

# **Investigation of Lung Cancer to Human Activities in Sri Lanka**

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# Effects of Air Pollution to our Health

- **Respiratory system diseases:**
  - Acute lower respiratory infections
  - Upper respiratory infections
- **Chronic Pulmonary Diseases:**
  - Chronic obstructive pulmonary diseases
- **Asthma**
- **Cancer:**
  - Lung cancer
  - Bladder cancer

# Indoor Air Pollution

- Indoor air pollution can be traced to prehistoric time when human first moved to temperate climate and it become necessary to construct shelter and use fire inside them for cooking, warmth and light
- Approximately, half of the world's population and 90% of rural households in developing countries are still rely on unprocessed biomass fuels
- In Sri Lanka, most of the people face to a similar problem because 80% of our population are poor and mostly use unprocessed biomass fuels (mainly wood) for cooking

# Indoor Air Pollution contd.

- In most of the houses women are responsible for cooking
- Since young children stay with their mother, they are subjected to higher-level of exposures to the indoor pollutants
- Other indoor combustion sources which contribute to indoor air pollutions are tobacco smoke, burning mosquito coils, burning of agricultural land and household waste, forest fires, use of kerosene lamps, industrial and vehicles emissions

# Indoor Pollutants and Health

- Many of the substances in biomass smoke can damage human health
- Most important are particles, carbon monoxide, nitrous oxide, sulfur oxide (principally from coal), formaldehyde and polycyclic organic matter, including carcinogens such as benzo[a]pyrene
- The particles with diameter below 10 microns [ $PM_{10}$ ] and particularly those less than 2.5 microns [ $PM_{2.5}$ ] can penetrate deeply into the lung which appear to have the greatest potential for damaging health

# Indoor Pollutants and Cancer

- Exposure to reactive intermediates can also increase the risk of cancer
- Organisms living in an aerobic environment, exposure to reactive oxygen species (ROS) is continuous and unavoidable
- ROS encompass a variety of partially reduced metabolites of oxygen such as super oxide anions, hydrogen peroxide and hydroxide radicals possessing higher reactivities than oxygen itself
- ROS generated intracellularly through a variety of processes, including as a by-product of normal cellular metabolism, or by leakage from mitochondrial respiration

# Cancer?

An abnormal cell growth within the body tissues.

## **Lung cancer 2 types:**

### **Small cell cancer:**

rapidly grows and spreads

not much associated with smoking

### **Non small cell cancer 3 types:**

Squamous or epidemoid : associated with tobacco  
smoke

Adenocarcinoma

Large cell cancer

# CANCER causing factors.....

## **Cigarette smoking related:**

Number of cigarettes smoke per day

Number of years smoked

Tar content in the cigarette

## **Environment related:**

Passive smoking: People near to the cigarette smoker and exposed to the main stream (exhaled) smoke

Vehicular emission

## **Occupation related:**

Asbestose

Chemicals/ Carcinogens

# Lung Cancer

- Expand into airways, causing cough, haemoptysis and bronchial obstruction
- Spread and invade locally within the thorax, causing compression, and invasion of the mediastinum and chest wall
- Spread via hilar, mediastinal and supraclavicular nodes
- Spread by haematogenous metastases, particularly to the bone marrow of the axial skeleton and ribs, brain, and liver-carcinomas of any size can cause paraneoplastic effects

# Objectives

The overall aim of this case-control study is to identify the confounding risk factors for lung cancer development.

To study the relationship between human activities and the cancer development.

