

**OCCUPATIONAL PROFILE AND MORBIDITY PATTERN AMONG  
FARMERS OF PERAMBALUR TALUK: A CROSS SECTIONAL  
STUDY**

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**DHANALAKSHMI SRINIVASAN MEDICAL COLLEGE AND HOSPITAL,  
PERAMBALUR – 621 113.**



**May – 2020**

## **CERTIFICATE**

This is to certify that the dissertation titled “**OCCUPATIONAL PROFILE AND MORBIDITY PATTERN AMONG FARMERS OF PERAMBALUR TALUK: A CROSS SECTIONAL STUDY**” is a bonafide research work of **Dr. T R RAJSRI** for the requirements of **M.D Community Medicine** Branch-XV Examination of the Tamil Nadu **Dr. M.G.R Medical University** to be held in MAY - 2020, was carried out by her, under our direct supervision and guidance.

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## DECLARATION

I, **Dr. T R RAJSRI** solemnly declare that, the dissertation title “**OCCUPATIONAL PROFILE AND MORBIDITY PATTERN AMONG FARMERS OF PERAMBALUR TALUK: A CROSS SECTIONAL STUDY**” was done by me from Department of Community Medicine at Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur under the supervision and guidance of professor **DR. KARTHIKEYAN. K.** This dissertation is submitted to The Tamil Nadu Dr. M.G.R Medical University, towards the fulfillment of requirement for the award of M.D. Degree in Community Medicine (Branch –XV).

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The work by **Dr. T R RAJSRI** titled “**OCCUPATIONAL PROFILE AND MORBIDITY PATTERN AMONG FARMERS OF PERAMBALUR TALUK: A CROSS SECTIONAL STUDY**” was done under my supervision and I assure that this candidate has abided by the rules of the Ethical Committee.

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## **PLAGIARISM CERTIFICATE**

This is to certify that this dissertation work titled “**OCCUPATIONAL PROFILE AND MORBIDITY PATTERN AMONG FARMERS OF PERAMBALUR TALUK: A CROSS SECTIONAL STUDY**” of the candidate **Dr. T R RAJSRI** with registration Number **201725252** for the award of **M.D** in the branch of **Community Medicine**. I personally verified from the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to recommendations 86 pages and shows **9%** plagiarism in the dissertation.

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## INTRODUCTION

**“A healthy workforce is vital for sustainable social and economic development on a global, national, and local level.”**

The International Labour Organization<sup>(1)</sup> states “The inadequate prevention of occupational diseases has profound negative effects not only on workers and their families but also on society at large due to the tremendous costs that it generates; particularly, in terms of loss of productivity and burdening of social security systems.

Globally one third of the population is involved in agriculture related works. India being a developing country, majority of its population is dependent on agriculture for employment. In India, 60% of the working population is employed in farming and agricultural works with high economical impact. Whereas, farmers and agricultural workers involved in this sector are exposed to factors and work conditions which have an adverse effect on their health. The major hazards in agriculture sector can be grouped into four categories vis., biological factors like exposure to disease causing microbes, parasites, animals etc., the second group is chemical factors like pesticides, insecticides, fertilizers etc., the third group is physical factors like exposure to extreme temperature, risk of accidents while handling machinery, accidental bites from snakes etc., and the last group is psychological factors that lead to stressful life, suicide etc<sup>(2-7)</sup>.

International Labour Organisation (ILO) estimates that there are 355,000 on job fatalities each year. Among these half of the fatalities occur in agriculture sector.

On each day, an average of 6000 workers die as a consequence of work related diseases or accidents<sup>(8)</sup>.

Globally, agriculture stands third most hazardous occupation preceded by mining and construction. Modernization of agriculture has resulted in intensive use of pesticide and other agro chemicals which causes major occupational risk leading on to respiratory impairments, poisoning, cancer and reproductive impairments<sup>(8,9)</sup>.

According to the Protocol of 2002 to the Occupational Safety and Health Convention, ILO, 1981 the term “occupational disease” covers any disease contracted as a result of an exposure to risk factors arising from work activity<sup>(10)</sup>.

Occupational diseases among farmers can be caused by exposure to multiple hazardous agents such as animal exposure, pesticide exposure, hazardous machinery handling etc., which can interplay in producing a disease<sup>(11)</sup>. Causal relationship between exposures and disease can be established by epidemiological studies. This can act as an evidence for exposure- response relationship in occupational diseases. Long term exposure measurements are not available for agricultural hazard exposure. Long term exposure to agricultural hazards can be evaluated through questionnaire method in which history of exposure can be assessed. This can improve the validity of investigation and exposure outcome relationship can be established. This study aims to compare the association between agricultural exposures with morbidity pattern among farmers.

“Occupational diseases are adverse conditions in the human being, the occurrence or severity of which is related to factors on the job or in the work environment.” Various

Factors can be physical, chemical, biological, ergonomic, psychosocial stressors and mechanical. Health hazards combined with hazardous environment lead onto disease development. It can cause new disease among previous healthy or at risk individual or it can lead on to aggravate pre existing illness of non-occupational origin. Occupational disease causes economic losses. Countries with good reporting system have established the effect on economy. In European Union, a study calculates the cost work-related diseases at a minimum of €145 billion per year<sup>(12)</sup>.

A New Zealand report indicated that the total financial cost for occupational injury and disease in 2004–05 was 4.9 billion New Zealand dollars (NZD) (3.4 per cent of GDP), excluding the cost of suffering and early death. Financial costs per case for occupational cancer are nearly NZD700,000, with total costs per case of NZD2.9 million, far higher than any other category<sup>(13)</sup>. In countries like USA, UK, Australia, economic loss of 4 to 6% GDP occurs due to occupation related health problems<sup>(14)</sup>. Due to lack of studies and nationwide reporting system, in India there might be underreporting of occupational diseases.

Despite wide knowledge on occupational hazards in farming and agricultural sector, the incidence of occupation related diseases among farmers might remain underestimated because of lack of proper reporting or subclinical manifestations and also due to low health seeking behavior among farmers. In other occupational groups, in contrary to farmers, the incidence of occupational diseases to a large extent reflects health consequences of occupational exposure, like pneumoconiosis in cotton mill workers.

Based on 2011 census data, Perambalur district in Tamilnadu has 82.81% of its population living in rural area<sup>(15)</sup>. Agriculture is the backbone of the economy of the district. Most of the lands in the district are used for agricultural purposes. More than half of its population is engaged in agriculture in order to earn their livelihood. The chief agricultural products in the district are paddy, sugarcane, groundnut, millets, cashew, etc. Every year approximately 60% revenue comes from the agricultural products in the district thereby helps in its economy to a great extent<sup>(15)</sup>.

While accurate figures for occupational issues are still hard to obtain on a global scale, it is recognized today that occupational accidents and diseases can have an impact on the productivity, competitiveness, and reputation of individual enterprises, as well as on the livelihoods of individuals and their families. The underreporting of occupational accidents and diseases remains an obstacle in raising the awareness of the need to place safe work higher in the political agenda. Most work-related deaths and nonfatal occupational accidents occur in low- and middle-income countries in South-East Asia and the Western Pacific region. These countries possess 40% of the world's working population, and additionally, the proportion of workers occupied in risky jobs is also higher. According to ILO, workplace accidents and diseases are preventable, and prevention is the key to tackle the growing number of work-related diseases<sup>(16)</sup>.

This study is first of its kind to be done in Perambalur district, thereby filling the gap in research. The objective of this study is to estimate the morbidity pattern among farmers of Perambalur district.

## **OBJECTIVE OF THE STUDY**

1. To estimate the morbidity pattern among farmers of Perambalur district

## JUSTIFICATION FOR THE CONDUCT OF STUDY

- Majority of the population in Perambalur is involved in farming and its allied agricultural sector for employment.
- Agricultural work tends to be a family occupation and all members of a family are involved in field activities.
- Farming is a lifelong occupation. The farmers live near the farm land and are often exposed to the environmental hazard throughout their life<sup>(17)</sup>.
- Use of chemicals like pesticides, insecticides exposes them to various dermatological conditions.
- The level of Knowledge, attitude and practices towards the safe work practices among agricultural workers might contribute to occurrence of ill-health among agricultural workers<sup>(18)</sup>

Hence this study has been planned to find out morbidity pattern among agricultural workers in Perambalur District.



## **METHODOLOGY**

### **SUBJECTS AND METHODS:**

The study was conducted in Perambalur Taluk in Perambalur district covering 25 villages with the population of 161993 according to 2011 census. The whole district has a population of 5.65 lakhs and is served by 10 CHCs, 51 PHCs, 203 sub-centers, 01 medical college and other private facilities.

This was a community based cross sectional study s done to find the morbidity pattern among farmers in Perambalur over the period of one year. Farmers residing in the study area were recruited to the study after obtaining informed consent. Total of 422 farmers were recruited into the study.

### **STUDY AREA:**

In Perambalur district, there are four Taluk, namely Perambalur, Kunnam, Veppanthattai, Alathur. The Perambalur Taluk was selected by simple random sampling method.

**STUDY SITE:** The study was conducted in Department of Community Medicine Dhanalakshmi Srinivasan medical college, Perambalur.

**STUDY POPULATION:** Farmers residing at Senjeri satisfying the inclusion and exclusion criteria.

**STUDY DESIGN:** Community Based Cross Sectional Study

**SAMPLE SIZE:** Assuming 50% prevalence of morbidity among farmers

$$N = Z^2_{1-\alpha}pq/d^2$$

$Z^2_{1-\alpha} = 1.96$  at 95% confidence interval

d= allowable error= 20%

p= Prevalence of the condition = 50%

q= 100-p= 50%

Sample size= 384

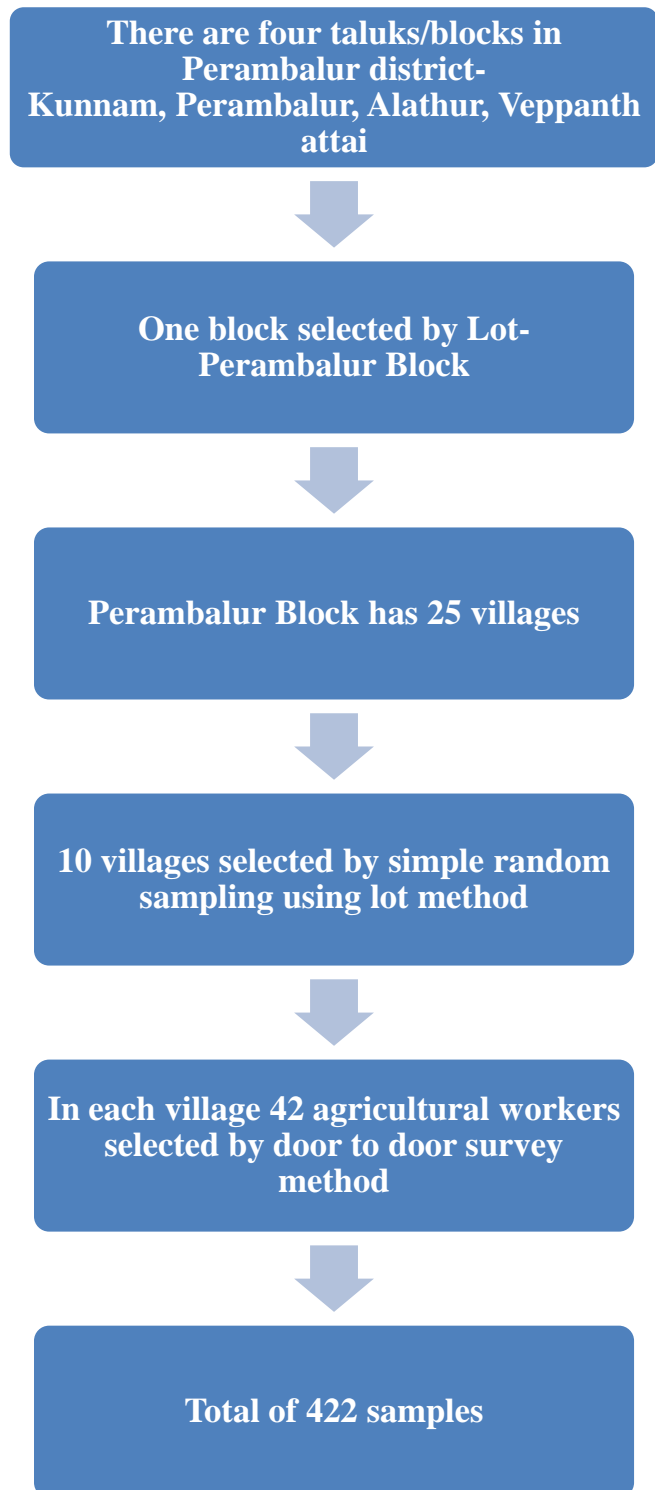
10% permissible error = 384+38= 422

**TOTAL SAMPLE SIZE: 422**

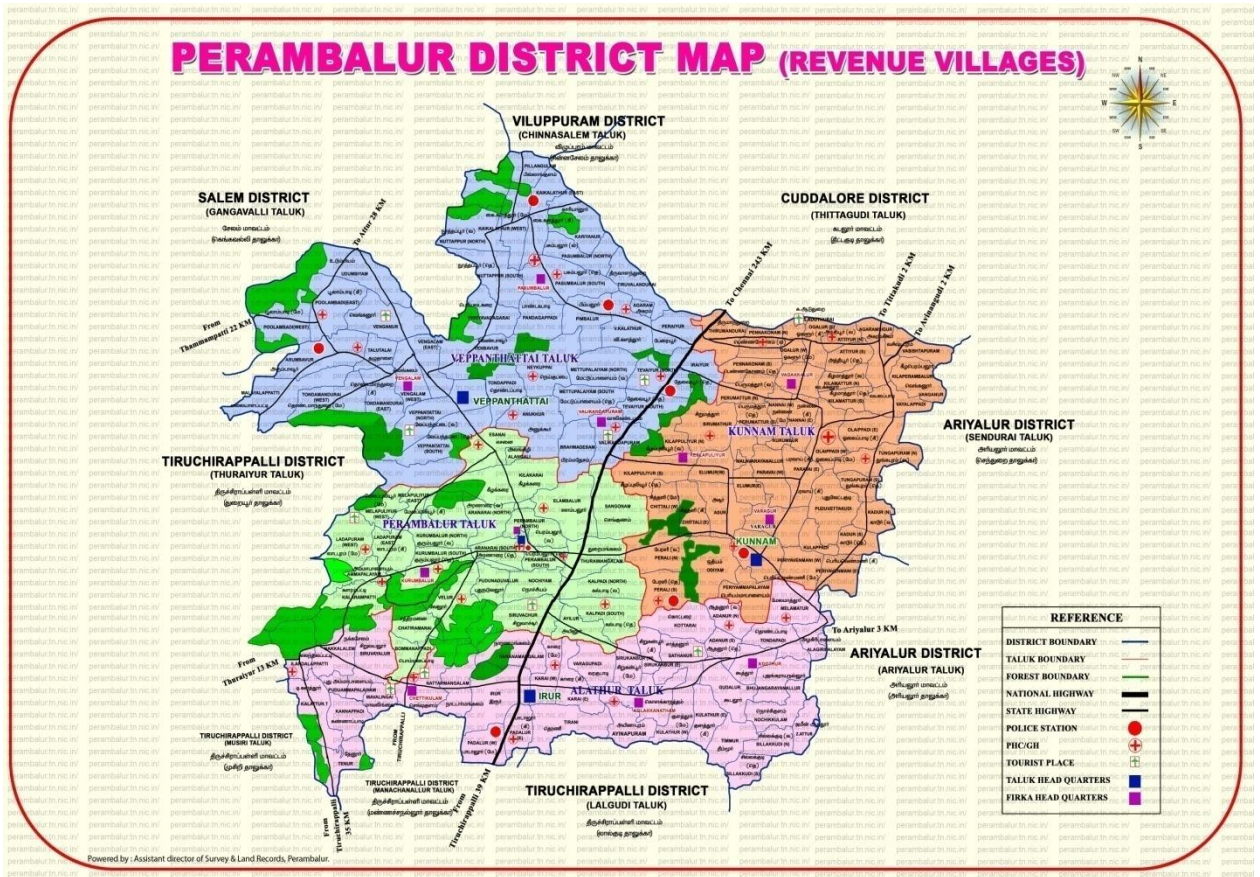
**SAMPLING METHOD:** Eligible subjects were recruited into the study by simple random sampling

