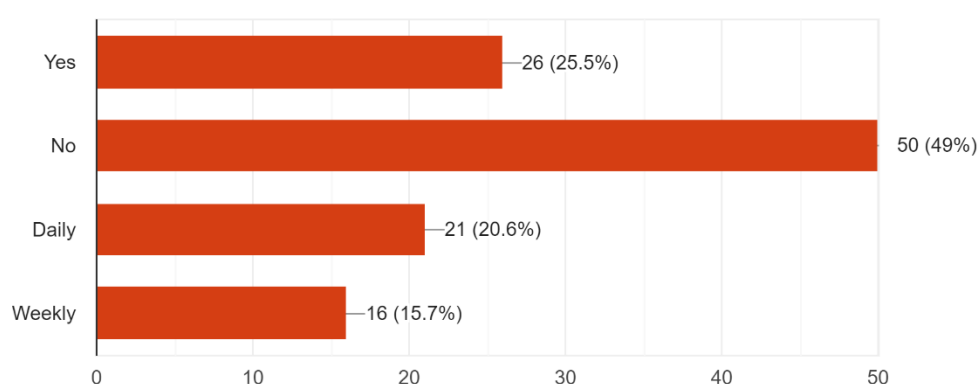
**Table 4.1:** Socio-demographic profile

### 4.2. BODY MASS INDEX

The BMI or the Body Mass Index (defined as the body mass divided by the square of the body height, and is expressed in units of  $\text{kg/m}^2$ , resulting from mass in kilograms and height in metres.) of the population suggest that, among the 102 participants studied 7(6.9%) are underweight with BMI less than 18 ( $>18$ ) showing that they have nutritional deficiency and 26 (25.8%) are overweight with BMI  $< 24 >30$  showing that they need to put down their weight. Around 7(6.9%) of the participants are obese means that a BMI of 30 and above, that is highly risky to the health; where are more than half of the participants- 61 (60.4%); are normal in BMI.

### 4.3. PHYSICAL ACTIVITY

Respondents were asked how often (frequency) and how long (duration) they engaged in physical activity and it was observed that around half of the participants – 50(49%); were not involved in any type of physical activities at any time. But 21(20.6%) participants of the survey are involved in any domains of physical activities daily, 16 (15.7%) participants are involved in doing the physical activities weekly. 26 (25.5%) of the participants are involved in physical activities but not in regular manner

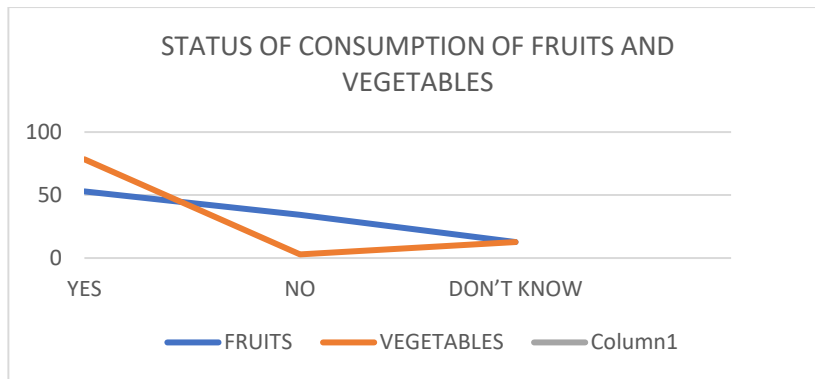


**Figure 4.1:** Status of physical activities in participants

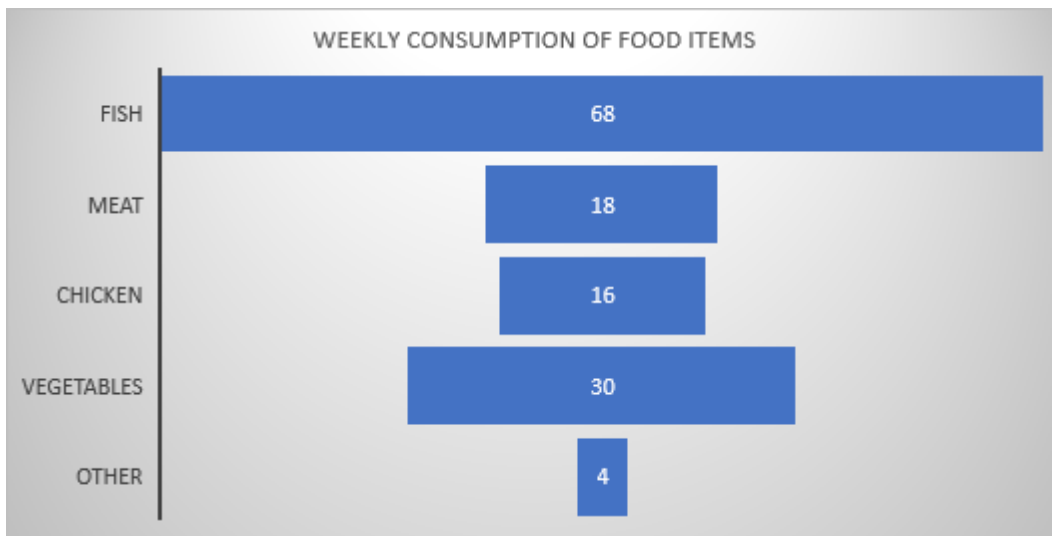
### 4.4. FOOD PATTERN IN DIET

When a question was raised to participants about the consumption of fruits and vegetables in the daily diet, it was observed that 52.9% (54) of the participants have fruits daily whereas 34.3% (35) responded that they do not consume fruits daily. Similarly, more than half of the participants (80- 78.4%) were involved in consuming veggies daily and only a few were not involved in having vegetables in diet. Majority of the participants include fish as a source of protein in their diet, which is given in the fig. 4.3

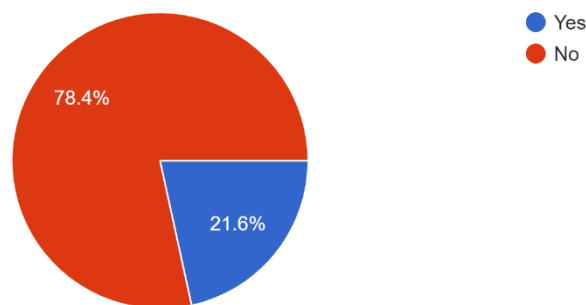
By this survey we understood that the water intake of 23% of the participants are to be corrected, whereas the rest of the participants (77%) do follow a healthy water intake habit. In this survey we could find that around 78.4% or 80 participants are involved in regular habit of having breakfast where as 21.6% or 22 participants don't have a regular pattern of having breakfast or they regularly skip their breakfast due to their busy schedule in their life.