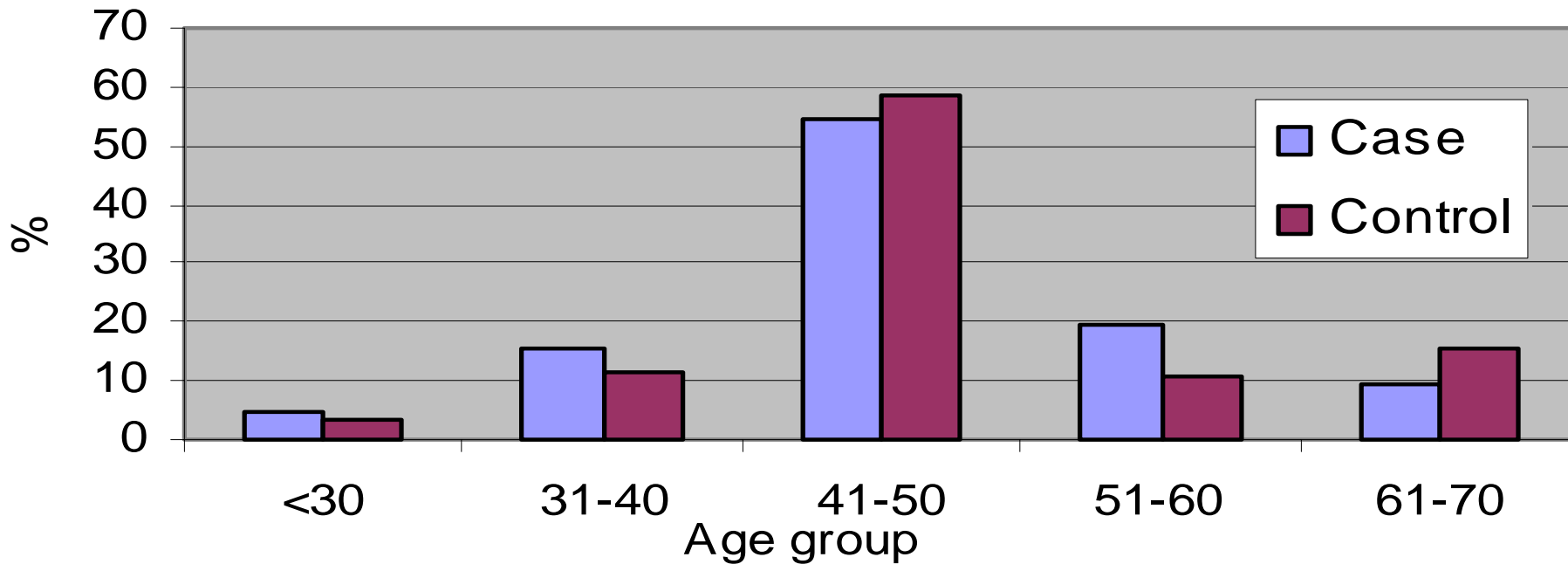
To gather information about the long-term exposure at the work place and in houses.

To collect information about sex, age, working place environment, exposure to cigarette smoke and exposure to other indoor smokes such as mosquito coils, joss sticks