**STUDY DURATION:** The study was done during January 2018 to June 2019. The duration of field study: December 2018 to April 2019

## **SAMPLING METHOD- MULTISTAGE SAMPLING**



# PERAMBALUR DISTRICT MAP WITH STUDY AREA



## **INCLUSION CRITERIA**

- Farmers both men and women who live in selected villages of Perambalur who gave informed consent
- Those who understand and speak Tamil

## **EXCLUSION CRITERIA**

- Migrant workers those not residing in the area
- Those not willing to give informed consent

## **ETHICAL CONSIDERATION:**

Institutional Ethical Committee of Dhanalakshmi Srinivasan medical College, Perambalur has given ethical clearance for this study.

## **DATA COLLECTION TOOL:**

Predesigned and pretested proforma was used.

The principal investigator interviewed the participants in local language (Tamil) using the predesigned proforma. Each participant was interviewed for 20minutes. The participants were interviewed in their houses or if not available were found and interviewed in their agricultural land during working hours. If not found in workplace, two subsequent visits were made. Even if not found, they were left out of the study.

## **PART A- Sociodemographic Profile:**

The first part of the proforma had details regarding the sociodemographic profile- Age, Sex, marital status, religion, educational status, type of family, number of family

members, total family income. Housing standards were assessed by the type of house, toilet facility in the house, kitchen in the house and type of fuel used for cooking.

#### **PART B- Occupational Profile:**

This section had questions on the occupational history and possible risk factors for occupational hazards exposure. The land ownership, the type of work the participant does in the farm was assessed. Duration of work, number of years in the job, frequency of exposure to pesticides were questioned. Contact with farm animals and machinery with duration of involvement were also elicited. Other occupations done during off season were enquired and nature of work recorded along with duration.

#### **PART C- Personal Habits:**

This part had questions on the personal habits of the participant like diet, tobacco and alcohol addiction. Use of iodized salt, exposure to passive smoking was also questioned.

#### **PART D- Morbidity Profile:**

Information regarding morbidity pattern, history of hospitalization, history of tuberculosis in the past, history of medicine intake were collected. Occupational morbidity like snake bite, scorpion sting, accidents injuries that occurred in farm were also enquired. Health issues caused due to application and exposure to pesticide were recorded from history.

## **DATA COLLECTION PROCEDURE:**

The participants were interviewed at their residence. If not available during visit two subsequent visits were made. Participants were also interviewed in their farm during working hours. Informed written consents were obtained after explaining about the study and patient information sheets were also given. Morbidity data were cross verified with the hospital records, bills, prescriptions that were available with the participants.

## **DEFINITION OF VARIABLES:**

**Age:** Number of completed years, cross verified using available documents.

**Religion:** Religion was recorded as Hindu, Muslim, Christian and others.

**Marital status:** marital status recorded as Married, Unmarried, widow, Divorced/  
living separately

**Literacy Status:** (according to census 2011)

**Illiterate:** Person who cannot read and write in any language.

**Literate:** Person who can read and write with understanding in any language.

**High school certificate-** Person who has completed formal school education up to  
10<sup>th</sup> standard

**Middle school certificate-** Person who has completed formal schooling up to 8<sup>th</sup>  
standard

**Primary school certificate-** Person who has completed formal schooling up to 5<sup>th</sup> standard

**Graduate and above:** Person who had completed any diploma/degree courses.

**Socio-economic status:** Socio-economic status was recorded based on Modified B G Prasad's Classification.

<b>S No.</b>	<b>Social Class</b>	<b>1961 Social classification (in Rs/month)</b>	<b>Revised for 2019 (in Rs/month)</b>
1.	I	100 and above	7008 and above
2.	II	50- 99	3504-7007
3.	III	30- 49	2102- 3503
4.	IV	15- 29	1051- 2101
5.	V	Below 15	1050 and below

Upper limit of class = Original (1961) upper limit x MF

Multiplication factor (MF) = (4.93 x 4.63\* x AICPI\*\*) /100

\*Linking factor between 1982 and 2001 series for the AICPI is 4.63

\*\*AICPI= All- India Average Consumer Price Index for Industrial Workers (Base 2001=100): 307(for January 2019)



**Type of family:**

**Nuclear family:** the family consisting of married couple and their dependent children.

**Joint Family:** Family members consist of married couples and their children who are in the same household sharing the common kitchen.

**Type of House:**

**Pucca:** Floor, roof and walls all are cemented.

**Semi- Pucca:** Temporary roofs with cemented floor and wall or any one of it.

**Kutchra:** Thatched roof, mud walls with mud floor

**Kitchen:** Separate room in the house with cooking area and smoke outlet is considered as having a separate kitchen

**Fuel Used:** Liquefied Petroleum Gas (LPG), Kerosene, cow dung, coal, charcoal.

**Pesticide Exposure:**

Farmers who handle pesticides by mixing, spraying or application in field personally anytime in their career.

Frequency of pesticide use: Recorded as times per day

Duration of pesticide use: Recorded in completed months or years of pesticide use

**Smoking Habits:**

Smoking status of the farmers has been included as Current smoker, Former smoker and Never smoked.

**Current smoker:**

Farmers who have consumed 100 cigarettes in their lifetime and continue smoking at present during the study period are categorized as current smokers.

**Former smoker/Ex-smoker:**

Farmers with history smoking 100 cigarettes in their lifetime but quit smoking during the study period are categorized as former smokers.

**Never smoked:**

Farmers those have never smoked or smoked less than 100 cigarettes in their lifetime are considered as non smokers.

**Passive Smoking:**

Farmers those who are exposed to smoke of a smoker or environmental tobacco smoke or second hand smoke are considered as passive smokers. Enquiry into the exposure site also made- either home or workplace.

**Working hours:**

Duration of time spent in farming work in a day – recorded in hours

Duration spent in farming occupation in their life: noted in completed months or years at the time of interview

**Animal Exposure/ Working with Animals:**

Farmers who are exposed with animals in their occupation or in their home either in confined enclosure or open space was considered as handling animals or animal exposure.

**STATISTICAL ANALYSIS:**

Data were entered in Microsoft Excel. Data were presented as frequency and percentages. Association was found out using Chi square test. Mean and Standard deviation was calculated for continuous variables.

p-value < 0.05 was considered as statistically significant.

Statistical analysis was done using SPSS version 16.

## **REVIEW OF LITERATURE**

The review of literature has been discussed under the following headings,

- 1. History on Occupational Health**
- 2. Occupational Health**
  - 2.1. Occupational Diseases**
  - 2.2. Definitions of occupational diseases**
  - 2.3. Spectrum of Occupational Diseases**
- 3. Agricultural Sector**
  - 3.1. Worldwide Farmers Population**
  - 3.2. National Farmers Population**
  - 3.3. Local Farmer's population**
  - 3.4. Agricultural Sector- An Unorganized Sector**
  - 3.5. Health Services available for Agricultural Sector**
- 4. Occupational Hazards in Farming:**
  - 4.1. Machinery related hazard**
  - 4.2. Biological Hazards**
  - 4.3. Animal transmitted diseases**
  - 4.4. Psychosocial hazard**
  - 4.5. Pesticide Exposure**
  - 4.6. Dermatological Conditions**
  - 4.7. Musculoskeletal Disorders**
  - 4.8. Accidents and injuries**
- 5. Relevant global and Indian studies**

## **1. History on Occupational Health**

“The classic approach to ensuring health and safety in the workplace has depended mainly on the enactment of legislation and inspection of workplaces to ensure compliance with health and safety standards”

While this approach has been effective in controlling many specific occupational hazards since the Industrial Revolution, it has not been very effective in the past several decades, particularly in developing countries, for several reasons. With the introduction of new agricultural techniques, agriculture has become an industry for which systems based on inspection are inadequate. There is a need to develop other systems to protect the health of agricultural workers<sup>(9)</sup>.

Occupational health problems have gradually increased in type and magnitude and have led to or aggravated diseases resulting from exposure to several risk factors, only one of which being the work environment

Examples include chronic obstructive pulmonary disease which is mainly caused by smoking but may be aggravated by irritant gases or dusts in the workplace. Low-back pain syndrome has several risk factors including rheumatic disorders, scoliosis and inappropriate posture at work<sup>(19)</sup>.

The WHO Global Strategy for Occupational Health for All, developed through the global network of the WHO Collaborating Centres in Occupational Health provides an important mechanism for protecting and promoting health at work.

According to the Declaration of Alma-Ata, 1978:

“Primary health care ... is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where workers live and work, and constitutes the first element of a continuing health care process.”

The Declaration of Alma-Ata led to the “recognition of the importance of primary health care (PHC) workers and community health workers in bringing health care to where people live and work”

PHC and community health care workers in most developing countries are not trained in the special needs of workers or in the simple measures that can be taken to prevent or overcome and control many workers’ health problems<sup>(20)</sup>.

Workers are therefore an integral part in the body of the Declaration.

## **2. Occupational Health:**

According to ILO <sup>(21)</sup> Occupational health is a multisectoral activity aimed at:

- The protection and promotion of the health of workers by preventing and controlling occupational diseases and accidents and by eliminating occupational factors and conditions hazardous to health and safety at work
- The development and promotion of healthy and safe work, work environments and work organizations
- The enhancement of the physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work
- Enabling workers to conduct socially and economically productive lives and to contribute positively to sustainable development

Occupational health has gradually developed from a mono-disciplinary, risk-oriented activity to a multi-disciplinary and comprehensive approach that considers an individual's physical, mental and social well-being, general health and personal development

Occupational health is at the centre of sustainable development in the following ways<sup>(16)</sup>

- The prevention of occupational accidents, injuries and diseases and the protection of workers against physical and psychological overload imply appropriate use of resources, minimizing the unnecessary loss of human and material resources.

- The objective of healthy and safe work environments calls for the use of safe, low-energy, low-toxic-emission, low-waste (green) technology, and in many countries occupational health legislation requires the use of the best available production technology.
- The occupational health approach may facilitate undisturbed production that increases the quality of products, productivity and process management and helps to avoid unnecessary loss of energy and materials and to prevent an unwanted impact on the environment
- Occupational health services aim to ensure workers' health, safety, working capacity and well-being.
- A healthy, productive and well motivated workforce is the key agent for overall socioeconomic development
- In addition, high-quality and productive work ensures healthy production of materials, goods and services and the consideration and practical implementation of the principles of sustainable development

## **2.1 Occupational Diseases:**

- “Are adverse conditions in the human being, the occurrence or severity of which is related to factors on the job or in the work environment”
- Factors can be physical, chemical, biological, ergonomic, psychosocial stressors and mechanical. When health hazards associated with working environment, it can cause occupational disease. It may be either one of the multiple causes of the disease or it may aggravate existing ill-health of non-



occupational origin. Working environment can also aggravate pre-existing diseases such as bronchial asthma which can be aggravated by dust exposure<sup>(10, 22)</sup>.

## **2.2 Definitions of occupational diseases**

According to the Protocol of 2002 to the Occupational Safety and Health Convention, 1981 (No. 155), the term “occupational disease” covers any disease contracted as a result of an exposure to risk factors arising from work activity.

The ILO Employment Injury Benefits Recommendation, 1964 (No. 121), Paragraph 6(1), defines occupational diseases in the following terms: “Each Member should, under prescribed conditions, regard diseases known to arise out of the exposure to substances and dangerous conditions in processes, trades or occupations as occupational diseases.”

- Two main elements are present in the definition of an occupational disease:
- The causal relationship between exposure in a specific working environment or work activity and a specific disease; and
- The fact that the disease occurs among a group of exposed persons with a frequency above the average morbidity of the rest of the population.

## **2.3 Spectrum of Occupational Diseases:**

- At one end of the spectrum of work-related conditions like – relationship of specific causative factors at work has been fully established and the factors concerned can be identified, measured and eventually controlled.

- At the other end there is unknown cloud of risk factors – weak, inconsistent, unclear relationship to working conditions.
- Middle of the spectrum requiring further knowledge depth – possible causal relationship but the strength and magnitude of it may vary.

### **3. Agricultural Sector:**

One of the oldest occupation in the history of mankind is farming, for 5000 years it was the main occupation<sup>(23)</sup>. Until the late seventies, half of the work force in the world worked on land<sup>(24)</sup>. Rapid technological development in the agricultural sector has tremendously improved in last 25 years. The new innovations have increased production. They have also given rise to new variety of problems related to safety and health. broadest and most extensive exposure to injury, diseases are suffered by agricultural workers<sup>(25)</sup>.

#### **3.1 Worldwide Farmers Population:**

Globally, 1.3 billion workers are engaged in farming and related works in agricultural sector according to International Labour Organisation<sup>(21)</sup>. This number represents half of the total working force worldwide. In developed and industrialised countries approximately 9% of the labour force is involved in agriculture. 60% of the agriculture sector workers are from developing countries. Asia being the most densely populated region in the world has the majority of agricultural workers. China has more than 40% of the world agricultural workers and India has more than 20% of the world agricultural population. 74% of the workers are from Asia and pacific, 16% from Africa, 3% from Latin America and 7% from industrialized and transition countries<sup>(3)</sup>.