**Figure 4.2:** Status of daily consumption of fruits and vegetables



**Figure 4.3:** Status of weekly consumption of vegetables and other food in diet.

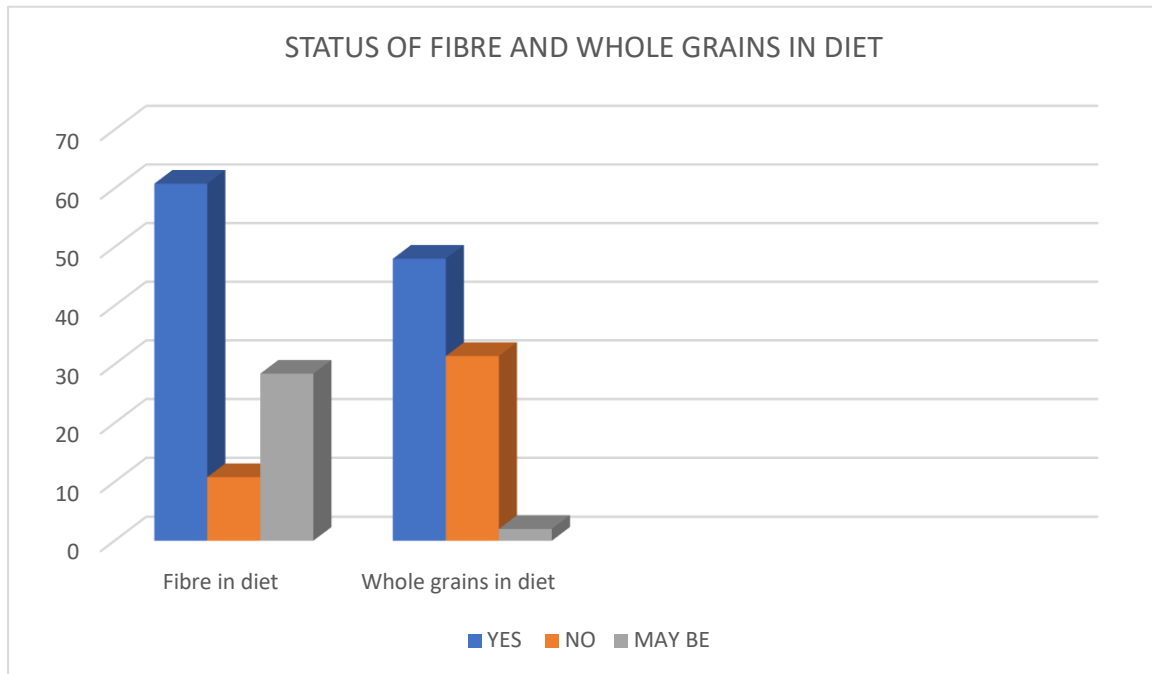


**Figure 4.5:** Status of regular skipping of breakfast

#### 4.5. FIBRE AND WHOLE GRAINS IN DIET

Respondents were asked how often they include fibre in their food, and it was found that 60.8% usually include dietary fibre in food, whereas 10.8% doesn't include fibre in their food and 28.4% of the participants include fibrous food in diet not usually but only sometimes. It was observed that 48% of the survey participants (49) includes whole grains in diet whereas, 31.4%

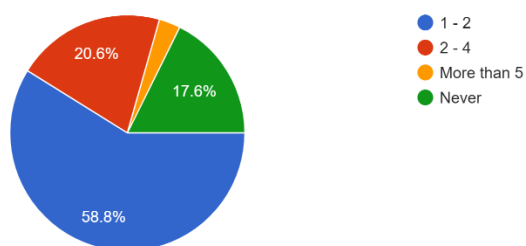
participants don't include this in their diet. This may be due to their lack of knowledge about the nutritious fact of wholegrains and 20.6% of the participants are not aware about the wholegrains in diet.



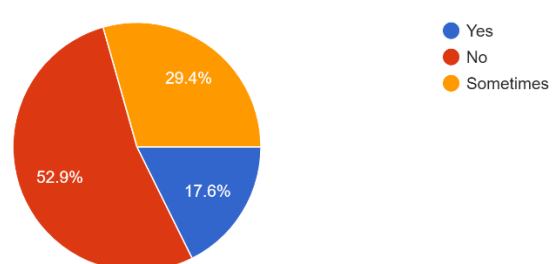
**Figure 4.6:** Status of including fibre and whole grains in diet.

#### 4.6. DRINKING COFFEE & ADDED SUGAR DRINKS

Among the participants of the survey, 58.8% have normal cup of coffee or tea (1-2 cup) per day. But 2.9% (3 participants) have a routine of drinking more than 5 cup of coffee or tea per day, which is too risky for their health. Same in the case of drinking drinks with added sugars. Around 18 participants have a habit of drinking soft drinks or drinks with added sugar per day and 54 participants do not drink soft drinks usually and the rest of the participants have a habit of drinking it sometimes when it feels necessary.