# Investigation Methodology

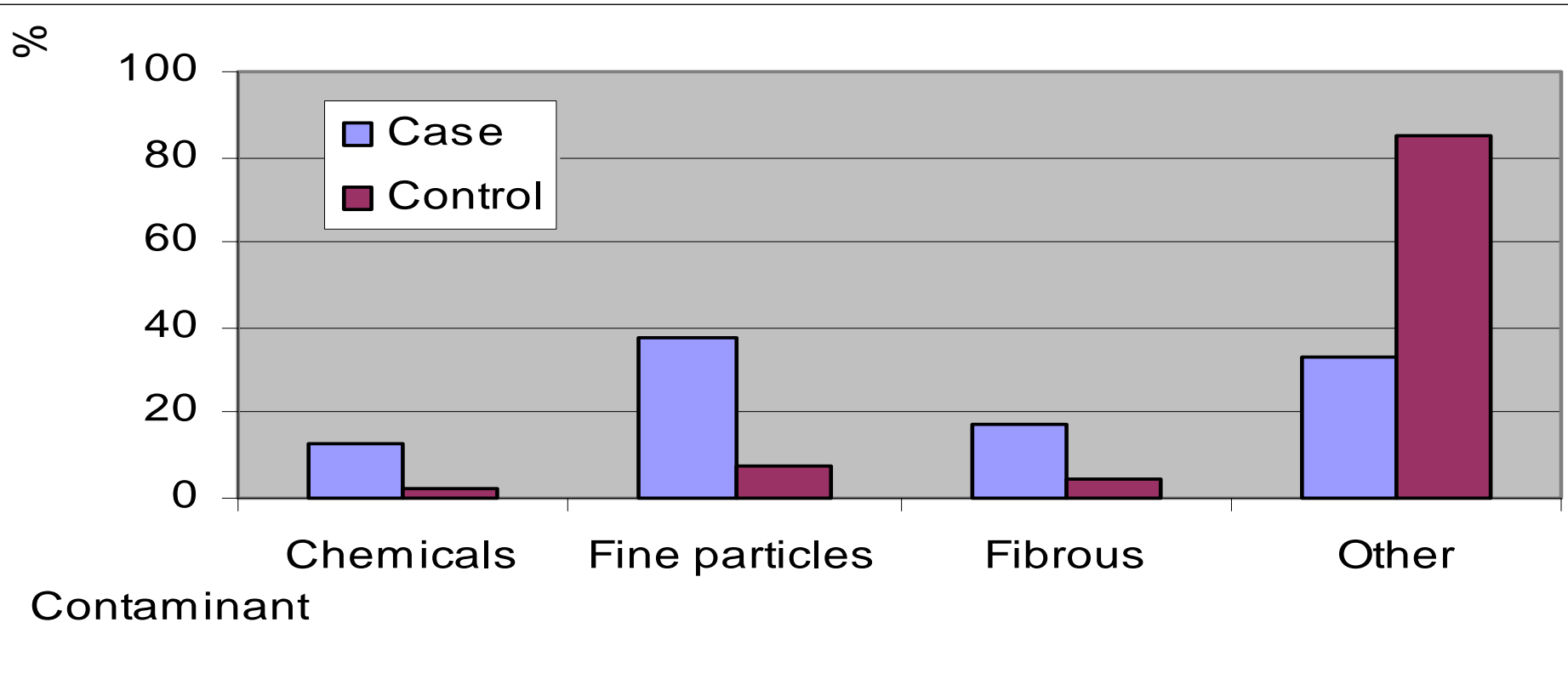
- 256 cancer patients at Maharagama cancer Hospital interviewed
- A questionnaire was given to all and data statistically analyzed using SPSS
- Cases -128 confirmed having Lung cancer
- Control – all other patients