Approximately 3.4 billion people – or 45% of the world’s population – live in rural areas. Roughly 2 billion people (26.7% of the world population) derive their livelihoods from agriculture. In 2016, an estimated 57% of people in Africa were living in rural areas. 53% of the population was economically active in agriculture. In

2017, an estimated 866 million people were officially employed in the agricultural sector: Of these, 292.2 million were located in Southern Asia, 148.4 million in Eastern Asia and 215.7 million in sub-Saharan Africa<sup>(19)</sup>. The agricultural sector accounted for 57.4% of total employment in sub-Saharan Africa and 42.2% in Southern Asia. Although the share of total employment in agriculture has declined over the past decade, the total number of workers in agriculture in sub-Saharan Africa has grown. There are more than 570 million farms in the world. More than 90% of farms are run by an individual or a family and rely primarily on family labour. Family farms occupy a large share of the world's agricultural land and produce about 80% of the world's food.

### **3.2 National Farmers Population:**

India being the second populous country in the world is also the largest producer of milk, pulses and jute. Second largest producer of rice, wheat, sugarcane, groundnut, vegetables, fruit and cotton. It is also one of the leading producers of spices, fish, poultry, and livestock and plantation crops. Worth \$ 2.1 trillion, India is the world's third largest economy after the US and China. India has total of 2.4 percent of the world's land area<sup>(26)</sup>.

Agriculture and its allied sector is the largest source of livelihood for majority of the population in India. Almost seventy percentages of the households in rural areas of India depend primarily on agriculture for their source of income and livelihood. Majority of them are small and marginal workers. In 2017-18, total food grain production was estimated at 275 million tons (MT). India is the largest producer

(25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world. India's annual milk production was 165 MT (2017-18), making India the largest producer of milk, jute and pulses, and with world's second-largest cattle population 190 million in 2012. It is the second-largest producer of rice, wheat, sugarcane, cotton and groundnuts, as well as the second-largest fruit and vegetable producer, accounting for 10.9% and 8.6% of the world fruit and vegetable production, respectively. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 18.53 trillion (US\$ 271.00 billion) in financial year 2018<sup>(27)</sup>.

Socio-economic, cultural and environmental factors influence the health and living conditions of farmers and agricultural workers. The environment in which rural people work and live, their standard of living, and their nutrition are as important to their health as the services available to them. In many countries, rural populations do not participate actively in policymaking and are not involved in the decisions which concern them.

Agricultural sector have highest labor migration and casual employment<sup>(27)</sup>. This mobility of workers is significant throughout the globe and pose various threat to farmers health. Wherever they come from, migrants are always heavily disadvantaged in terms of pay, social protection, housing and medical protection. The migration of young men to the city means that agricultural work is increasingly left to women and children. Women now account for more than 40 per cent of the total agricultural workforce, and child labour is widespread. Women are mainly engaged in non-permanent jobs in both large- and small-scale holdings, but this does not mean that

they reduce their domestic activities. Rural women have a double role as workers and housewives.

### **3.3 Local Farmer's population:**

Agriculture is the principal source of livelihood for more than 40 percent of the population of this State. Agriculture provides wage goods required by the non-agricultural sectors and raw materials for the industrial sector. Ratcheting up the growth of the economy would be possible provided the agriculture sector fares well on a sustained basis. A good performance of the agriculture sector is viewed as an effective instrument for attainment of inclusive economic growth and poverty reduction. It ranked second in the productivity of paddy next only to Punjab and came first in the yield of maize and oilseeds. The productivity of sugarcane in Tamil Nadu was almost double of what was obtained at the national level. The better agricultural accomplishments are the result of continued technological gains and appropriate policies and timely intervention measures of the Government.

According to 2011 census, Tamilnadu has a population of 72147030. Of this 51.6% of the population resides in rural area. Total of 45.5% constitute working population. Among those, 3855375 are main cultivators and 7234101 are agricultural laborers (total of 42.1% of the working population are involved in agriculture).

Tamil Nadu agriculture is the most overriding sector in the economy of the state. Around 70 percent of the state's population is involved in agricultural activities as this is one of the major means of livelihood in Tamil Nadu. Tamil Nadu has occupied an area of 1.3 lakh sq. km with an overall area of around 63 L.Ha for plantation. The

major crops sown in Tamil Nadu are rice, jowar, ragi, bajra, maize, and pulses. Few other crops that are highly cultivated in the regions of Tamil Nadu are cotton, sugarcane, tea, coffee, and coconut.

### **3.4 Agricultural Sector- An Unorganized Sector**

The Indian Economy is characterized by the existence of a vast majority of informal or unorganized labour employment. As per the Economic Survey 2007-08, 93% of India's workforce include the self employed and employed in unorganized sector. Small and marginal farmers, landless agricultural laborers, share croppers, Attached agricultural labourers, bonded labourers, migrant workers, contract and casual labourers come under this category.

Marginal labour sectors are often termed as informal or unorganized sectors, and primarily consist of workers engaged in various services that are fully outside government policies and legislation<sup>(28)</sup>. These small-scale organizations do not have any proper labour division and formal employment systems, such as an agreement or contract, and no safety and exposure guidelines are followed by the management; thus the workers are exposed to unrestricted occupational hazards. Inadequate awareness of handling of hazardous material and inappropriate protection exposes the workers to the risk of occupational hazards.

Although agriculture is the major employment in India, it still remains as an unorganized sector. Majority of the workers are poorly paid, under employment prevails leading on to overload of work to the employed few. Employment is available only during harvesting and sowing season. Rest of the year workers are engaged in

other jobs or remain unemployed leading on to socioeconomic problems. The unorganized workers are subject to exploitation by the rest of the society. They receive poor working conditions especially wages much below that in the formal sector, even for closely comparable jobs, ie, where labour productivity is no different. The work status is of inferior quality and inferior terms of employment, both remuneration and employment. Being an unorganized sector, agricultural workers and employers remain outside labour laws.

### **3.5 Health Services available for Agricultural Sector:**

In both developing and developed countries, health status remains low in rural areas compared to urban area. The migration of population in search of occupation to the urban area and unplanned urbanization are the reasons for the divide. This has lead to imbalance in the distribution of resources to rural areas. Limited funds are available, in particular, grass root level primary care sector areas where a greater impact could be made among the rural populations. Small rural health centers often find difficulty in attracting and retaining workforce. Inaccessible services to the remote population who are mostly farmers, lead onto development of adverse health conditions among them. Hence, mortality rate remains high in rural area due to inaccessible services.

In developing countries, agricultural workers may live in extremely primitive conditions, in areas where roads are non-existent or inadequate and transportation is difficult. The majorities of the rural population in developing countries has an inadequate diet and are exposed to both general and occupational diseases. The high prevalence of epidemic and endemic diseases in most rural areas further aggravates



rural workers' poor health and misery. Many diseases and health impairments arise from poor sanitation, inadequate housing, malnutrition and a wide variety of parasitic and bacterial infections affecting the entire rural population. In less-developed countries, the challenge to provide health for the whole rural community is greater, as traditional health approaches have provided few effective mechanisms to reach local communities.

#### **4. Occupational Hazards in Farming:**

Worldwide, agriculture is one of the hazardous occupations. In several countries the fatal accident rate in agriculture is double the average for all other industries. According to ILO estimates, workers suffer 250 million accidents every year. Out of a total of 335,000 fatal workplace accidents worldwide, there are some 170,000 deaths among agricultural workers.

The risk of occupational hazard has increased due to the use of machinery, pesticides and agrochemicals<sup>(29)</sup>. Machinery such as tractors and harvesters has the highest frequency and fatality rates of injury<sup>(30)</sup>. Available data from developing countries shows that there has been an increase in the accident rate in agriculture. Such accidents occur mainly among migrants and daily workers, as well as women and children whose numbers in waged labor are constantly rising. Exposure to pesticides and other agrochemicals constitutes a major occupational risk which may result in poisoning and death and, in certain cases, work-related cancer and reproductive impairments.

##### Agricultural workers' working condition:

The working environment has an influence on the farmer's health. The following are few of the conditions faced by them<sup>(31)</sup>

- Most of the agricultural work or tasks are done in the open air ultimately exposing the workers to climatic conditions

- “Contact with animals and plants exposing the agricultural workers to infections, parasitic diseases, allergies and other health problems”
- “Use of hazardous chemicals and biological products”
- “Seasonal nature of the particular work which should be done in specific periods”

#### List of Hazards:

Those related to:

- Machinery such as tractors, trucks and harvesters, and cutting and piercing tools;
- Hazardous chemicals: pesticides, fertilizers, antibiotics and other veterinarian products;
- Toxic or allergenic agents: plants, flowers, dusts, animal waste, gloves, oils;
- Carcinogenic substances or agents: certain pesticides such as arsenicals and phenoxy-acetic herbicides, UV radiations, parasitic diseases such as bilharziasis and facioliiasis;
- Transmissible animal diseases: brucellosis, bovine tuberculosis, hydatid disease, tularemia, rabies, Lyme disease, tinea, listerioses;
- Other infectious and parasitic diseases: leishmaniasis, bilharziasis, facioliiasis, malaria, tetanus, mycosis;
- Confined spaces such as silos, pits, cellars and tanks;

- Noise and vibration;
- Ergonomic hazards: use of inadequate equipment and tools, unnatural body position or prolonged static postures, carrying of heavy loads, repetitive work, excessive long hours;
- Extreme temperatures due to weather conditions;
- Contact with wild and poisonous animals: insects, spiders, scorpions, snakes, certain wild mammals<sup>(27)</sup>.

#### **4.1 Machinery related hazard:**

With the increasing utilization of machinery in farms, there is also ever increasing accidents and hazards to health caused by them. The accidents that occur in farm can be attributed to a lot of factors<sup>(32)</sup>. Fatigue, haste, and stress can cause farmers to undertake activities that they know are unsafe. The speed and sophistication of farm machinery means that the slightest error by the operator can cause a serious accident<sup>(25)</sup>. The safety issues of the machines have been questioned and farm safe machines are promoted. Various programs<sup>(33, 34)</sup> and publications<sup>(35)</sup> have been developed in late eighties to create awareness among farmers regarding farm safety and safe use of agricultural equipments.

The reported official documentation on the incidence of occupational accidents and diseases are imprecise and underestimated, due to inadequate and lack of uniform recording and notifications systems. Majority of the accidents occurring in farms are non fatal, thereby going unnoticed by the system. Failure to report minor injuries and

accidents results in poor data quality. The death certificate doesn't include the occupational cause as a reason for death. Agricultural sector's occupational hazards still remain unknown leading onto further underreporting. Because of this reason in many countries the reporting and compensation systems doesn't include the agricultural sector or certain categories of agricultural workers. Many countries group agriculture together with other sectors such as hunting, forestry and fishing in their global estimates.

“Problems in diagnosis also lead to under-reporting in the vast majority of countries. Chronic conditions due to noise, vibration, and low exposure to dusts or pesticides are more difficult to evaluate due to their long-term effects and uncertain symptoms” Workers are thus deprived of proper treatment and appropriated preventive measures. This situation is becoming particularly serious with rapid technological changes in agricultural production and with an increasing use of hazardous substances. It is also amplified by the poor control that workers have over the rhythm, content and organization of their work and the weak enforcement of safety and health regulations in agricultural settings.

#### **4.2 Biological Hazards:**

Biological hazards associated with farming are respiratory illness, diseases transmitted by animals, dermatological conditions, hearing impairment etc.

Respiratory Problems- farming as an occupation poses the agricultural workers at the risk of developing respiratory illness. Asthma may be precipitated by both immunologic and nonimmunologic agents. Immunologic causes include reactions to

cereal grain pollens, livestock dander, grain dust fungal antigens, and mites in organic dusts. Asthma may also be precipitated by certain organic dusts and organic insecticides through non-immunologic means. In addition, some farmers with pre-existing bronchial hyperactivity may develop bronchospasm from the nonspecific initial effects of various dusts, fumes, and gases to which they are exposed. "Farmer's lung" is an immunologically mediated pneumonitis caused by fungal spores from mouldy hay or grain<sup>(22, 36)</sup>. Certain gases that are highly reactive or highly soluble in water cause primary irritation of the mucous membranes and pulmonary edema. Examples include ammonia, chlorine, sulphur dioxide, ozone, and hydrogen sulfide.

#### **4.3 Animal transmitted diseases:**

Zoonoses, or animal-transmitted diseases, are another occupational hazard for farmers. At least 150 such diseases have been documented worldwide, of which rabies, viral encephalitis, brucellosis, and psittacosis are some of the better known<sup>(37)</sup>.

#### **4.4 Psychosocial hazard:**

In addition to bearing the physical burdens associated with long and strenuous work hours, farmers experience stress related to the environment, psychological states, social factors, and potential illnesses<sup>(38, 39)</sup>. Levels of stress may be compounded by other issues that indirectly contribute to these factors, such as the farm serving as both home and office, and having to work with family members who share in the burden of stress<sup>(39, 40)</sup>.

Financial pressures, weather, international grain markets, banking, and government policy all contribute to the farmer's stress. Many of the farmers' problems are chronic,

and they cannot simply walk away from them. Dr. Lilly Walker from the University of Brandon has suggested some ways that farmers can begin to overcome some of the negative effects of stress. They include listing and completing farm tasks in order of importance, involvement with various recreational activities, and maintaining a strong family unit. Physicians who care for farm families have to be aware of the stresses and intervene when problems become apparent.

The manifestation of severe psychosocial stress leads on to farmer's suicide. Farmers who commit suicide tend to use methods to which they have easy access, and these methods are more likely to be lethal. Hanging was also more frequent, while more than half of the cases of self poisoning involved agricultural or horticultural chemicals<sup>(41)</sup>.

A number of studies of occupational and work-related stress have found that levels of stress are higher among women, minorities, unmarried individuals, and those with a lower socioeconomic status<sup>(42, 43)</sup>.

#### **4.5 Pesticide Exposure:**

Pesticides are chemical compounds that are used to kill pests, including insects, rodents, fungi and unwanted plants, which are widely used in agriculture<sup>(44)</sup>. Majority population of India are engaged in agriculture hence are exposed to pesticides. While pesticides help in increasing crop production, their indiscriminant use adversely effects environment and human health making it an important concern in public health. Agriculture is the primary occupational sector in India. Nowadays, agriculture shifted from organic farming to chemical farming because it gives them more yield

and economy but leaves them with serious health problems. Exposure to hazardous chemicals like pesticide both occupationally and environmentally causes many health problems to human.