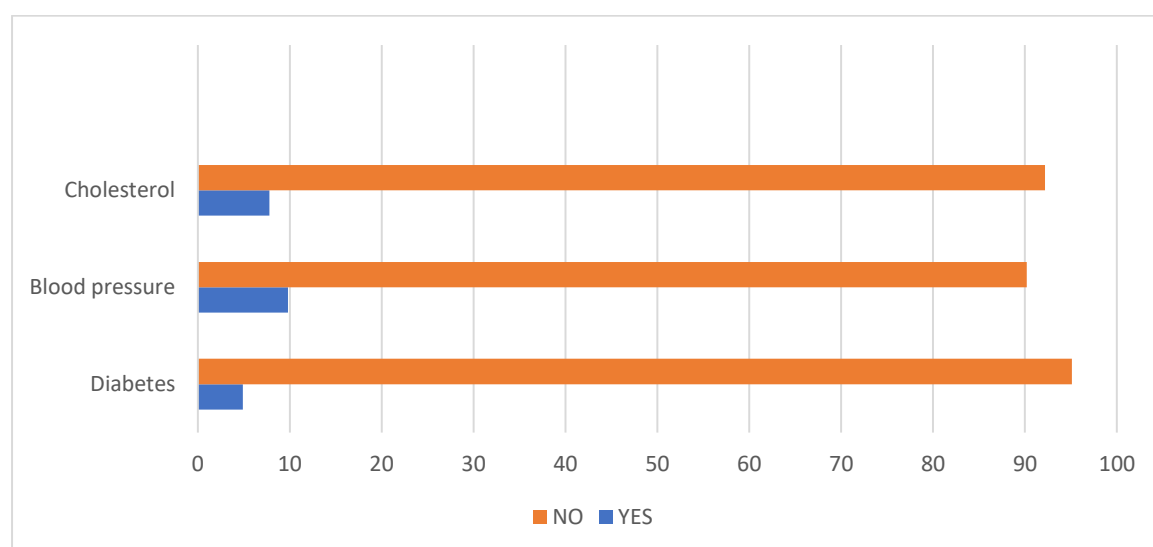
**Figure 4.7.1:** Status of drinking coffee/day



**Figure 4.7.2:** Status of drinking drinks with added sugar/day

#### 4.7. CHOLESTEROL, BLOOD PRESSURE & DIABETES

The table 4.2 gives the information obtained by the survey. It was observed that among the 102 participants only 5 (4.9%) had high Low-Density Lipoprotein (LDL). High levels of LDL cholesterol raise your risk for heart disease and stroke. Similarly, in case of body blood pressure 10 (9.8%) had Hypertension or high blood pressure. For diabetes, only 8 (7.8%) had High blood sugar or hyperglycaemia. Considering the whole data from the table 4.3 given above we can conclude that majority of the participants are free of the life style disease such as Cholesterol, Blood pressure and Diabetes mellitus.



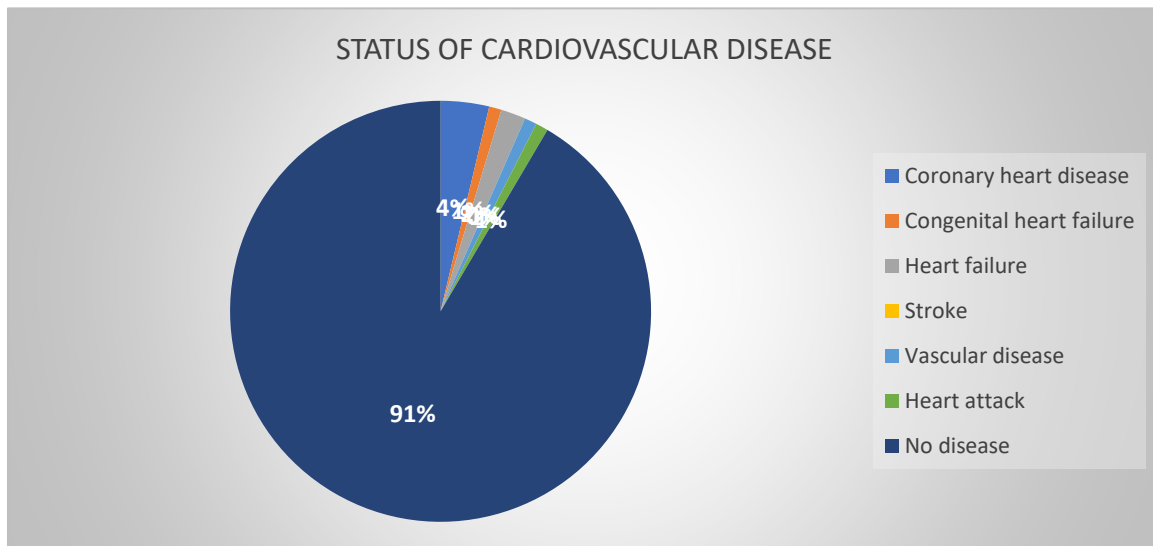
**Figure 4.8:** Status of lifestyle diseases such as cholesterol, BP and diabetes.

Lifestyle disease	Present in (%)	Absent in (%)
Cholesterol	5 (4.9%)	97 (97.1%)
Blood pressure	10 (9.8%)	92 (90.2%)
Diabetes mellitus	8 (7.8%)	94 (92.2%)

**Table 4.2:** Status of some of the lifestyle diseases in participants.

#### 4.8. CARDIOVASCULAR DISEASES

96.1% (98 participants) had responded that they don't have any type of CVDs, whereas 3.9% have responded that they had coronary heart disease or chest pain. 2% responded that they had heart failure and congenital heart defect, vascular diseases and heart attack was experienced by 1% of the respondents of this survey respectively.