# Age Groups of Patients



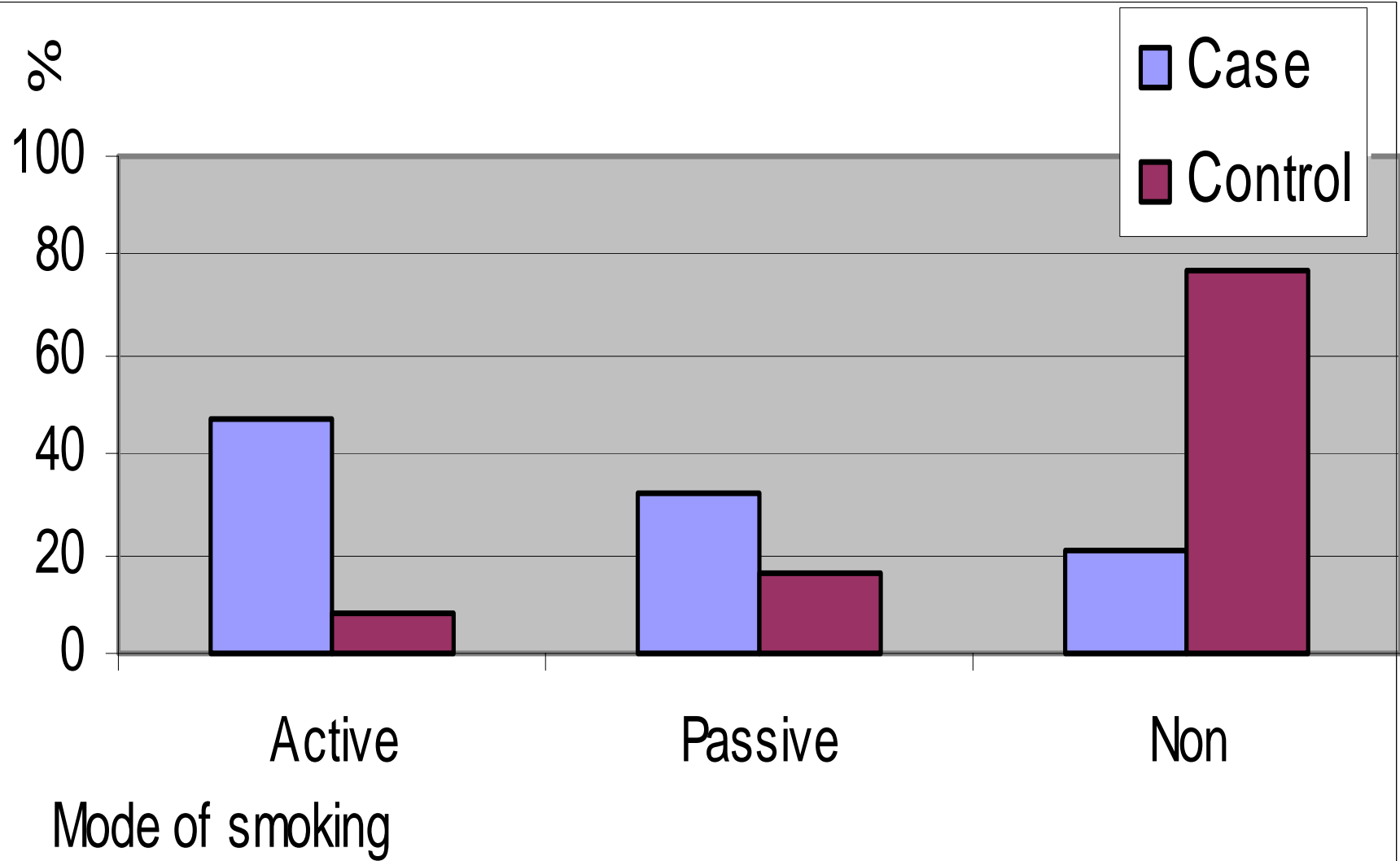
- 55% belong to age 40 to 50 yrs
- 78% of lung cancer patients have been employed
- 28% were found unemployed
- 73% found exposed to contaminated air at their working places