According to International Labor Organization, as much as 14% of all occupational injuries are due to exposure to pesticides and other agrochemical constituents and 10% of these are fatal<sup>(2)</sup>. The World Health Organization (WHO) and the United Nations Environmental Program estimated that one to five million cases of pesticide poisoning occur among agricultural workers each year with about 20000 fatalities<sup>(45, 46)</sup>. WHO periodically publishes list of hazardous chemicals, which sets out a classification system to distinguish between the more and the less hazardous forms of selected pesticides based on acute risk to human health (that is the risk of single or multiple exposures over a relatively short period of time). It takes into consideration the toxicity of the technical active substance and also describes methods for the classification of formulations<sup>(47)</sup>. The recent version of this classification (2009) has classified pesticides as - Ia: Extremely hazardous, Ib: Highly hazardous, II: Moderately hazardous, III: Slightly hazardous and U: Unlikely to present acute hazard. The primary reasons for accidental poisoning among agricultural workers include inappropriate use, inadequate knowledge and awareness about pesticide storage, protective measures. A literature search revealed that there is a dearth of studies in India relating to pesticide use pattern and associated hazards.

Exposure to pesticides both occupationally and environmentally causes a range of human health problems. It is estimated that nearly 10,000 deaths annually to use of chemical pesticide worldwide, with about three-fourths of these occurring in



developing countries<sup>(48)</sup>. At present, India is the largest producer of pesticides in Asia and ranks twelfth in the world for the use of pesticides with an annual production of 90,000 tons. Pesticides being used in agricultural tracts are released into the environment and come into human contact directly or indirectly. Humans are exposed to pesticides found in environmental media (soil, water, air and food) by different routes of exposure such as inhalation, ingestion and dermal contact. Exposure to pesticides results in acute and chronic health problems. These range from temporary acute effects like irritation of eyes, excessive salivation to chronic diseases like cancer, reproductive and developmental disorders.<sup>(31)</sup>

There is a dearth of studies related to these issues in India. A study which looks into the health effects of acute pesticide poisoning among the cotton growers of India by Mancini *et al* is a positive step to fill this research gap<sup>(49)</sup>. Specific studies dealing with the agricultural practises of the farmers regarding pesticide use and its health impacts is needed to make informed policy decisions to bring about changes in the agricultural practises in India. Therefore, we undertook a study among the farmers of Tamil Nadu to look into the various aspects of pesticide use in agriculture and its impact on human health.

#### **4.6 Dermatological Conditions:**

The leading causative agents for skin problems among farmers are:

\* Plant and animal products (inedible), such as poison oak, poison ivy, shrubs, weeds, flowers, and leathers;

\* Agricultural chemicals, such as fungicides, herbicides, and insecticides; and

\* Food products, such as fruits, nuts, vegetables, and cereals. The most common presentation of the skin diseases was contact dermatitis followed by various types of skin infections. Dermatophyte skin lesions were the most common form of infections in the farming population.

#### **4.7 Musculoskeletal Disorders:**

Agriculture is a challenging occupation in which farmers suffered from various work-related problems and musculoskeletal disorders (MSDs) <sup>(50)</sup>. The main factors of these problems are among the less technically advanced sector workers (i.e., agriculture, construction, handicraft, etc.), especially involved in stooped posture and repetitive manual tasks. These factors can be divided into individual, work characteristics and tool-related factors <sup>(6, 51-54)</sup>. Manual harvesting exposes farmers to risk of development of MSDs. The high prevalence of MSDs in this sector may be attributed to various types of repetitive awkward movements (i.e., frequently working with the flexed back area, lifting and bringing heavy loads, etc.) and poor working postures (i.e., squatting, kneeling, etc.) sustained by workers for long working hour<sup>(52)</sup>. In various operations (i.e., weeding, cutting, sowing, etc.) and during the manual harvesting work, the worker adopts such postures in which trunk and head move forward with slight inclination for better cutting/holding of the product/ crop. Literature shows that several operations such as cutting/harvesting crops and weeding, generates excessive physical strain on the musculoskeletal system which may further contribute to development of MSDs among the farmers<sup>(55, 56)</sup>. Therefore, to reduce/prevent MSDs, there is a need to find out the possible risk factors related to such problems among the manual harvesting farmers.

MSDs, particularly in the trunk, shoulders, and hands/ wrists are progressively frequent in Asian producers. In India, various studies have reported MSDs in farmers and work related upper limb disorders occurrence rates for farmers reported at about 63–98% <sup>(57-60)</sup>. To date there is limited study available on the prevalence of MSDs among farmers.

#### **4.8 Accidents and injuries:**

Work-related injuries and illnesses kill an estimated 1.2 million people around the world every year. This figure roughly equals the global annual number of deaths from malaria or is four times the number of lives lost in the Asian Tsunami. In terms of morbidity, 250 million work-related accidents and 160 million work-related illnesses occur annually<sup>(61)</sup> and these numbers translate into an annual economic loss of approximately 4% of the world's gross national product<sup>(20)</sup>.

Despite these stark numbers, only an estimated 5– 10% of the workers in developing countries and 20–50% of the workers in industrialized countries have access to adequate occupational health services. Even in a developed country like the United States, approximately 70% of the hundred million workforce is not covered by occupational health services, and fewer than 15% work in plants with a full-time or part-time physician<sup>(62, 63)</sup>.

#### **Other factors affecting health:**

Despite the fact that certain developing countries have reached higher levels of economic development, nutrition and health are still problem areas. This situation provokes a vicious circle of low productivity, low wages, malnutrition, ill-health and

low working capacity. The interaction between poor living and working conditions determines a distinctive morbidity-mortality pattern among agricultural workers, which is due to the combination of malnutrition, general and occupational diseases, and complications arising from undiagnosed or untreated diseases. Low working capacity is closely related to workers' malnutrition and poor health.

Diseases and accidents caused by agricultural work are also conditioned by a range of factors such as climate, fauna, population density, living conditions, level of education, training, technological development, quality of services, etc. Agricultural workers are dependent on the general standards of public health services in rural areas where the provision of health care, adequate water supply and sanitation systems are generally insufficient. The low standards of hygiene in living quarters affect not only smallholdings, but also the large enterprises which provide housing for temporary workers and for migrant workers. Lack of knowledge prevails among rural community regarding the health hazards they may face in their work. Traditional health approaches have few effective mechanisms to reach rural communities.

“Apart from being an antidote to unsafe work conditions, which breed ill health and predispose to injury and death, occupational health services have been endorsed by both the World Health Organization (WHO) and the International Labour Office (ILO) as a prescription for a healthier, happier, and more productive workforce”

“Therefore, the justification for the propagation and adoption of occupational health services worldwide is as self-evident as for the distribution of mosquito nets, vaccination against epidemic diseases, or, for that matter, the installation of early warning systems in the Tsunami-prone oceans of the world”

## **5. Relevant Studies:**

### **Indian Studies:**

A cross sectional study conducted in Chandigarh (9), the lung functions were assessed. Total of 486 farmers were interviewed, among them 142(29.2%) were smokers. 106(21.8%) farmers were symptomatic, with chronic bronchitis 34(32.15), cough 38(35.6%), chest tightness 8(7.5%), bronchial asthma 13(12.3%), post nasal drip or dyspnea 4(3.8%). Symptoms were more common among non-smokers (55.6%) compared to smokers (44.3%).

A study done on knowledge and practices of safety use of pesticide among farm workers by Kumari et. al (64) in Andhra Pradesh showed that self-reported toxicity symptoms with pesticide use were skin rash (40.5%), headache (48%), excessive sweating (22.5%) and diarrhea (21.3%). These toxicity symptoms found to be negatively correlated with use of protective measures ( $r = -0.78$ ;  $p < 0.001$ ). Education had greater influence on knowledge on pesticide use reveals that 10<sup>th</sup> and above qualification having 83% of knowledge ( $p = 0.002$ ) but has no influence in motivating them to practice safety measures while using pesticide ( $p = 0.793$ ). Experience of the farm workers showed significant influence on both knowledge and safety practice of pesticide use in which positively associated with knowledge ( $p = 0.001$ ) but does not having much influence on practice ( $p = 0.04$ ). Farmers working in closed fields had higher knowledge than those working in open fields due to the nature of closed fields favors the appearance of hazards. Age has no influence on knowledge and practice of

pesticide use. Significant correlation ( $r = 0.525$ ;  $p < 0.001$ ) between the knowledge score and the practice score on protective measure.

A study on pesticide use pattern among farmers in West Bengal by Banerjee et. al (65) revealed that during pesticide spraying, 29.8% had headache, 26% nausea, 9.8% burning sensation in the eye, 9.2% cough and 2% had muscle cramp. On use of personal protective measures, covering nose and mouth with cloth combined with bath after spraying is most common 27%.

A study conducted in Thanjavur district on impact of use of pesticide on health of farmers by Chitra et. al (66) among 631 farmers, 433 were pesticide sprayer and 198 were non-sprayer who involved other agricultural activities like weeding, sowing etc., 373 sprayers (86.1%) and 156(78.8%) non-sprayers reported at least one respiratory symptoms. Symptoms were excessive sweating (36.5%), burning eyes/stinging eyes/itching eyes (35.7%), dizziness (28.4%), cough and breathlessness (17.6%), wheezing (6.8%). Regarding of duration of pesticide exposure mean duration is 11.8 years. Regarding use of personal protective equipment, 382(88%) sprayers didn't any protective measures

Study conducted on health seeking behavior of farming community in Jorhat district, Assam by Rahman et.al (67) found that most common cause of morbidity among farming community was respiratory tract infection 54.25% followed by musculoskeletal problems 23.25%, gastrointestinal problems 11.75%, skin diseases 8.5% and other 2.25%. 62% of workers seek treatment in the government hospital followed by private clinicians 17% and traditional healers 11%.

S K Gosh et al (68) did a case control study in Ahmadabad district of Gujarat among agricultural tobacco workers. Total farmers population was 9000, among which they conducted study of 290 tobacco farmers. 150 non tobacco farmers were selected as controls. Medical examination, Chest X ray, lung function tests, urine and blood tests were done in order to find out the effect of occupational exposure of tobacco among farmers. The study concluded that the frequency of symptoms was very high among tobacco workers (86.20%) when compared to the controls.

### **Global Studies:**

Martin iversen et al (69) performed an epidemiological study among 1685 Danish farmers in order to assess the prevalence of self reported asthma, wheezing during work, and chronic bronchitis and their risk factors. Among the study participants, 7.7% had self reported asthma and 23.6% had chronic bronchitis. Odds of developing disease were 2.03 times higher among the farmers.

Bronwyn Brew et al (70) conducted a longitudinal cohort study among farmers of Australia. Longitudinal cohort study was analyzed over four time points comparing farmers with non-farming workers for physical and mental wellbeing. Farmers those lived in rural remote areas reported worse mental health and wellbeing when compared to non-farm workers. The study concluded that Remoteness was a significant factor in the mental health and wellbeing of farmers, more so than financial stress, rural factors and recent adverse events.

Hannae Jo et al (71) conducted a cohort study for Agricultural Work Related Musculoskeletal Disorders (FARM) among Farmers of Kangwon Province, South

Korea. Questionnaire was used to elicit sociodemographic, health characteristics and agricultural work-related factors. In addition they also did laboratory examinations (lumbar spinal radiography and serologic testing). 91.3% of the subjects reported musculoskeletal pain and 63.8% reported low back pain. Farmer's stress inventory and subjective stress indices were above median scale values indicating a stressful work. Self perceived quality of life was good.

Jane A. Hoppin et al (72) evaluated pesticide and other occupational exposures as risk factors for adult-onset asthma. The prospective cohort study was conducted among pesticide applicators and their spouses in Iowa and North Carolina. Self administered questionnaires and telephone interviews were done. Respondents provided information on demographics, smoking, farming, lifetime pesticide use, and medical history. Among 25,814 women studied, 2.7% of them had adult onset asthma, 40% had atopic asthma and 60% had non atopic asthma.

Based on the literature review done on the occupational hazards among farmers, there is a lacunae in research pertaining to the present study's area i.e. Perambalur district. This study first of its kind in Perambalur district tried to fill in the research gap in assessing morbidity status of farmers. The sociodemographic profile, occupational profile and morbidity pattern among farmers were studied. The authors hope that the study's result will throw light onto the morbidity suffered by the farmers and attracts the attention of stakeholders in order to influence policy making.



## **RESULTS**

### **STATISTICAL METHODS**

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Non normally distributed quantitative variables were summarized by median and interquartile range (IQR). Data was also represented using appropriate diagrams like bar diagram, pie diagram and box plots.

Categorical outcomes were compared between study groups using Chi square test /Fisher's Exact test (If the overall sample size was  $< 20$  or if the expected number in any one of the cells is  $< 5$ , Fisher's exact test was used.)