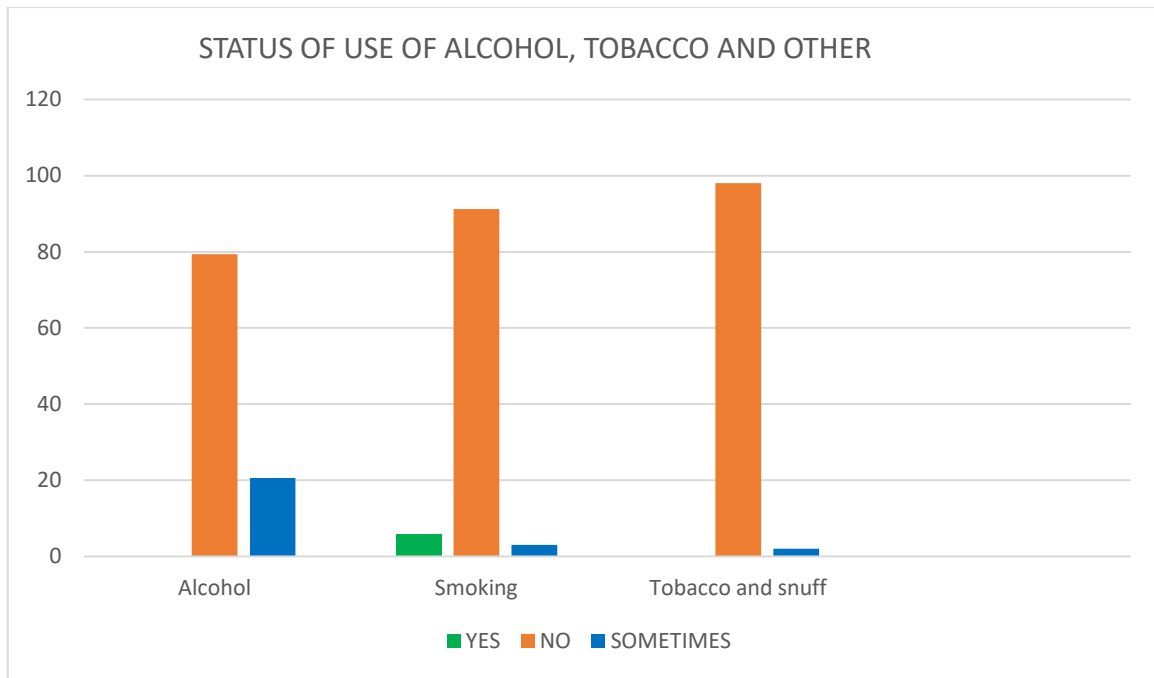


**Figure 4.9:** Status of Cardiovascular diseases (CVD) in participants.

#### 4.9. SMOKING AND ALCOHOLISM

In this survey we could gather information on the smoking habits of the participants. Fig. 4.10 gives an account of participants who smoke regularly and also shows an account of the alcoholic habit of participants.

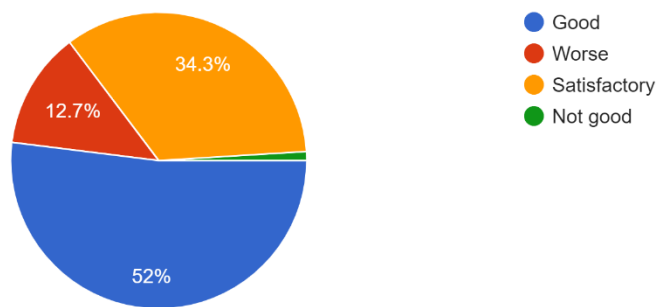




**Figure 4.10:** Status of using smoked tobacco in any form and alcohols

#### 4.10. MENTAL HEALTH

Among the 102 participants in the survey, we could only observe 52% (53 participants) with a good mental health. The proportion of participants that responded of having knowledge of suffering a disease condition are evident from the above-mentioned tables and figures.



**Figure 4.11:** Status of mental health of participants.

Among the 102 respondents of the survey, it is confirmed that majority (around 92%) of the respondents (both urban and rural area) are free from lifestyle diseases by the current scenario, if not properly maintained they're also vulnerable to health risk. The rest of the respondents who are confirmed with the lifestyle diseases such as blood pressure, diabetes, cholesterol, etc are presently at health risk and need to be treated properly with nutritious diet and medication.

## CHAPTER V

# **DISCUSSION**

Current studies have shown that the major determinants of chronic diseases are not inherited, but are primarily responsible for lifestyle, diet, and environmental factors. We learned from the analysis that lifestyle factors can cause NCDs / chronic diseases, so efforts were initiated to reduce the prevalence of NCDs, to create awareness among the population, to maintain a healthy weight and to maintain a healthy daily routine. In contrast to urban population, rural population suffers more from physical limitations/physical inactivity, in view of the fact that chronic diseases are more prevalent in these populations and they lack proper knowledge and awareness.

From this study we understood that among the 102 respondents of the survey, it is confirmed that around 72% of the respondents of both urban and rural area are free from lifestyle diseases in the current situation, and if not properly cared for, they are at risk of health risks. This shows that a ratio of people in society are affected by NCD's whereas a greater ratio is maintaining a good healthy lifestyle. Physical activity or exercise can improve the health and reduce the risk of developing lifestyle diseases like type 2 diabetes, cancer and cardiovascular disease. Physical activity and exercise can have immediate and long-term health benefits. But the percent of people involved in the daily physical activity is considerably less (50%), while half of the respondents doesn't involve in any type of physical activity. This can result in lifestyle diseases and its hazards. Fruit and vegetables should be an important part of our daily diet. They are naturally good and contain vitamins and minerals that can help us to keep healthy. They can also help protect against diseases. Depending on the age and sex federal guidelines recommend that adults eat at least 1½ to 2 cups per day of fruit and 2 to 3 cups per day of vegetables as part of a healthy eating pattern. Most fruits are naturally low in fat, sodium, and calories. None have cholesterol. Fruits are sources of many essential nutrients that are under consumed, including potassium, dietary fibre, vitamin C, and folate (folic acid). Diets rich in potassium may help to maintain healthy blood pressure. Vegetables are important sources of many nutrients, including potassium, dietary fibre, folate (folic acid), vitamin A, and vitamin C. Diets rich in potassium may help to maintain healthy blood pressure was some of the recommendations and observations put forward in various studies conducted and also by *World health organisation* (2018).