# Work Place Environment

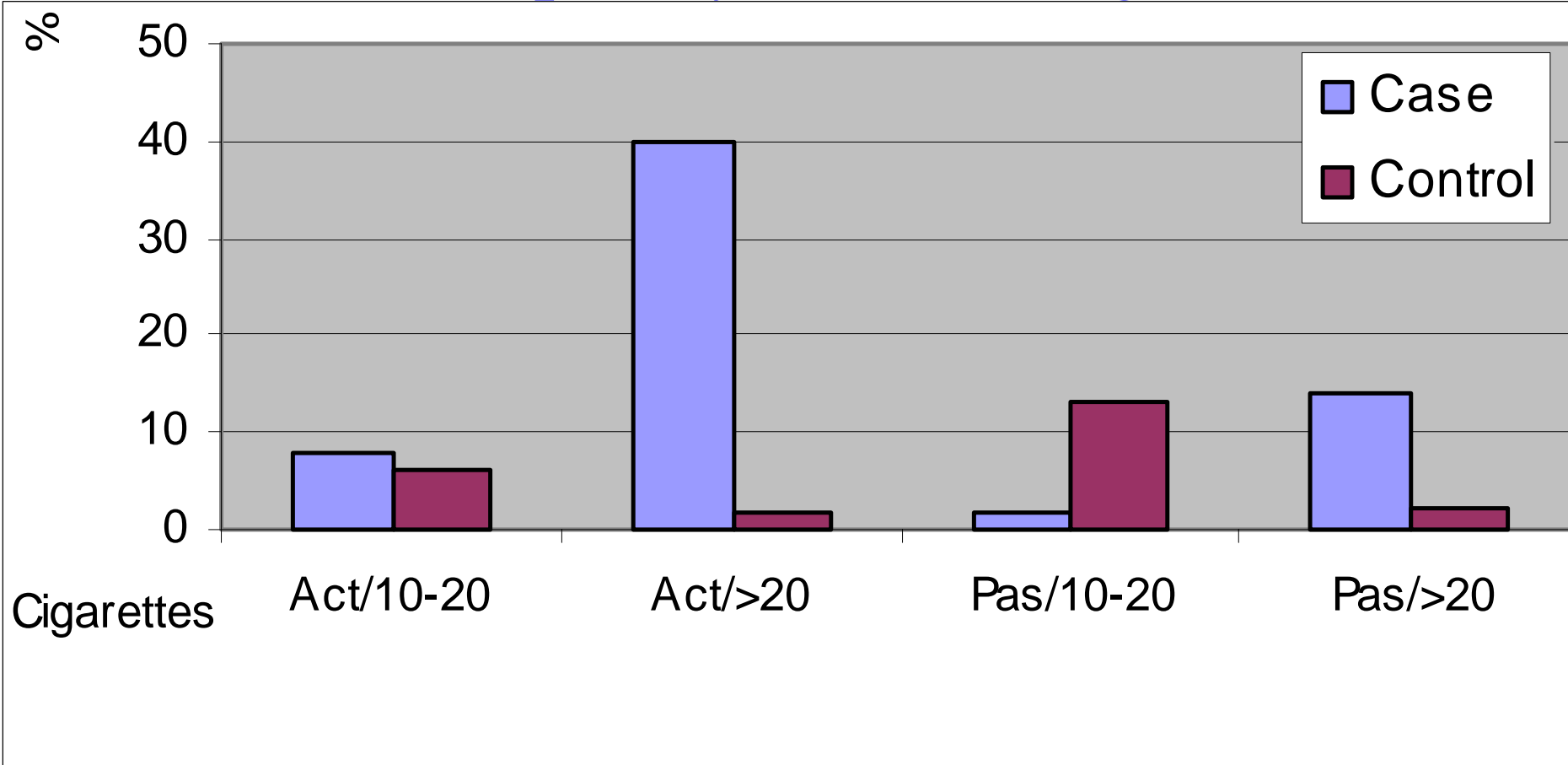


- Cases 67% have been exposed to one of three contaminants
- Cases 33% exposed to other sources