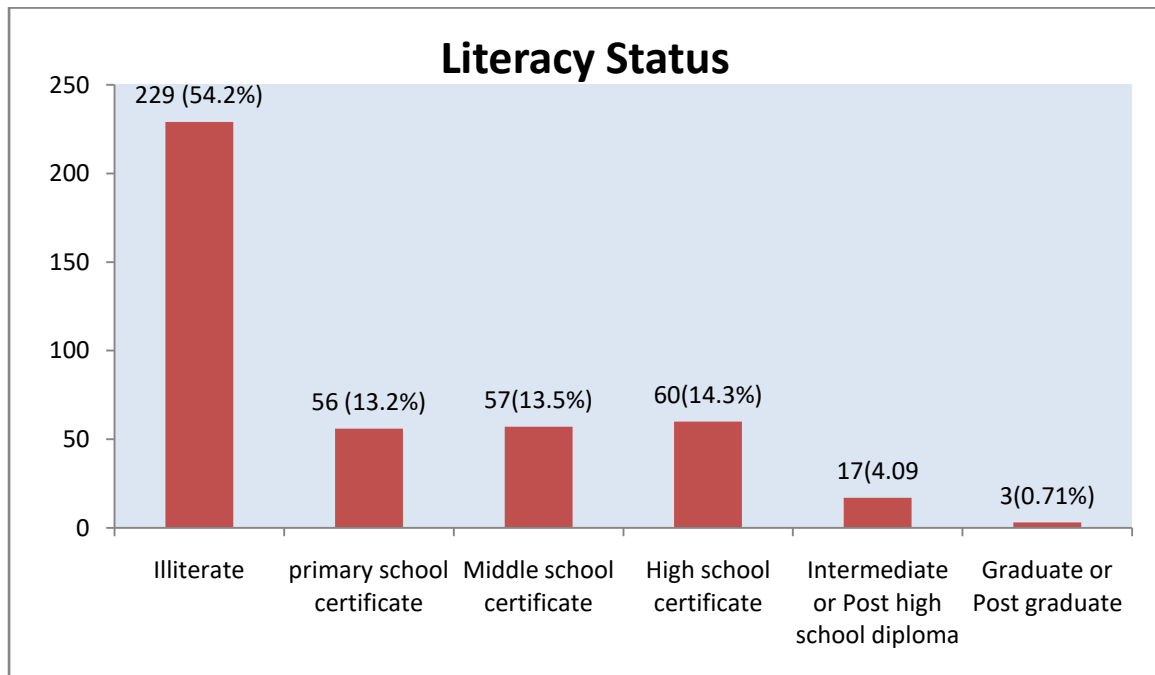
P value  $< 0.05$  was considered statistically significant. IBM SPSS version 16 was used for statistical analysis

**Table 1: Sociodemographic characteristics of study participants (n=422)**

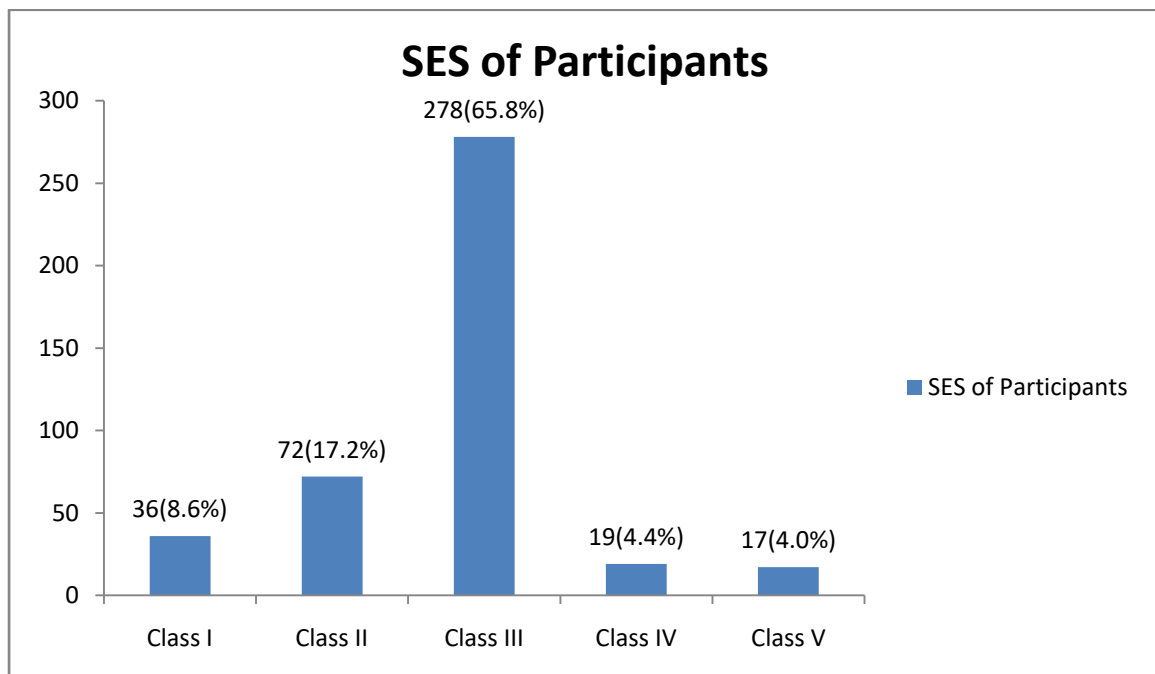
S No	Characteristics		Frequency	Percentage(%)
1.	Age		47.19±12.47	
2.	Sex	Male	069	16.4
		Female	353	83.6
3.	Marital Status	Married	386	91.5
		Unmarried	004	0.9
		Widow	029	6.9
		Divorced	003	0.7
4.	Religion	Hindu	417	98.8
		Muslim	3	0.7
		Christian	2	0.5
5.	Education	Graduate or Postgraduate	3	0.8
		Intermediate or Post high school diploma	17	4.0
		High school certificate	60	14.2
		Middle school certificate	57	13.6
		Primary school certificate	56	13.2
		Illiterate	229	54.2
6.	No of family members	<3	95	22.5
		3-5	269	63.7
		>5	58	13.8
7.	Type	Nuclear	343	81.2
		Joint	79	18.8
8.	Socioeconomic Classification	Class I	36	08.6
		Class II	72	17.2
		Class III	278	65.8
		Class IV	19	04.4
		Class V	17	04.0
9.	Type of House	Pucca	126	29.9
		Kutchra	144	34.1
		Semi-pucca	152	36.0
10.	Toilet In house	No	193	45.7
		Yes not in use	37	8.8
		Yes in use	192	45.5
11.	Kitchen	Yes	259	61.4
		No	163	38.6
12.	Fuel	Gas	371	87.9
		Kerosene	18	4.3
		Wood/ charcoal	33	7.9

The mean age of the farmers were 47.19 years. Among the study population, 69 (16.4%) participants were male and remaining 353 (83.6%) participants were female. Majority of 386 (91.5%) participants were married, followed by widower, unmarried and divorced was 6.9%, 0.9% and 0.7% respectively. Majority of 229 (54.2%) participants were illiterate. The proportion of high school certificate, middle school certificate and primary school certificate and Intermediate or Post high school diploma was 14.2%, 13.6%, 13.2% and 4% respectively. Among the farmers 95 (22.5%) lived in a family with <3 members, 269 (63.7%) in 3 to 5 members and 58 (13.8%) in >5 member families. Among the study population, 343 (81.2%) participants belong to nuclear family and 79 (18.8%) participants belonged to joint family. Majority of the farmers 278(65.8%) belonged to Class II socioeconomic status according to modified BG Prasad classification. Among the study population, 126 (29.9%) participants were living in pucca house, 144 (34.1%) in kutcha house and 152 (36%) in semi-pucca house. Among the study population, 259 (61.4%) participants had separate kitchen in the house and 371 (87.9%) participants were using gas, 18 (4.3%) kerosene and 33 (7.9%) were using wood/charcoal. (Table 1)

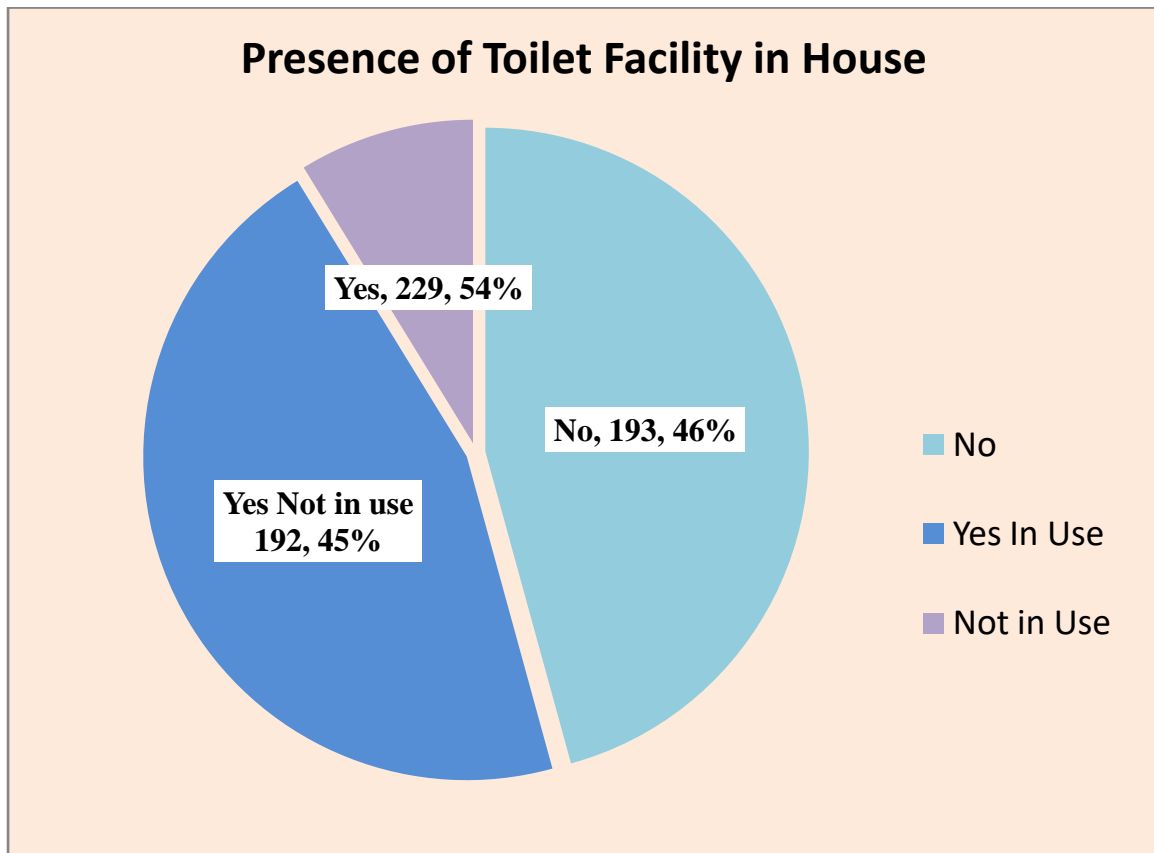
**Figure 1: Literacy Status of farmers (n=422)**



**Figure 2: Socioeconomic status of Study Population (n=422)**



**Figure 3: Toilet Facility at Farmer's House (n=422)**



**Table 2: Personal Habits of the study participants (n=422)**

<b>S No</b>	<b>Characteristics</b>		<b>Frequency</b>	<b>Percentage(%)</b>
1.	<b>Diet</b>	Vegetarian	039	9.2
		Mixed	383	90.8
2.	<b>Iodized Salt use</b>	Yes	398	94.3
		No	024	5.7
3.	<b>Tobacco consumption</b>	Yes	47	11.1
		No	375	88.9
3a	Form of tobacco used (n=47)	Chewable	27	57.4
		Smoke	20	42.6
3b	Duration of usage (in yrs) (n=47)	<5	16	34.0
		5-10	11	23.4
		≥10	20	42.6
3c	Currently using(n=47)	Yes	36	76.5
		No	11	23.5
4.	<b>Alcohol consumption</b>	Yes	13	3.1
		No	409	96.9
4a	Type of alcohol consumed (n=13)	Beer	3	23.2
		Whiskey	5	38.4
		Brandy	5	38.4
4b	Duration of consuming (n=13)	<5	2	15.3
		5-10	2	15.3
		≥10	9	69.4
4c	Currently using(n=13)	Yes	9	69.2
		No	04	30.8

Among the study population, 39 (9.2%) participants were consuming vegetarian diet and 383 (90.8%) consuming mixed diet. 398 (94.3%) participants were using iodized salt. Among the 47 (11.1%) people consumed tobacco, 27 (57.44%) people were taking chewable form and 20 (42.55%) people were smoking. (Table 2)

**Table 3: Occupational Profile of study participants (n=422)**

S No	Characteristics		Frequency	Percentage(%)
1.	Land Ownership	Yes No	297 125	70.4 29.6
1a	Work in own land	Yes No	214 83	72.0 28.0
2.	Kind of work	1)Sowing 2) Tilling 3) Spraying of insecticides/pesticides 4) Cutting 5)Grain handling 6) Thrashing 7)Grain storage 8)Machinery operator 9) All of the above	148 14 7 26 75 6 0 2 144	35.1 3.3 1.7 6.2 17.8 1.4 0 0.5 34.1
3.	Years in working		18.56 ± 12.97	
4.	Number of hours working per day		06±1.77	
5.	Pesticide exposed	Yes No	80 342	19 81
5a	Frequency of exposure(n=80)	Weekly Monthly Quarterly during harvesting season	35 24 21	43.7 30 26.3
6.	Using pesticide	Yes No	68 354	16.1 83.9
6a	Frequency	Weekly Monthly Quarterly during harvesting season	27 22 19	39.7 32.4 27.9
7.	Handling farm animals	Yes No	84 338	19.9 80.1
7a	Duration of handling	<5 5-10 ≥10	38 18 28	45.2 21.4 33.4
8.	Handling machinery	Yes No	76 346	18 82
8a	Type of machinery (n=76)	Tractor Sprayers others	43 30 3	56.6 39.5 3.9

8b	Years	<2	22	28.9
		2-5	36	47.3
		≥5	18	23.7
8c	Hours per month	<5	30	39.5
		5-10	41	53.9
		≥10	5	6.6
9.	Other work in off season	Yes	84	19.9
		No	338	80.1
9a	Specify (n=84)	Household(maid)	35	41.7
		100 days work	49	58.3
9b	Months in a year	<3	38	45.2
		3-6	25	29.8
		≥6	21	25.0

Among the participants 297 (70.4%) had their own land. The mean year of working in farm was 18.56 in the study population. The mean number of hours working per day was 6hrs. Among the 80 (19%) participants those who were exposed to pesticides, 35 (43.7%) got exposed weekly, 24 (30%) had monthly exposure and 21 (26.3%) participants were quarterly exposed. Among the 68 (16.1%) participants who were using pesticide, 27 (39.7%) were handling pesticides weekly, 22 (32.4%) monthly and 19 (27.9%) quarterly. (Table 3)



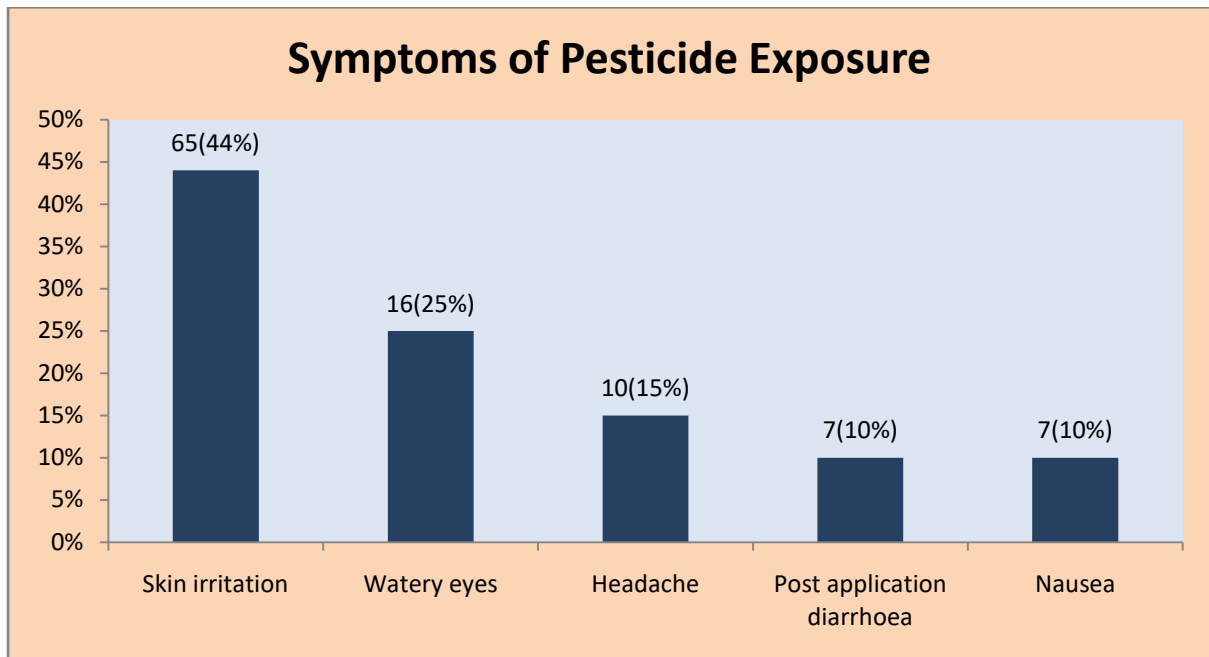
**Table 4: Morbidity Profile of Study Participants (n=422)**