Eating a healthy diet is all about feeling great, having more energy, and improving health. Good nutrition, physical activity, and healthy body weight are essential parts of a person's overall health and well-being (*M. D. Phillips, R. M. Patrizi, et.al.,2012*). It is important to have healthy diet to maintain a good health, meanwhile it is important to have enough water intake to remain healthy. The general recommendation for adults is to drink at least 2 litres of water per day. However, for those with physical jobs, exercising or living in hot climates, more is needed – up to 4 litres or more. Children should also drink at least 2 litres of safe water per day (*World health organisation,2008*). the water intake of 23% of the participants are to be corrected, whereas the rest of the participants (77%) do follow a healthy water intake habit.

Breakfast is often called 'the most important meal of the day', and for good reason. As the name suggests, breakfast breaks the overnight fasting period. It replenishes the supply of glucose to boost your energy levels and alertness, while also providing other essential nutrients required for good health. Skipping the morning meal can throw off the body's rhythm of fasting and eating. When we wake up, the blood sugar is needed by our body to make your muscles and brain work their best and it will be usually low. Breakfast helps replenish it.

Dietary fibre increases the weight and size of our stool and softens it. A bulky stool is easier to pass, decreasing the chance of constipation. In a loose, watery stools, fibre may help to solidify the stool because it absorbs water and adds bulk to stool. Helps maintain bowel health. Whole grains are packed with nutrients including protein, fibre, B vitamins, antioxidants, and trace minerals (iron, zinc, copper, and magnesium). A diet rich in whole grains has been shown to reduce the risk of heart disease, type 2 diabetes, obesity, and some forms of cancer.

Having a cup of tea gives warmth and energy to our actions and thoughts. But drinking too much of coffee, cool drinks and drinks with added sugar creates ill effects or side effects on our health. In our survey it was observed that 58.8% have normal cup of coffee or tea (1-2 cup) per day. But 2.9% (3 participants) have a routine of drinking more than 5 cup of coffee or tea per day, which is too risky for their health. Caffeine's(coffee) main effect on the body is an increased temporary sense of wakefulness and alertness, but it can also cause uncomfortable symptoms. Caffeine increases the release of acid in the stomach, sometimes leading to an upset stomach or heartburn. Similarly, frequently drinking sugar-sweetened beverages is associated with weight gain/obesity, type 2 diabetes, heart disease, kidney diseases, non-alcoholic liver disease, tooth decay and cavities, and gout, a type of arthritis.

Cardiovascular diseases (CVD) are well established as leading contributors to the burden of diseases in the developing countries, (*Lopez AD., Mathers CD., et.al, 2001*) as well as the developed world. An estimated 16.7 million, or 29.2% of total global deaths, result from the various forms of CVDs, many of which are preventable by action on the major primary risk factors such as unhealthy diet, physical inactivity, etc. Some of the risk factors of CVDs account for 61% of cardiovascular deaths and they include alcohol use, tobacco use, high blood pressure, high body mass index, high blood cholesterol and glucose, low fruit and vegetable intake, and physical inactivity. This survey accounts a very few cases of cardiovascular disease (around 3%) and some are having congenital heart failure, vascular diseases and even had heart attack.

Smoking, chewing tobacco, snuff and alcoholism are highly injurious to health. Among which smoking is the most adverse one. It not only kills the person addicted to it but also kills those who inhale the smoke of the cigars exhaled by the smokers. A person who shares a room or a car constantly with a regular smoker the he is subjected to more health risk than the smoker.

Food intake can alter not only the physical health but also the mental health of a person. For example, more cup of coffee per can alter the mood energy of a person, it is because caffeine in coffee can cause insomnia, nervousness and restlessness, also cause headache, anxiety, agitation, ringing in the ears, and irregular heartbeats. There for good and proper food habit is essential to maintain a calm and peaceful mental health.

In 2008, approx. 1.7 million people died worldwide due to wrong nutritional habits (*World Health Organization, 2018*). In present study, a better percent of the population lacks proper nutrition which can further lead to lethal diseases like cancer, as improper diet can raise the risk of causing cancer. When examined, diet-related factors account for almost 30% of cancer. Alcohol consumption causes oral, liver, and small amount of risk for breast cancer and proper intake of fruits and vegetables reduces the risk of several types of cancer. So, it is advised to take proper nutrition which includes fruit, vegetables, and cereals to maintain a healthy bodyweight with regular physical activity and avoid consumption of alcohol (*World Health Organization, 2018*).

In 2016, 3 million people died globally due to alcohol consumption ([WHO, 2019](#)). In a study done in rural Tamil Nadu by *Logaraj, et al., in 2014*, 16% were consuming alcohol, in the present study, the incidence of people consuming alcohol and alcoholic products in rural region

is very low (around 20%). And further, a study conducted in Delhi (*Logaraj M, Hegde SK, John K, Balaji R, 2014*) shows 50.7% subject consuming alcohol which is higher than the current study result. From a study, it's elucidated that one death occurs every six seconds due to the use of tobacco and exposure to tobacco smoke (Tobacco control- Global Health Observatory). Consumption of tobacco products in our area is much more as compared to the study done in 2013 by Bhagyalaxmi, et al., in rural Gujarat where only 32% of subjects were consuming tobacco products. In an urban slum of Coimbatore 39% had smoking history which is much higher in comparison with our studied subjects.