# Smoking Habits

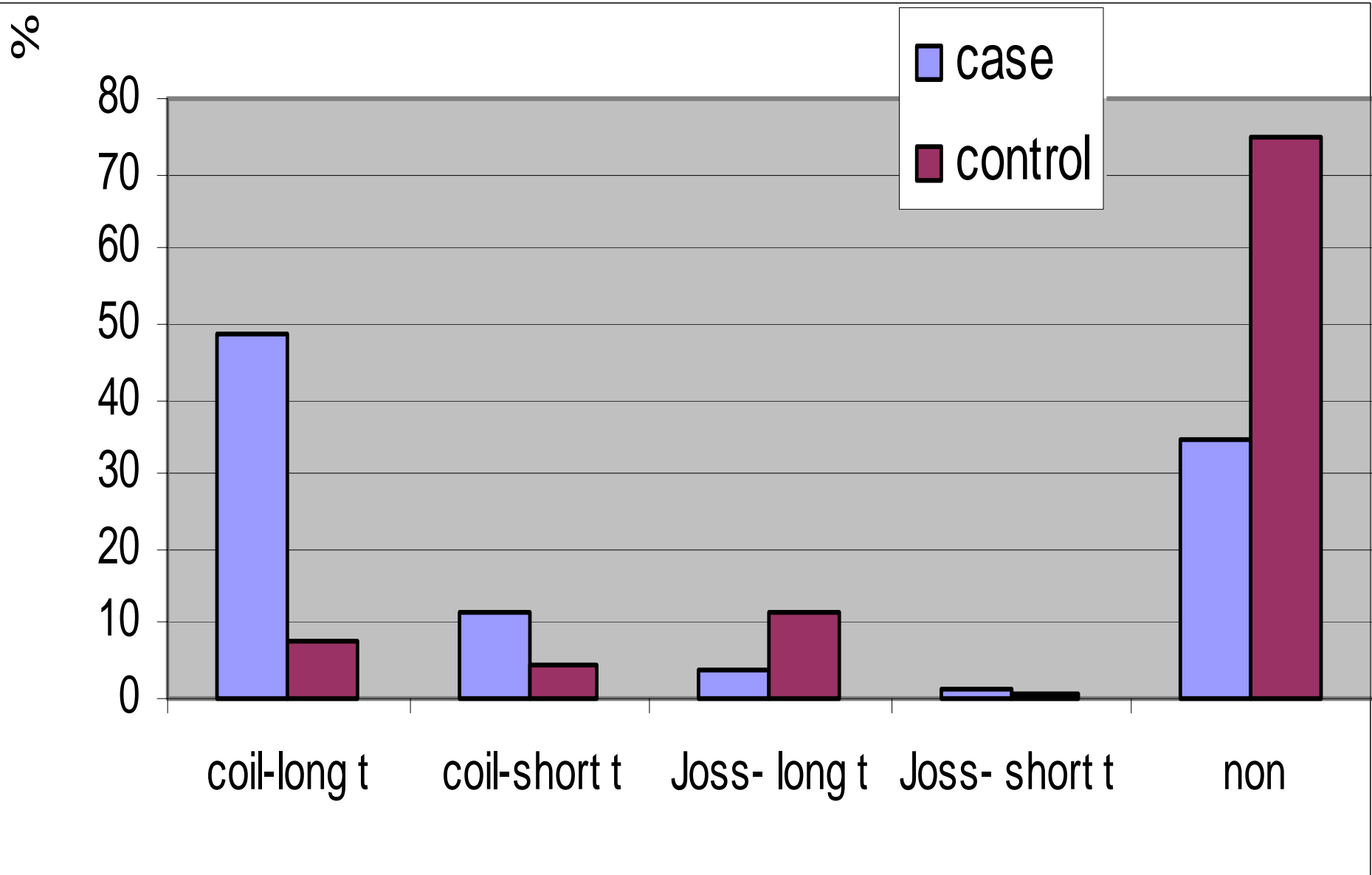


# Frequency of Smoking

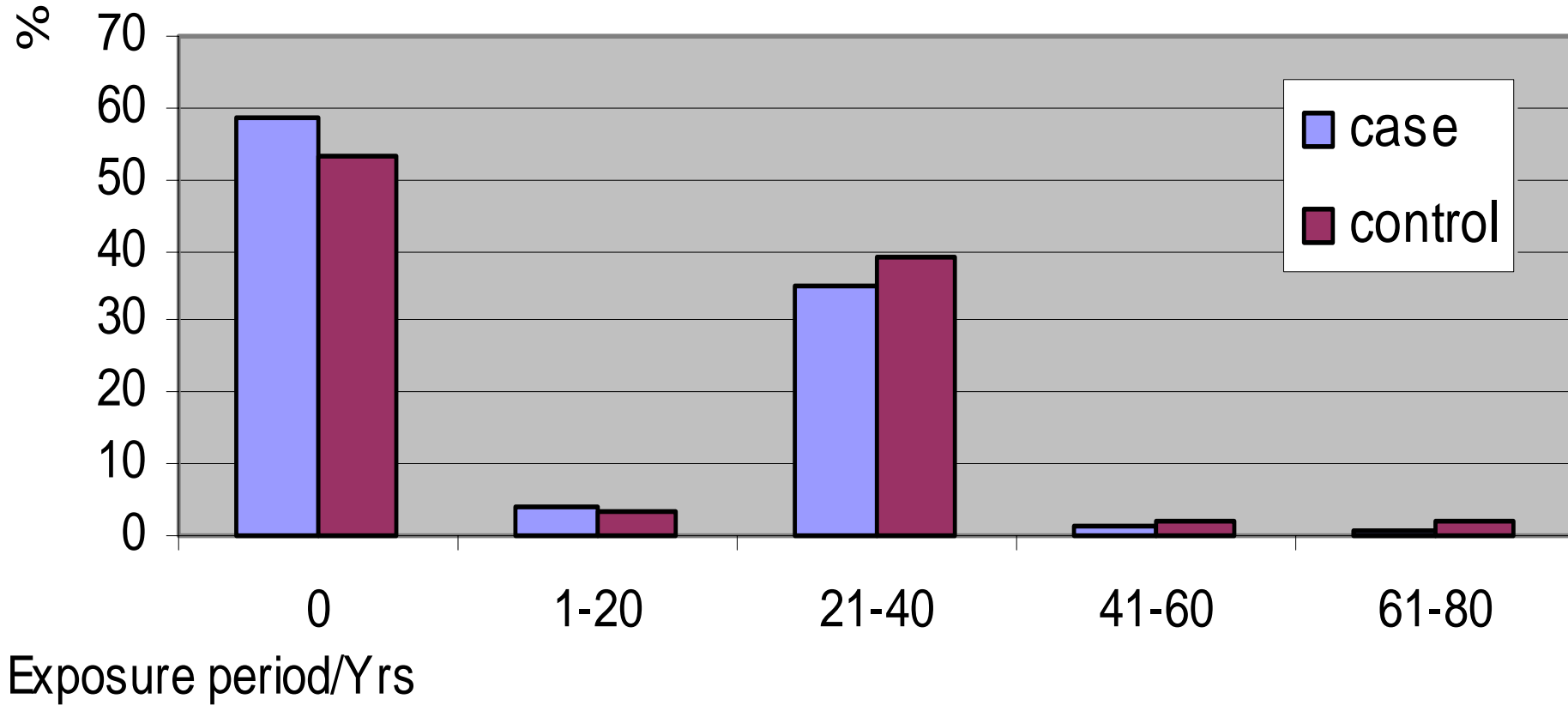


- 70% cases exposed to tobacco smoke (48% active, 32% passive)
- 40% active-directly consumed 20 cigarettes per day
- 14% passive due to others taking 20 cigarettes

# Other Indoor Smokes



# Household Cooking



- 0-yrs exposure period for mostly male both control and case

# Correlations

<b>Cancer causative</b>	<b>P value</b>	<b>Significance level</b>
Carcinogens	0.000	95%
Fine particles	0.000	95%
Fibers	0.000	95%
Smoking	0.040	95%
Indoor smoke	0.023	95%
Wood smoke	0.104	95%

# Conclusions

- Primary analysis of data by univariate analysis method suggests strong correlations for cancer with sex, working place environment, exposure to fine powders and particles, exposure to fibrous materials, exposure to other indoor smoke including mosquito coils and joss sticks and smoking while a poor correlation exists between cancer with biomass smoke
- Further statistical analysis are underway

THANK YOU