S.No	Morbidity details		Frequency	Percentage (%)
1.	<b>Suffering from disease (morbidity)</b>	Yes	124	29.4
		No	298	70.6
1a	Specific morbidity	Respiratory	5	4.03
		DM	29	23.3
		HTN	44	35.5
		DM+HTN	15	12.1
		Musculoskeletal	8	6.5
		Endocrine	5	4.03
		Dermatological	7	5.6
		Gastrointestinal	2	1.6
		Ophthalmological	9	7.2
2.	<b>Hospitalization in past one year</b>	Yes	27	6.4
		No	395	93.6
2a	Reason (n=27)	Medical	15	55.5
		Surgical	7	25.9
		Emergency care	5	18.5
2b	Place of hospitalization (n=27)	Public	17	62.96
		Private	10	37.03
3.	<b>On medication</b>	Yes	137	32.5
		No	285	67.5
4.	<b>TB in past</b>	Yes	17	4.03
		No	405	95.97
4a	Treatment status(n=17)	Treated	15	88.2
		Untreated	0	0
		Treatment default	2	11.8
5.	<b>Animal attack</b>	Yes	12	2.8
		No	410	97.2
5b	Animal(n=12)	Cow/buffalo	10	83.3
		Sheep/Goat	02	16.7
6.	<b>Accidents and falls</b>	Yes	14	3.3
		No	408	96.7
7.	<b>Snake bite</b>	Yes	10	2.3
		No	412	97.7
7a	Place	Farm	8	80
		House	2	20
7b	Type of snake	Poisonous	6	60
		Non poisonous	4	40
7c	Availed treatment at	Health facility	8	80
		Native treatment	2	20
8.	<b>Scorpion sting</b>	Yes	18	4.3
		No	404	95.7

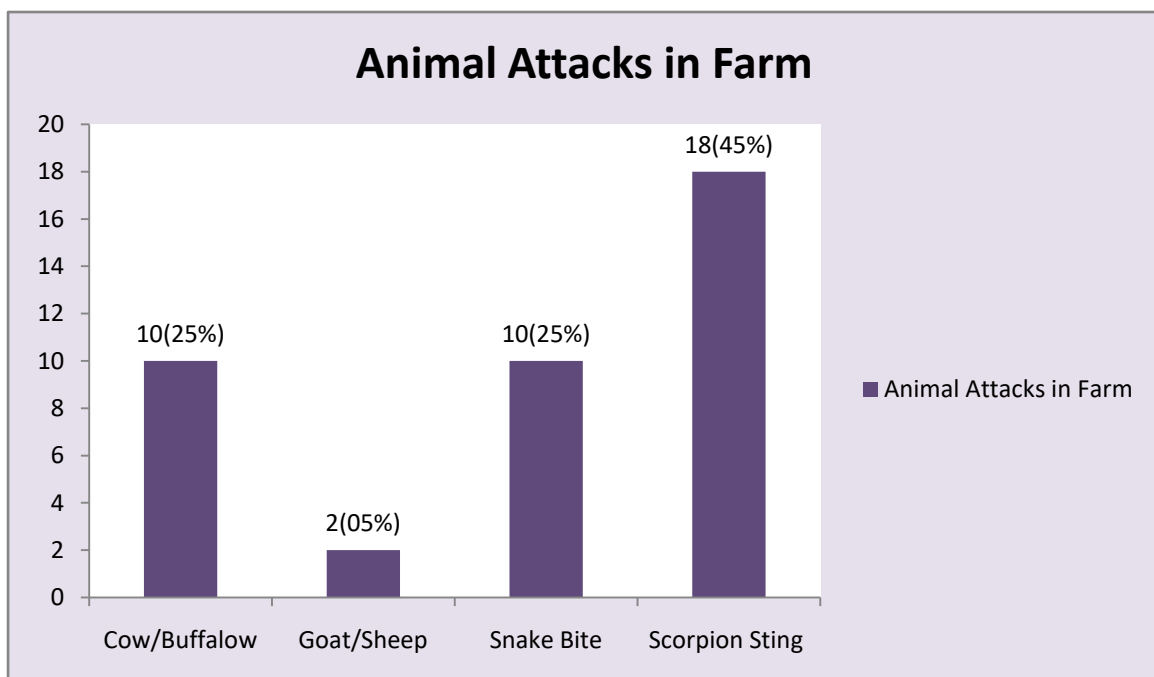
8a	Place (n=18)	Farm	14	77.8
		House	4	22.2
8b	Availed treatment at	Health facility	8	44.4
		Native treatment	10	55.6
9.	<b>Pesticide related health problem</b>	Yes	52	12.3
		No	370	87.7
9a	Number of episodes(n=52)	<2	15	28.8
		≥2	37	71.2
9b	Availed treatment at	Health facility	40	76.9
		Native treatment	12	23.1

Among the study population, 124 (29.4%) were suffering from disease. Majority of 44 (35.5%) had hypertension, followed by diabetes, DM+HTN was 23.3% and 12.1% respectively. Among the study population, 27 (6.4%) were hospitalized in past one year. The reason for hospitalization was 15 (5.5%) medical, 7 (25.9%) surgical and 5 (18.5%) emergency care. Place of hospitalization for 17 (62.96%) participants were public hospital and 10 (37.03%) private hospital. Among the study population, 137 (32.5%) were on medication during the study period. Among the study population, 17 (4.03%) participants had tuberculosis in past. 12 (2.8%) participants had history of animal attack in past one year, 10 (83.3%) participants were attacked by cow/buffalo and 2 (16.7%) participants were attacked by sheep/goat. 10 (2.3%) participants had history of snake bite in past one year. 8 (80%) participants had snake bite in farm and 2 (20%) participants in house. In people with snake bite, 6 (60%) were attacked by poisonous snake and 4 (40%) were attacked by non-poisonous snake. 18 (4.3%) participants had scorpion sting in past one year, 14 (77.8%) participants were stung in farm and 4 (22.2%) in house. Among people with scorpion sting, 8 (44.4%) participants were treated in health facility and 10 (55.6%) underwent native treatment.(Table 4)

**Figure 4: Reported symptoms after pesticide usage and exposure by the study participants**



**Figure 5: Animal Attacks among Farmers in Past one year (n=40)**



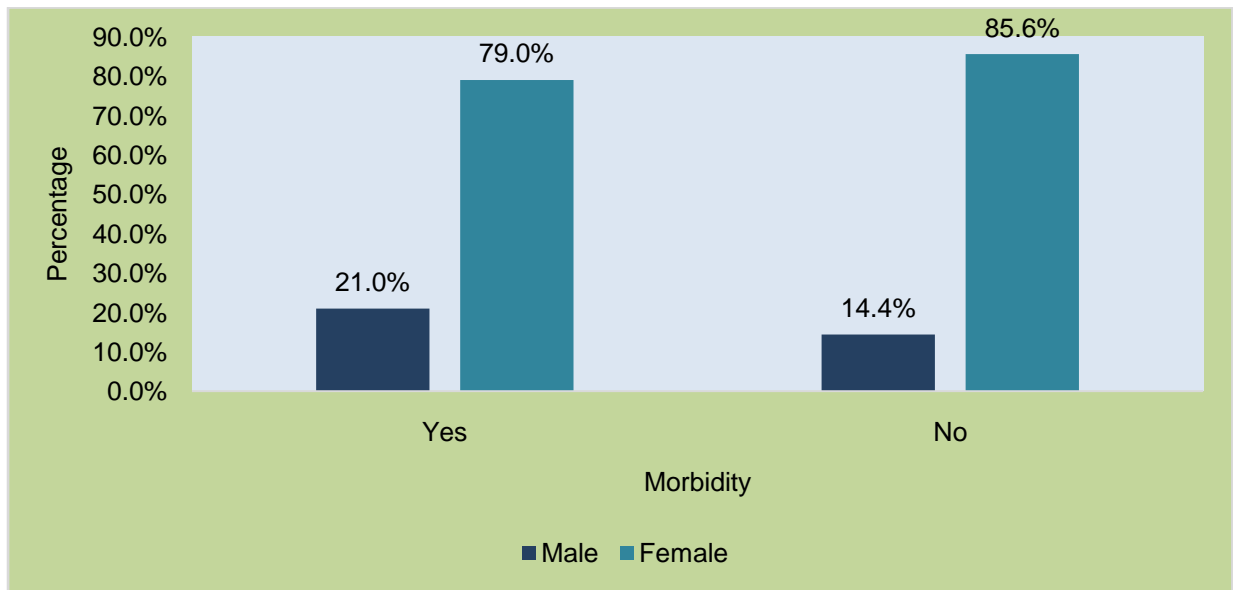
**Table 5: Comparison of demographic variables between suffering from disease (morbidity) (n=422)**

S.No	Demographic variables	Suffering from Disease		P value
		Yes (N=124)	No (N=298)	
1.	Age (Mean SD)	50.49 ± 10.92	45.89 ± 12.63	<0.001
2.	<b>Gender</b>			0.098
	Male	26 (20.97%)	43 (14.43%)	
	Female	98 (79.03%)	255 (85.57%)	
3.	<b>Educational Status</b>			0.001
	Illiterate	83(36.2%)	146(63.8%)	
	Literate	41(21.2%)	152(78.8%)	
4.	<b>Type of Family</b>			0.829
	Nuclear	100 (80.65%)	243 (81.54%)	
	Joint	24 (19.35%)	55 (18.46%)	
5.	<b>Family members</b>			0.008
	<3	40 (32.26%)	55 (18.46%)	
	3-5	69 (55.65%)	200 (67.11%)	
	>5	15 (12.1%)	43 (14.43%)	
6.	<b>Type of House</b>			0.279
	Pucca	36 (29.03%)	90 (30.2%)	
	Kutchha	49 (39.52%)	95 (31.88%)	
	Semi-Pucca	39 (31.45%)	113 (37.92%)	
7.	<b>Toilet Facility In House</b>			0.988
	No	56 (45.16%)	137 (45.97%)	
	Yes, Not in Use	11 (8.87%)	26 (8.72%)	
	Yes, In Use	57 (45.97%)	135 (45.3%)	
8.	<b>Separate Kitchen In House</b>			0.263
	Yes	71 (57.26%)	188 (63.09%)	
	No	53 (42.74%)	110 (36.91%)	

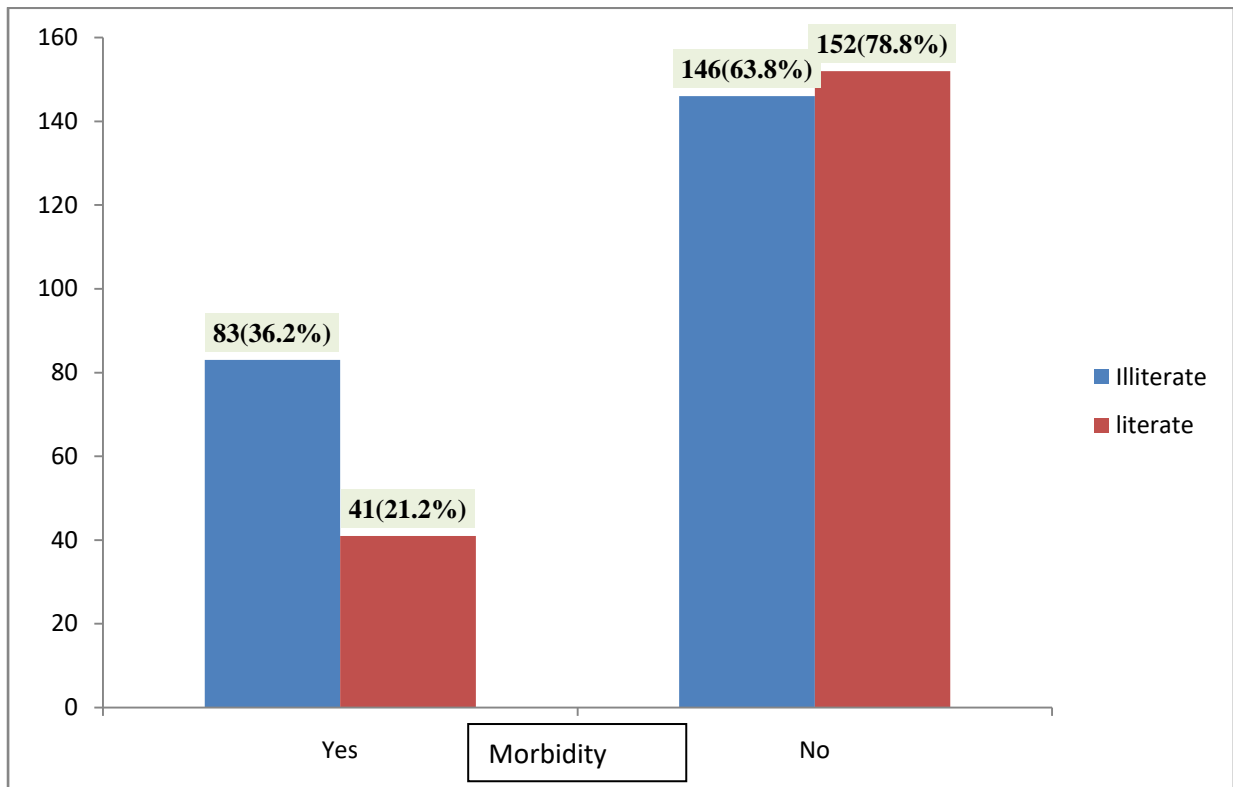
The difference in gender between morbidity is found to be insignificant with a P-value of 0.098. Among the people with morbidity, 107 (86.29%) participants were married, 14 (11.29%) widower and 3 (2.42%) divorced. Among the people suffering from disease, all of them 124 (100%) were hindu. The difference between educational status of the participants and morbidity were statistically significant with p value 0.001. The difference in type of family between morbidity is found to be insignificant with a P- value of 0.829. The difference in gender between suffering from disease is

found to be insignificant with a P- value of 0.098.. The difference in type of house between suffering from disease is found to be insignificant with a P- value of 0.279. The difference in toilet facility in house between suffering from disease is found to be insignificant with a P- value of 0.988. The difference in separate kitchen in house between suffering from disease is found to be insignificant with a P- value of 0.263. (Table 5)