In 2014, globally around 8.5% of adults aged 18 and above had raised diabetes and 1.13 billion people worldwide are affected by hypertension (*World Health Organization, 2018*). From the study at Delhi, the prevalence of hypertension was 36.9% and that of diabetes was 10.53%. In Jamnagar study, hypertension was reported in 33.5% and diabetes in 10.4% of study subjects. When these results are compared with the results of the current study the prevalence of hypertension is lesser in these studies, possibly because these studies were done in both urban and rural areas, and diabetes was also reported less in our study when compared with these studies. hypertension was reported in 9.8% and diabetes in 7.8% in our studies.

Despite presence of the synergistic effect of risk factors where clustering of unfavourable lifestyle risk behaviours is more detrimental to health, many public health intervention strategies focus on individual health behaviours in isolation. The present study is the first to describe clustering of lifestyle risk behaviours in a nationally representative population of India and across different socio-demographic and economic strata of population in India. In this study, we investigated the phenomenon of clustering of unfavourable lifestyle risk factors or diseases among Indian adults aged 18 years and above. This study eventually identifies the subgroups with elevated risk to more than one risk factors and informs to build effective prevention strategies to reduce the current burden of premature mortality. The rationale behind using population aged 18 years and above for the study is firstly, information on this topic is scarce and secondly, it may provide clues for better prevention strategies to curb morbidity and mortality associated with lifestyle risk behaviours among the middle-aged working population. A population-based program of screening of lifestyle diseases may be beneficial for the prevention of non-communicable diseases.

## CHAPTER VI

# **CONCLUSION**

Lifestyle diseases were found to be the major causes that are associated with chronic non-communicable disease. Both men and women have shown a rise in the clustering of lifestyle risk behaviours. Hypertension, Diabetes mellitus, cholesterol, overweight/obesity and CVD's were some of the common comorbid conditions brought out by the study. These conditions were associated with factors such as age, socioeconomic status, BMI, food pattern and consumption of alcohols and tobacco etc. As this study finds likelihood to co-occurrence of multiple risk factors in the middle ages, it is trivial to assume that India may face a significant increase in chronic non-communicable diseases in the coming decades increasing the burden to the health care services and loss of productivity due to deaths and disabilities at peak working ages.

In conclusion there are many factors that contribute to negative lifestyle diseases such as food pattern, improper diet, lack of nutritious food such as roughage etc. This in turn informs the rise in the lifestyle risk behaviours that leads to many NCD's. But this negative effect of the lifestyle diseases has shown a decrease from the previous studies that only about 10% of the population shows risk to health due these NCD's whereas majority of the population is involved in proper food pattern and nutritious food intake, thereby showing good health. Also, the prevalence of health risk behaviour such as smoking, alcohol consumption and tobacco use has shown a decline from previous studies has also decreased the bundling of risk factors across the population of all background characteristics especially among adult men and women belonging to 18-35 years of age. Therefore, to prevent chronic disease morbidity and mortality by focusing on multiple modifiable risk factors can be a solution to prevent future premature and avoidable mortality in India due to NCDs. It is also important to promote regular physical activity, reducing sedentary behaviour and eating healthily should be emphasized and encouraged across all population subgroups. A population-based program of screening of lifestyle diseases may be beneficial for the prevention of non-communicable diseases.

## **REFERENCE**

1. Sjølie, A. K., Klein, R., Porta, M., Orchard, T., Fuller, J., Parving, H. H., ... & DIRECT Programme Study Group. (2008). Effect of candesartan on progression and regression of retinopathy in type 2 diabetes (DIRECT-Protect 2): a randomised placebo-controlled trial. *The Lancet*, 372(9647), 1385-1393.
2. Sharma, M., & Majumdar, P. K. (2009). Occupational lifestyle diseases: An emerging issue. *Indian journal of occupational and environmental medicine*, 13(3), 109.
3. World Health Organization. (2019). *Global status report on alcohol and health 2018*. World Health Organization.
4. WHO. (2008). World Economic Forum Report of a Joint Event.
5. Deepadarshan, H., & Hiremath, S. D. (2017). Lifestyle factors and lifestyle diseases among rural population of Bengaluru rural district. *International Journal of Community Medicine and Public Health*, 4(5), 1558-1561.
6. Pappachan, M. J. (2011). Increasing prevalence of lifestyle diseases: high time for action. *The Indian journal of medical research*, 134(2), 143.
7. Reddy, K. S., Shah, B., Varghese, C., & Ramadoss, A. (2005). Responding to the threat of chronic diseases in India. *The Lancet*, 366(9498), 1744-1749.
8. Gupta, R., Al-Odat, N. A., & Gupta, V. P. (1996). Hypertension epidemiology in India: meta-analysis of 50 year prevalence rates and blood pressure trends. *Journal of human hypertension*, 10(7), 465-472.
9. Unwin, N., Gan, D., & Whiting, D. (2010). The IDF Diabetes Atlas: providing evidence, raising awareness and promoting action. *Diabetes research and clinical practice*, 87(1), 2-3.
10. Jeemon, P., & Reddy, K. S. (2010). Social determinants of cardiovascular disease outcomes in Indians. *The Indian journal of medical research*, 132(5), 617.
11. Roy, A., Prabhakaran, D., Jeemon, P., Thankappan, K. R., Mohan, V., Ramakrishnan, L., ... & Sentinel Surveillance in Industrial Populations Study Group. (2010). Impact of alcohol on coronary heart disease in Indian men. *Atherosclerosis*, 210(2), 531-535.
12. Huxley, R., Lewington, S., & Clarke, R. (2002). Cholesterol, coronary heart disease and stroke: a review of published evidence from observational studies and randomized controlled trials. In *Seminars in vascular medicine* (Vol. 2, No. 03, pp. 315-324). Copyright© 2002 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel.:+ 1 (212) 584-4662.
13. Stratton, I. M., Adler, A. I., Neil, H. A. W., Matthews, D. R., Manley, S. E., Cull, C. A., ... & Holman, R. R. (2000). Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *Bmj*, 321(7258), 405-412.

14. Fuller, J., Shipley, M., Rose, G., Jarrett, R. J., & Keen, H. (1980). Coronary-heart-disease risk and impaired glucose tolerance The Whitehall Study. *The Lancet*, 315(8183), 1373-1376.
15. Lorenzo, C., Okoloise, M., Williams, K., Stern, M. P., & Haffner, S. M. (2003). The metabolic syndrome as predictor of type 2 diabetes: the San Antonio heart study. *Diabetes care*, 26(11), 3153-3159.
16. Sharma, A., Sharma, M. K., & Kumar, M. (2009). Modulatory role of *Emblica officinalis* fruit extract against arsenic induced oxidative stress in Swiss albino mice. *Chemico-biological interactions*, 180(1), 20-30.
17. World Health Organization. (2003). *The world health report 2003: shaping the future*. World Health Organization.
18. Nicholas, L., Roberts, D. C., & Pond, D. (2003). The role of the general practitioner and the dietitian in patient nutrition management. *Asia Pacific journal of clinical nutrition*, 12(1).
19. Egger, G., & Dixon, J. (2010). Inflammatory effects of nutritional stimuli: further support for the need for a big picture approach to tackling obesity and chronic disease. *Obesity reviews*, 11(2), 137-149.
20. Barbaresko, J., Koch, M., Schulze, M. B., & Nöthlings, U. (2013). Dietary pattern analysis and biomarkers of low-grade inflammation: a systematic literature review. *Nutrition reviews*, 71(8), 511-527.
21. Spadafranca, A., Rinelli, S., Riva, A., Morazzoni, P., Magni, P., Bertoli, S., & Battezzati, A. (2013). *Phaseolus vulgaris* extract affects glycometabolic and appetite control in healthy human subjects. *British Journal of Nutrition*, 109(10), 1789-1795.
22. Bales, C. W., & Kraus, W. E. (2013). Caloric restriction: implications for human cardiometabolic health. *Journal of cardiopulmonary rehabilitation and prevention*, 33(4), 201.
23. Calder, P. C., Ahluwalia, N., Brouns, F., Buetler, T., Clement, K., Cunningham, K., ... & Winklhofer-Roob, B. M. (2011). Dietary factors and low-grade inflammation in relation to overweight and obesity. *British Journal of Nutrition*, 106(S3), S1-S78.
24. Monteiro, C. A. (2009). Nutrition and health. The issue is not food, nor nutrients, so much as processing. *Public health nutrition*, 12(5), 729-731.
25. Cordain, L. (2012). *AARP The paleo diet revised: Lose weight and get healthy by eating the foods you were designed to eat*. John Wiley & Sons.
26. Campbell, T. M., & Campbell, T. C. (2008). The benefits of integrating nutrition into clinical medicine. *The Israel Medical Association journal*, 10(10), 730.
27. Minich, D. M., & Bland, J. S. (2013). Personalized lifestyle medicine: relevance for nutrition and lifestyle recommendations. *The Scientific World Journal*, 2013.



28. Monge-Corella, S., García-Pérez, J., Aragonés, N., Pollán, M., Pérez-Gómez, B., & López-Abente, G. (2008). Lung cancer mortality in towns near paper, pulp and board industries in Spain: a point source pollution study. *BMC public health*, 8(1), 1-11.
29. Dunstan, D. W., Howard, B., Healy, G. N., & Owen, N. (2012). Too much sitting—a health hazard. *Diabetes research and clinical practice*, 97(3), 368-376.
30. Phillips, M. D., Patrizi, R. M., Cheek, D. J., Wooten, J. S., Barbee, J. J., & Mitchell, J. B. (2012). Resistance training reduces subclinical inflammation in obese, postmenopausal women. *Medicine & Science in Sports & Exercise*, 44(11), 2099-2110.
31. Wooten, J. S., Phillips, M. D., Mitchell, J. B., Patrizi, R., Pleasant, R. N., Hein, R. M., ... & Barbee, J. J. (2011). Resistance exercise and lipoproteins in postmenopausal women. *International journal of sports medicine*, 32(1), 7.
32. Gémes, K., Ahnve, S., & Janszky, I. (2008). Inflammation a possible link between economical stress and coronary heart disease. *European journal of epidemiology*, 23(2), 95-103.
33. Almadi, T., Cathers, I., & Chow, C. M. (2013). Associations among work-related stress, cortisol, inflammation, and metabolic syndrome. *Psychophysiology*, 50(9), 821-830.
34. Miller, W. R., & Seligman, M. E. (1975). Depression and learned helplessness in man. *Journal of abnormal psychology*, 84(3), 228.
35. Dixon, J. B., Browne, J. L., Lambert, G. W., Jones, K. M., Reddy, P., Pouwer, F., & Speight, J. (2013). Severely obese people with diabetes experience impaired emotional well-being associated with socioeconomic disadvantage: results from Diabetes MILES—Australia. *Diabetes research and clinical practice*, 101(2), 131-140.
36. Lopez-Anton, R., Santabarbara, J., De-la-Cámara, C., Gracia-García, P., Lobo, E., Marcos, G., ... & Lobo, A. (2015). Mild cognitive impairment diagnosed with the new DSM-5 criteria: prevalence and associations with non-cognitive psychopathology. *Acta Psychiatrica Scandinavica*, 131(1), 29-39.
37. Mitler, M. M., Dement, W. C., & Dinges, D. F. (2000). Sleep medicine, public policy, and public health. *Principles and practice of sleep medicine*, 2, 453-62.
38. Wells, M. E., & Vaughn, B. V. (2012). Poor sleep challenging the health of a nation. *The Neurodiagnostic Journal*, 52(3), 233-249.
39. Ferrie, J. E., Kivimäki, M., Akbaraly, T. N., Singh-Manoux, A., Miller, M. A., Gimeno, D., ... & Shipley, M. J. (2013). Associations between change in sleep duration and inflammation: findings on C-reactive protein and interleukin 6 in the Whitehall II Study. *American journal of epidemiology*, 178(6), 956-961.
40. Alvarez, G. G., & Ayas, N. T. (2004). The impact of daily sleep duration on health: a review of the literature. *Progress in cardiovascular nursing*, 19(2), 56-59.
41. Altevogt, B. M., & Colten, H. R. (Eds.). (2006). Sleep disorders and sleep deprivation: an unmet public health problem.