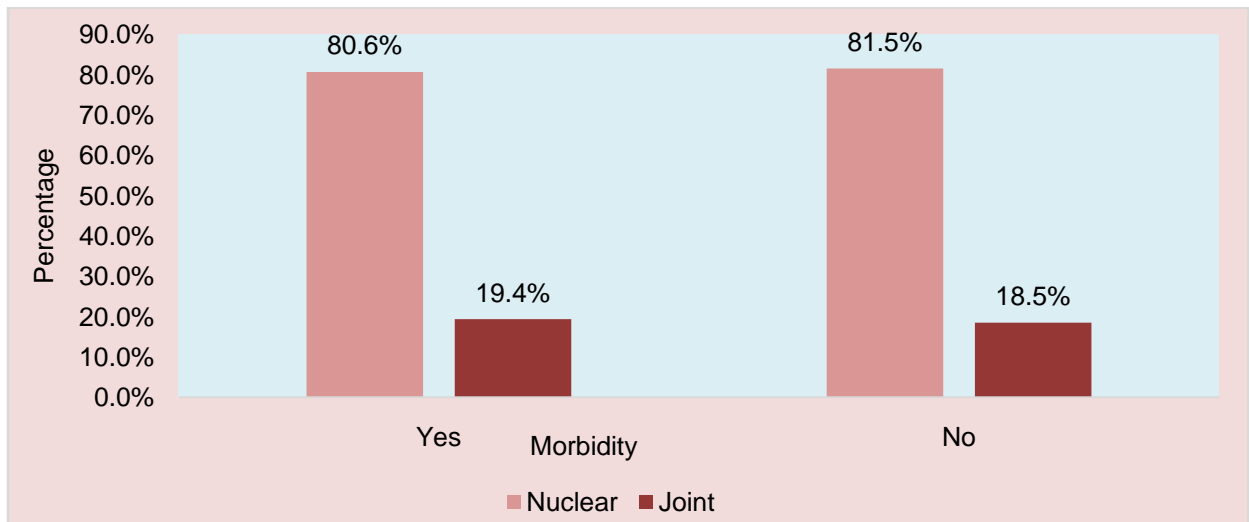
**Figure 6: Cluster bar chart of comparison of gender between morbidity (n=422)**



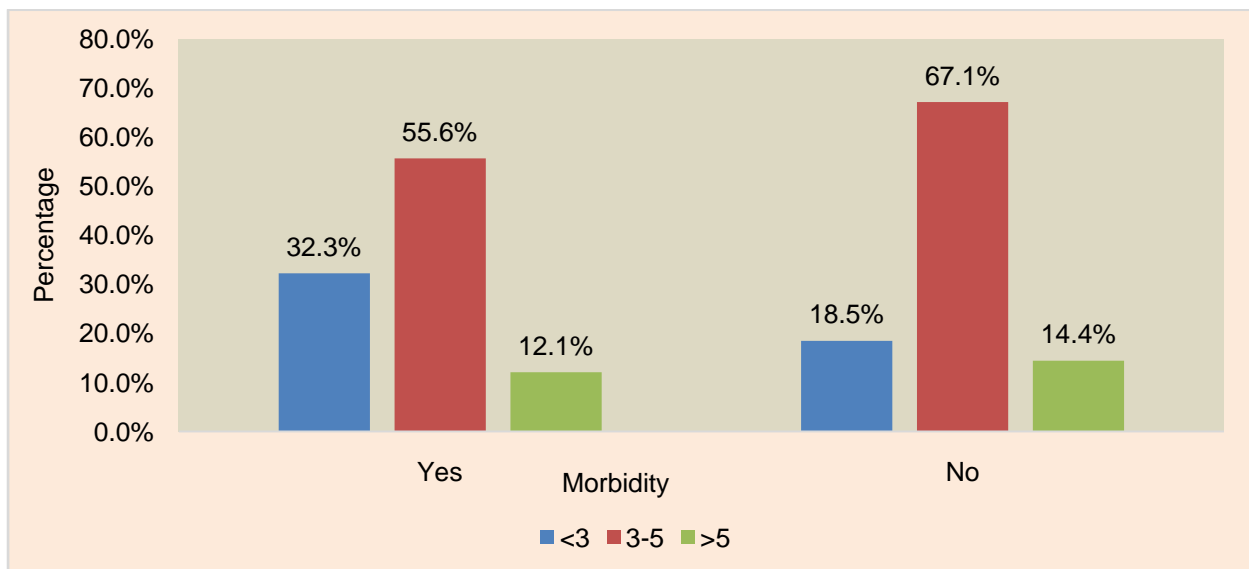
**Figure 7: Comparison of educational status between morbidity (n=422)**



**Figure 8: Cluster bar chart of comparison of type of family morbidity (n=422)**



**Figure 9: Cluster bar chart of comparison of family members between morbidity (n=422)**



**Table 6: Comparison of personal habits between suffering from disease (morbidity) (n=422)**

S No	Personal habits	Morbidity		P value
		Yes (n=124)	No (n=298)	
1.	<b>Diet</b>			0.202
	Vegetarian	8 (6.45%)	31 (10.4%)	
	Mixed	116 (93.55%)	267 (89.6%)	
2.	<b>Iodized Salt use</b>			0.662
	Yes	116 (93.55%)	282 (94.63%)	
	No	8 (6.45%)	16 (5.37%)	
3.	<b>Tobacco consumption</b>			0.078
	Yes	19 (15.32%)	28 (9.4%)	
	No	105 (84.68%)	270 (90.6%)	
4.	<b>Alcohol consumption</b>			0.911
	Yes	4 (3.23%)	9 (3.02%)	
	No	120 (96.77%)	289 (96.98%)	

The difference in diet between morbidity is found to be insignificant with a P- value of 0.202. The difference in iodized salt use between morbidity is found to be insignificant with a P- value of 0.662. The difference in tobacco consumption between morbidity is found to be insignificant with a P- value of 0.078. The difference in alcohol consumption between morbidity is found to be insignificant with a P- value of 0.911. (Table 6)



**Table 7: Comparison of Occupational Profile between morbidity (n=422)**

Occupational Profile	Morbidity		P value
	Yes (n=124)	No (n=298)	
<b>Land Ownership</b>			
Yes	91 (73.39%)	206 (69.13%)	0.383
No	33 (26.61%)	92 (30.87%)	
<b>Kind of work</b>			
Sowing	34 (27.42%)	114 (38.26%)	*
Tilling	0 (0%)	14 (4.7%)	
Spraying Of Insecticides/Pesticides	1 (0.81%)	6 (2.01%)	
Cutting	9 (7.26%)	17 (5.7%)	
Grain Handling	23 (18.55%)	52 (17.45%)	
Thrashing	0 (0%)	6 (2.01%)	
Machinery Operator	0 (0%)	2 (0.67%)	
All Of The Above	57 (45.97%)	87 (29.19%)	
<b>Pesticide exposed</b>			
Yes	22 (17.74%)	58 (19.46%)	0.681
No	102 (82.26%)	240 (80.54%)	
<b>Using pesticide</b>			
Yes	15 (12.1%)	53 (17.79%)	0.148
No	109 (87.9%)	245 (82.21%)	
<b>Handling farm animals</b>			
Yes	30 (24.19%)	54 (18.12%)	0.155
No	94 (75.81%)	244 (81.88%)	
<b>Other work in off season</b>			
Yes	16 (12.9%)	68 (22.82%)	0.020
No	108 (87.1%)	230 (77.18%)	

*\* No statistical test was applied-due to 0 subjects in the cell*

The difference in land ownership between morbidity is found to be insignificant with a P- value of 0.382. The difference in Pesticide exposure is found to be insignificant with a P- value of 0.681. The difference in using pesticide and morbidity is found to be insignificant with a P- value of 0.148. Farm animal exposure and morbidity is found to be insignificant with a P- value of 0.155. The difference in other work in off season between morbidity is found to be significant with a P- value of 0.020. (Table 7)

## DISCUSSION

The current study was a community based cross sectional study done in Perambalur district among farmers. The study's objective was to estimate the morbidity pattern among farmers. The study's findings reveal that the prevalence of morbidity was 29.4% among the study participants.

Among the study participants majority (83.6%) were women farmers. The reason for this is women were available at the time of study. In Perambalur district women are employed more in farming, when compared to men who mostly work in other occupation such as in construction site, factories etc.

Among the study participants 91.5% were married and 98.8% belonged to Hindu religion. There was a statistically significant difference was observed between educational status and presence of disease (morbidity) among farmers  $P=0.001$ . This reflects that among those suffering from disease majority (63.8%) were illiterate. Knowledge about the occupational hazards, poor work hygiene and lack of awareness could be the reason for this significant difference. Similar findings were present in a study done by kumari et al (64), in which the study's participants had poor knowledge on safe work practices leading on to high prevalence of morbidity.

The socioeconomic class of the participant also influences the health of farmers. Affordability of health services, personal protective equipments are all determined by the socioeconomic class of the participants<sup>(43)</sup>. In the current study majority (65.8%) of the participants belonged to Class III of Modified BG Prasad's Scale. Reflecting a monthly income range of Rs 2102 to Rs 3503. This indicates that majority of farmers

belonged to lower socioeconomic stratum which makes them vulnerable to poverty and poor health.

Using toilet and access to sanitary toilets also contributes to the health and wellbeing of the population. In the current study only 54.3% of the farmers had access to toilet and among them 8.8% were not using the facility. This acts as a potential risk factor for various health hazards among farmers.

In the current study, 11.2% of the study participants were consuming tobacco. This is comparatively low compared to a cross sectional study conducted in Chandigarh (9), to assess the lung functions among farmers. Total of 486 farmers were interviewed, among them 142(29.2%) were smokers. 106(21.8%) farmers were symptomatic, with chronic bronchitis 34(32.1%), cough 38(35.6%), chest tightness 8(7.5%), bronchial asthma 13(12.3%), post nasal drip or dyspnea 4(3.8%). Symptoms were more common among non-smokers (55.6%) compared to smokers (44.3%). Similarly in the current study morbidity was more among smokers compared to non smokers.

A study done on knowledge and practices of safety use of pesticide among farm workers by Kumari et. al (64) in Andhra Pradesh showed that self-reported toxicity symptoms with pesticide use were skin rash (40.5%), headache (48%), excessive sweating (22.5%) and diarrhea (21.3%). Similarly in the current study the most common complaints were Skin irritation (44.0%), watery eyes(25%), headache(15%), nausea(10%) and post application diarrhoea(10%). Similar findings were also observed in a study on pesticide use pattern among farmers in West Bengal by Banerjee et. al (65) revealed that during pesticide spraying, 29.8% had headache, 26%

nausea, 9.8% burning sensation in the eye, 9.2% cough and 2% had muscle cramp. On use of personal protective measures, covering nose and mouth with cloth combined with bath after spraying is most common 27%. A study conducted in Thanjavur district on impact of use of pesticide on health of farmers by Chitra et. al (66) among 631 farmers, 433 were pesticide sprayer and 198 were non-sprayer who involved other agricultural activities like weeding, sowing etc., 373 sprayers (86.1%) and 156(78.8%) non-sprayers reported at least one respiratory symptoms. Symptoms were excessive sweating (36.5%), burning eyes/stinging eyes/itching eyes (35.7%), dizziness (28.4%), cough and breathlessness (17.6%), wheezing (6.8%). Regarding of duration of pesticide exposure mean duration is 11.8 years.

6.4% of the farmers in the current study were hospitalized in past one year and among them 62.96% preferred public government services and 37.03% preferred private facility. This is similar to the study done on the health seeking behavior among farming community in Jorhat district by Rahman et al(67), in which participants preferred government services over private facility. Reasons for preference were easy accessibility, cost effectiveness and awareness about available schemes.

Among the 422 farmers, 80.1% were employed only in farming and 19.9% were employed in other works during off season. Among them, the most common work they were employed in off season were household maid work (41.7%) and 58.3% were employed in 100 days scheme (National Rural Employment Guarantee Act).

In the current study, animal attacks were reported by 40(9.5%) of the participants. The most common attacks were Scorpion sting (45%), Snake bite (25%) and attack by

cow(25%). Exposure to animals and handling animals puts farmers at the risk of animal attacks in the workplace which is also an occupational hazard. Accidents and falls in the farm were reported by 3.3% of the study population. Working with machinery, handling sharps also predisposes them to risk of injuries. A study done by Cooper et al (30) on agricultural accidents, also had similar findings. The most common type of injury reported were bull-gore injury, lacerations, poisonous stings.

12.3% of the study population reported health problems caused by pesticides after exposure. Pesticides being the most common chemical used in modern agriculture put the farmer at the risk of exposure and development of adverse effects. A study done by Banerjee et al (65) had findings similar to current study with 85% of the farmers reported health problems after application of pesticides. The reason in the difference could be due the characteristics of the participants. In current study majority were women and in the study done by banerjee et al pesticide sprayers were the participants. The extent of exposure could be more among the second group leading onto high prevalence in the symptoms.

## **LIMITATIONS OF THE STUDY**

- Our study was based on self reported health status
- No examination or laboratory investigations were done
- Environmental measurements like soil or water testing to find the effects of pesticides were not done
- Since the data collection was done during the working hours, availability of the participants was difficult. Majority has gone for work and even after multiple visits it was difficult to interview them.

## SUMMARY

A community based cross sectional study was done in Perambalur district to find out the occupational profile and morbidity pattern among farmers.

A semi structured pre tested questionnaire was used to collect information regarding sociodemographic profile, occupational profile, personal habits, morbidity. Information on addictions and history of passive smoking, cooking habits, Medical history, History related to agricultural work like duration of work, types of work, use of pesticide, morbidity suffering from, history regarding accidents, falls, animal exposure, snake bite, scorpion sting etc.

The study revealed the following findings:

- Prevalence of morbidity among the farmers was 29.4%

The morbidity pattern observed was –

- Non communicable diseases were present among 70.9% of the diseased
- Ophthalmological morbidity was observed among 7.2% of the diseased farmers
- Musculoskeletal Diseases among 6.5%
- Dermatological conditions among 5.6%
- Respiratory morbidity among 4.03% of the diseased
- Others like endocrine, gastrointestinal among 5.63% of the diseased farmers.