42. Crowley, S. J., & Carskadon, M. A. (2010). Modifications to weekend recovery sleep delay circadian phase in older adolescents. *Chronobiology international*, 27(7), 1469-1492.
43. Villareal, D. T., Banks, M., Siener, C., Sinacore, D. R., & Klein, S. (2004). Physical frailty and body composition in obese elderly men and women. *Obesity research*, 12(6), 913-920.
44. Lee, M., Czerwinski, S. A., Choh, A. C., Towne, B., Demerath, E. W., Chumlea, W. C., ... & Siervogel, R. M. (2004). Heritability of calcaneal quantitative ultrasound measures in healthy adults from the Fels Longitudinal Study. *Bone*, 35(5), 1157-1163.
45. Rehm, J., Taylor, B., & Room, R. (2006). Global burden of disease from alcohol, illicit drugs and tobacco. *Drug and alcohol review*, 25(6), 503-513.
46. Lynch, K. L., Shapiro, B. J., Coffa, D., Novak, S. P., & Kral, A. H. (2015). Promethazine use among chronic pain patients. *Drug and alcohol dependence*, 150, 92-97.
47. Huang, D., Hunter, Z., & Francescutti, L. H. (2013). Alcohol, health, and injuries. *American Journal of Lifestyle Medicine*, 7(4), 232-240.
48. O'Keefe, J. H., Bybee, K. A., & Lavie, C. J. (2007). Alcohol and cardiovascular health: the razor-sharp double-edged sword. *Journal of the American College of Cardiology*, 50(11), 1009-1014.
49. Mozaffarian, D., Hao, T., Rimm, E. B., Willett, W. C., & Hu, F. B. (2011). Changes in diet and lifestyle and long-term weight gain in women and men. *New England Journal of Medicine*, 364(25), 2392-2404.
50. Bhattarai, M. D. (2009). Three patterns of rising type 2 diabetes prevalence in the world: need to widen the concept of prevention in individuals into control in the community. *Journal of Nepal Medical Association*, 48(174), 173-9.
51. Candib, L. M. (2007). Obesity and diabetes in vulnerable populations: reflection on proximal and distal causes. *The Annals of Family Medicine*, 5(6), 547-556.
52. Vaag, A. A., Grunnet, L. G., Arora, G. P., & Brøns, C. (2012). The thrifty phenotype hypothesis revisited. *Diabetologia*, 55(8), 2085-2088.
53. Spahn, J. M., Lyon, J. M., Altman, J. M., Blum-Kemelor, D. M., Essery, E. V., Fungwe, T. V., ... & Wong, Y. P. (2011). The systematic review methodology used to support the 2010 Dietary Guidelines Advisory Committee. *Journal of the American Dietetic Association*, 111(4), 520-523.
54. Harman, N. L., Leeds, A. R., & Griffin, B. A. (2008). Increased dietary cholesterol does not increase plasma low density lipoprotein when accompanied by an energy-restricted diet and weight loss. *European journal of nutrition*, 47(6), 287-293.
55. Iso, H., Rexrode, K. M., Stampfer, M. J., Manson, J. E., Colditz, G. A., Speizer, F. E., ... & Willett, W. C. (2001). Intake of fish and omega-3 fatty acids and risk of stroke in women. *Jama*, 285(3), 304-312.

56. Whitworth, J. A., & Chalmers, J. (2004). World health organisation-international society of hypertension (WHO/ISH) hypertension guidelines. *Clinical and experimental hypertension (New York, NY: 1993)*, 26(7-8), 747-752.
57. Foster, C., Shilton, T., Westerman, L., Varney, J., & Bull, F. (2018). World Health Organisation to develop global action plan to promote physical activity: time for action.
58. Finegold, J. A., Asaria, P., & Francis, D. P. (2013). Mortality from ischaemic heart disease by country, region, and age: statistics from World Health Organisation and United Nations. *International journal of cardiology*, 168(2), 934-945.
59. Lopez, A. D., Mathers, C. D., Ezzati, M., Jamison, D. T., & Murray, C. J. (2006). Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The lancet*, 367(9524), 1747-1757.
60. Siegel, R. L., Miller, K. D., & Jemal, A. (2019). Cancer statistics, 2019. *CA: a cancer journal for clinicians*, 69(1), 7-34.
61. Benjamin, E. J., Muntner, P., Alonso, A., Bittencourt, M. S., Callaway, C. W., Carson, A. P., ... & American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2019). Heart disease and stroke statistics—2019 update: a report from the American Heart Association. *Circulation*, 139(10), e56-e528.
62. Logaraj, M., Hegde, S. K., John, K., & Balaji, R. (2014). A study on risk factors for lifestyle diseases among patients attending fixed mobile clinic in a rural block in Tamil Nadu. *International Journal of Health & Allied Sciences*, 3(3), 199.
63. Bhagyalaxmi, A., Atul, T., & Shikha, J. (2013). Prevalence of risk factors of non-communicable diseases in a District of Gujarat, India. *Journal of health, population, and nutrition*, 31(1), 78.
64. Stevens, J., Cai, J., Pamuk, E. R., Williamson, D. F., Thun, M. J., & Wood, J. L. (1998). The effect of age on the association between body-mass index and mortality. *New England Journal of Medicine*, 338(1), 1-7.

## **KEYWORDS**

1. BMI
2. NCD'S
3. CVD'S
4. DIABETES
5. CHOLESTEROL
6. HYPERTENSION
7. SMOKING
8. ALCOHOL
9. DIETARY FIBRE
10. OBESITY
11. MORBIDITY
12. MORTALITY

THE END