- Among the study participants 54.3% were illiterate and 45.7% were literate.
- Majority (65.8%) of the farmers belonged to Class III socioeconomic status
- 45.7% of the farmers had not access to toilet facility and were practicing open air defecation
- 35% of the farmers in the study had exposure/used pesticide in their working environment and 12.3% reported health problems after exposure to pesticide
- Animal attacks, snake bite, scorpion sting were reported by 2.8%, 2.3% and 4.3% respectively
- 3.3% of farmers had accidents and falls in the farm
- 62.96% of the diseased farmers preferred public health sector for treatment



## **CONCLUSION**

Overall in our study the prevalence of morbidity was 29.4% among the farmers. The morbidity profile of the farmers revealed that there was huge impact of occupational factors on the health of the farmers. Personal habits like alcohol consumption, smoking also influences the health. Educational status of the farmers played a major role in determining the disease status. This can be due to lack of knowledge and awareness about the hazards.

## **RECOMMENDATIONS**

Based on the current study's findings, following recommendations are suggested

- Occupational health in farming is a hidden area which has to be explored in order to provide with preventive care services.
- The prevalence of morbidity in the current study was 29.4%.
- The occupational diseases among farmers are preventable and also the risk factors which can also be prevented.
- By effective health education and by creating awareness on use of safe work practices among agricultural workers can reduce the incidence of occupational diseases.
- The findings of this study reveal that further studies are needed for exploring into the occupational health among farmers in order to ensure early identification and appropriate treatment as well as prevention of occupational hazards and diseases.

### **Future Research Areas suggested:**

- Knowledge, attitudes and practices regarding personal protective equipment usage among farmers.
- Economic impact of occupational hazards and diseases in the agricultural sector.
- Self-perceived Quality of Life among agricultural workers.

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## **ABSTRACT**

### **INTRODUCTION:**

Agriculture and its allied sector acts as the source of employment for rural population. The health status of the farmers is influenced by the working conditions, environmental exposure to chemicals and other hazards. This study explores the morbidity pattern among farmers.

### **MATERIALS AND METHODS:**

A community based cross sectional study was conducted in Perambalur district during January 2018 to June 2019. A pretested questionnaire was administered to 422 farmers selected through multistage sampling method. Sociodemographic profile, occupational profile and morbidity patterns were assessed.

### **RESULTS:**

Among the study participants 54.3% were illiterate and 45.7% were literate. Majority (65.8%) of the farmers belonged to Class III socioeconomic status. Prevalence of morbidity was 29.4% of which Non communicable diseases were present among 70.9% of the diseased, Ophthalmological morbidity was observed among 7.2% of the diseased farmers, Musculoskeletal Diseases among 6.5%, Dermatological conditions among 5.6%, Respiratory morbidity among 4.03% of the diseased, others like endocrine, gastrointestinal among 5.63% of the diseased farmers.

CONCLUSIONS:

From the study's finding it is concluded that farmers' health is affected by various occupational factors like environment, chemical exposure, animal exposure etc. Most of these exposures can be prevented if appropriate awareness is created among the farmers.

KEYWORDS: Agriculture, Occupational Diseases, Pesticide exposure, Morbidity

ANNEXURE-I

TAMIL QUESTIONNAIRE

tpdhj; njhFg;G

1. gq;Nfw;ghsh; milahs tptuk; :

2. ngah; :

r%f FLk;g Gs;sp tptuq;fs;

3. taJ :

4. ghypdk; : 1)Mz; 2)ngz; 3)jpUeq;if

5. jpUkz epiy : 1) jpUkzkhdt; 2)jpUkzkhfhjth;

3) tpjit 4)tpthfuj;J/jdpj;jdpNa tho;gth;

6. kjk; : 1) ,e;J 2)K];yPk; 3)fpwp];Jth; 4),juh;

7. fy;tpj;jFjp : 1) njhopy; rhh; / nfsutg;gl;lk;

2) gl;ljhhp my;yJ KJfiyg;gl;ljhhp

3) ,ilepiy my;yJ cah;epiyf;fy;tp gl;lak;

4.cah;epiyg;gs;sp rhd;wpjo; 5) eLepiyg;gs;sp rhd;wpjo;

6) njhlf;fg;gs;spr; rhd;wpjo; 7) vOjg;gbf;fj;njhpahjth;

8. FLk;g cWg;gpdh;fspd; vz;zpf;if :

9. FLk;gj;jpd; tif :

10. FLk;g khj tUkhd;

(vy;yh tifahd tUkhdq;fSk; cl;gl) :

11. r%f;g; nghUshjhu epiy :

12. tPl;bd; tif 1)epiyahdJ 2) \$iutPL 3) gFjp epiyahdJ

13. tPl;by; foptiw trjp: 1) ,y;iy 2).gad;ghl;by;

y;yhj epiyapy; cs;sJ 3) gad;ghl;by; cs;sJ

14. tPl;by; jdp rikaiw 1)Mk; 2),y;iy

15. rikf;fg; gad;gLj;jg;gLk;; 1) vhpthA(LPG) 2) kpd;rhuk; 3) kz;nzz;nza;

vhpnghUs; tif 4) epyf;fhp 5) kuf;fhp 6) tpwF; 7)tptrhaf;fopTfs;

8) tpyq;F rhzk; 9) Gy;Gjh; 10)kw;wit

njhopy; rhh;e;j tptuq;fs;

16. cq;fSf;F nrhe;jkhf epyk; cs;sjh? 1)Mk; 2),y;iy

m) Mnkdpj; nrhe;j epyj;jpNyNa Ntiy nra;fpwPh;fsh? 1)Mk; 2),y;iy

17. cq;fs; tpij epyj;jpy; ve;j khjphpahd Ntiyar; nra;fpwPh;fs;?

1) tpij njspj;jy; 2)cOjy; 3)G+r;rpKue;J njspj;jy; 4)mWtil nra;jy;

5)jhdpaq;fisf; ifahSjy; 6)fjpubj;jy; 7)jhdpaq;fisr; NrKpj;jy;

8),ae;jpuq;fisf; ifahSjy; 9),jutif...

18. vj;jid Mz;L fhykhf ,j;njhopy ePq;fs; nra;J tUfpwPh;fs;?

19. xUehspy; cq;fs; tpisePyj;jpy; vt;tsT Neuk; Ntiy nra;tPh;fs;?

20. cq;fs; Ntiyapy; G+r;rp kUe;Jfspd; Njitia czh;e;Js;sPh;fsh?

1)Mk; 2),y;iy

Mnkdpj; vg;ngHoj mjd; mtrpaj;ij czh;e;jPh;fs;?

21. ePq;fs; G+r;rpKue;Jfis gad;gLj;JtJz;lh? 1)Mk; 2),y;iy

m) Mnkdpj; vg;ngHOnjy;yhk; mij ePq;fs; gad;gLj;JtPh;fs;?

22. cq;fs; tpij epyj;jpy; tpyq;Ffisg; gad;gLj;JtJz;lh? 1)Mk; 2),y;iy.

m) Mnkdpj; vj;jid Mz;Lfhykhf tpyq;Ffisg;

gad;gLj;jptUfpwPh;fs;?

23 .cq;fs; Ntiyapd;NghJ njhopy; rhh;e;j ,ae;jpuq;fis ePq;fs; gad;gLj;JtPh;fsh? 1)Mk; 2),y;iy

m)Mnkdpj; tpsf;Ff

M)vj;jid Mz;Lfsha;.

,)xU khjj;jpy; vj;jid kzp Neuk; tiu.

24. nra;Ak; Ntiyapy; Vw;gLk; ePz;l Ntiyapd;ikf; fhyq;fspy; NtW VjhtJ  
Ntiyfspy; ePq;fs; <LgLtJz;lh?  1)Mk;  2),y;iy

m) Mnkdpy; mjd; tptuk;

M)Xuhz;by; vj;jid khjq;fs; ,J Nghd;W NtW Ntiyfspy; <LgLTPh;ts;?

**idpahs; gof;ftof;fq;fs;**

25. czTg;gof;fk; :  1) jhtu tif kl;Lk;  2) vy;yhk;

26. mNahbd; cg;G gad;gLj;Jjy;  1)Mk;  2),y;iy

27. ePq;fs; vg;NghjhtJ ve;j tbtj;jpyhtJ Gifapiyia gad;gLj;jpaJz;lh?  
 1)Mk;  2),y;iy

m) Mnkdpy; mjd; tbtuk;  1)

Gifapd;wp thapy; nky;Yjy;  2) Gif ntsptUk; tifapy;

28. vt;tsT fhykhf gad;gLj;jp tUfpwPh;fs;?

29. ,g;ngnOJk; gad;gLj;jp tUfpwPh;fsh?  1)Mk;  2),y;iy

m) ,y;iynadpy; mij epWj;jpaikf;fhd fhuzk;

30. ePq;fs; vg;NghjhtJ kJit cl;nfhz;bUf;fpwPh;fsh?  1)Mk;  2),y;iy

m) Mnkdpy; mjd; tif  1)gPh;  2)tp];fp  3) gpuhz;b

4)kw;wit

31. vt;tsT fhykhf mij cl;nfhz;L tUfpwPh;fs;?

32. ePq;fs; jw;NghJk; kJit cl;nfhz;tJz;lh?  1)Mk;  2),y;iy

m) ,y;iynadpy; mij epWj;jpaikf;fhd fhuzk;

**NehAw;w Ra tptuk;**

33. ePq;fs; VjhtJ NehapdhNyh my;yJ fha;r;rypdhNyh ghjpf;fg;gl;LJz;lh?

1)Mk;  2),y;iy

m) Mnkdpy; mjd; tptuk;

34. fle;j Xuhz;by; ePq;fs; vg;NghjhtJ kUj;Jtkidapy; mDkjpf;fg;gl;LJz;lh?

1)Mk;  2),y;iy

m) Mnkdp; mjw;fhd fhuzk;

M)

35. ePq;fs; jw;NghJ VNjDk; Neha;f;fhf kUe;Jfis cl;nfhz;L tUfpwPh;fsh?

36. Kd;G vg;nghOjhtJ cq;fSf;F fhrNeha; ,Ue;jJz;lh?

m) Mnkdp;

37. fle;j Xuhz;by; jq;fSf;F tpyq;Ffshy; jhf;Fjy;fs; my;yJ fhaq;fs; Vw;gl;LJz;lh?

m) Mnkdp; tpyq;F kw;Wk; fhak; Mfpatw;wpd; tptuq;fisf; Fwpg;gpl

38. fle;j Xuhz;by; cq;fs; gz;izapy; VNjDk; tpgj;Jfs; my;yJ FiwghLfs; Vw;gl;LJz;lh?

m) Mnkdp; epfo;Tfspd; vz;zpf;ifiaAk; mjw;fhd fhuzq;fisAk; Fwpg;gplTk;.

39. fle;j Xuhz;by; cq;fSf;F ghk;Gf;fb Vw;gl;LJz;lh?

m) Mnkdp;

40. fle;j Xuhz;by; cq;fSf;F Njs; nfhl;baJz;lh?

m) Mnkdp;

41. G+r;rpf; nfhy;ypfisg; gad;gLj;jpajhy; ePq;fs; vg;nghOjhtJ Rfhjhug; ghjpg;GfSf;F cs;shdJz;lh? m)

M) Mnkdp; vj;jid jlitfs; vd;gJ

,)Nkw;nfhz;l kUj;Jtk;

## Annexure II- INFORMED WRITTEN CONSENT

### ஆய்வில் பங்கேற்போரின் ஒப்புதல் படிவம்

ஆய்வின் பெயர் : பெரம்பலூர் தாலுகாவின் விவசாயிகளிடையே தொழில்சார்ந்த சுயவிவரம் மற்றும் நோயுற்ற தன்மை: ஆய்வு

ஆய்வு எண் :  
ஆய்வில் பங்கேற்போரின் பெயர் :  
தகப்பனார்/ பாதுகாவலர் பெயர் :

(அ) நான் \_\_\_\_\_ இந்த படிவத்தை முழுவதும் கவனத்துடன் படித்தேன் ( அல்லது) படித்துக்காட்டப்பட்டது எனக்கு சந்தேகங்களை கேட்க அனுமதி தரப்பட்டது.

(ஆ) நான் முழுமனதுடன் இந்த ஆய்வில் பங்கேற்கிறேன் இந்த ஆய்விலிருந்து எப்பொழுது வேண்டுமானாலும் விலகிக் கொள்ளலாம் அது எனது சிகிச்சை முறையை எந்த விதத்திலும் பாதிக்காது என்பதை அறிந்து கொண்டேன்.

(இ) என்னுடைய உண்மையான தகவல்களை ஆய்விற்கு சம்மந்தப்பட்டவர்கள் எப்பொழுதும் வேண்டுமானாலும் சரிபார்த்துக் கொள்ளலாம், என்னுடைய சம்மதமில்லாமல் ஆய்வாளர் எப்பொழுது வேண்டுமானாலும் என்னை ஆய்வில் இருந்து நீக்கலாம் என்பதை அறிந்து கொண்டேன் பொது இடத்தில் தகவல் அளிக்கும் போது என்னுடைய அடையாளம் ரகசியமாக பாதுக்கப்படும்.

(ஈ) ஆய்வின் தன்மையை பற்றி முழுதும் புரிந்து கொண்டேன் என்னுடைய தேவையை பற்றி ஆய்வாளரால் எடுத்துரைக்கப்பட்டது. ஆய்வினால் எனக்கு ஏற்படும் பிரச்சனைகள் குறித்து எனக்கு தெரிவிக்கப்பட்டது.

(உ) இந்த ஆய்வின் முலம் ஏற்படும் அசௌகரியங்களுக்கு முழுமையாக பொறுப்பேற்றுக் கொள்கிறேன்.

(ஊ) என்னுடைய சந்தேகங்கள் முழுவதும் தீர்க்கப்பட்டன.

(எ) இந்த ஆய்வில் பங்கேற்க முழுமனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் பெயர்: \_\_\_\_\_

கையொப்பம்: \_\_\_\_\_ பெருவிரல் ரேகை: \_\_\_\_\_

நாள்: \_\_\_\_\_ நேரம்: \_\_\_\_\_

உடனிருப்போரின் பெயர்: \_\_\_\_\_

நாள்: \_\_\_\_\_ நேரம்: \_\_\_\_\_

ஆய்வாளரின் பெயர்: \_\_\_\_\_ கையொப்பம்:

\_\_\_\_\_

1. சாட்சியாளரின் பெயர் \_\_\_\_\_

கையொப்பம்: \_\_\_\_\_ நாள்: \_\_\_\_\_

2. சாட்சியாளரின் பெயர் \_\_\_\_\_

கையொப்பம்: \_\_\_\_\_ நாள்: \_\_\_\_\_



### Annexure III- Community Based Study- Data Collection



