

Research work on HEALTH HAZARDS IN THERMAL POWER PLANT

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ABSTRACT

*Thermal plants comes under power stations which produces electric power. They are based on coal and water to produce steam or gas-driven turbines. The machines converts raw stored energy into kinetic energy. In this process it has severe deteriorating effects on human health and surrounding environment. Recent survey was done to assess the health hazards of workers working in industries. The most common health hazards in occupational health industry include silicosis pneumoconiosis also due to presence of small dust particles, the most commonly affected organ are lungs and skin. **MATERIALS AND METHODS:** Survey presents cross sectional study of 256 workers working in bhusawal thermal power stations. It contains questionnaires of occupational disease , time and site of work and there primary preventive measures taken. **RESULTS:** It can be seen that majority of workers are suffering from lung disease like asthma and most are of >30yr age group with working hour of 8 to 10 hours. The most common associated comorbidities includes hypertension, and eyesight problems. The average, working experience of 5 to 10 years followed by 10 to 20 years. Also the site of work was outdoor in majority and presence of sensorineural hearing loss in 36.7% and having skin manifestations 31.6%. The primary mode of treatment is government hospital 46.5% with preventive measures taken like face mask ,gloves, industrial shoes and eye protection also the annual checkup “once a year” is 76.1% and “twice a year” is 17.6 . **CONCLUSION:** The present Study highlights health hazards are mostly due to dust particles which causes respiratory and allergic diseases among industrial workers in the vicinity of thermal power plants*



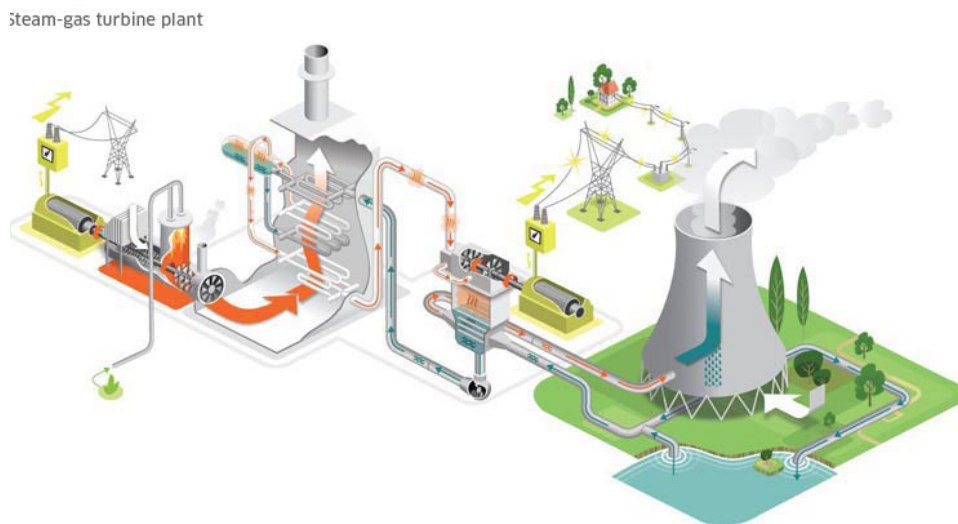
KEYWORDS - Thermal power plant, health hazards, lung disease, primary treatment, occupational diseases, respiratory.

INTRODUCTION

Electricity is the best necessity of the modern Eire and globally 41% of them are generated by coal-based thermal plants in India. Major source of generation of electricity accounts for 60% from coal-based thermal power plants. There are almost 106 thermal power plant in India with the capacity of 221802.59 MW.

A thermal power station is a type of power station in which heat energy is converted to electrical energy. In a steam-generating cycle heat is used to boil water in a large pressure vessel to produce high-pressure steam, which drives a steam turbine connected to an electrical generator.

Basic Principle. The burning of fuels such as oil, coal and LNG (liquefied natural gas) fires a boiler to generate high-temperature, high-pressure steam. This steam is used to drive a steam turbine. A generator attached to the steam turbine generates electricity.



Health hazards associated with thermal power industries.

In thermal power stations, the main health hazardous agent is coal ash and fine dust particles. Coal ash, rich in calcium, silicate, magnesium and aluminium and also it contains up to 10% free silica. The workmen responsible for boiler maintenance and cleaning are exposed to the dust of coal ash and oil residues. The conversion of oil produces dust and ash containing pentoxide and vanadium. Also the workers working in turbine and boiler departments get manifestations of carbon monoxide and fly ash.

In modern power stations, cryosulphate used as a lubricant in turbine generators can also be found in the workroom area. Sulphur dioxide is also seen in the working environment where oil use contains high sulphur. The most characteristic feature

and peculiar to thermal power Station is that there are often marked changes in air temperature. The result of poor ventilation mostly due to bad layout in the building themselves.

The workers in Boiler Room suffers from diseases of Respiratory tract such as asthma, bronchitis due to cool ash, and from Eyesight diseases, such as conjunctivitis due to vanadium compounds, the residue of the oil combustion and more harmful than the dust given off after the conversion of other fuels, when these dust particles gets in contact with the skin, it may results in dermatitis, which can be seen as rash and haemorrhages. also we can see some kind of eczema over the skin linings.

Due to heavy machinery and fast moving turbine causes huge amount of noise which can lead to sensorineural hearing loss and noise induced hearing loss. So the present study was taken to assess the health status of the residents and workers working in the industries in the vicinity of thermal power plants.

MATERIALS AND METHODS

The present cross-sectional study was done in a 5 m radius around disable thermal power Plant situated in Maharashtra state of India. The study includes 256 workers working in the industry. Complete elimination technique was adopted in the study.

Study was carried out using questionnaire.

The information was gathered using Google forms with the help of literature review. The questionnaire was prepared in both English language as well as regional language and admitted to the participants in the local language. The reliability and validity of the questionnaire was tested.

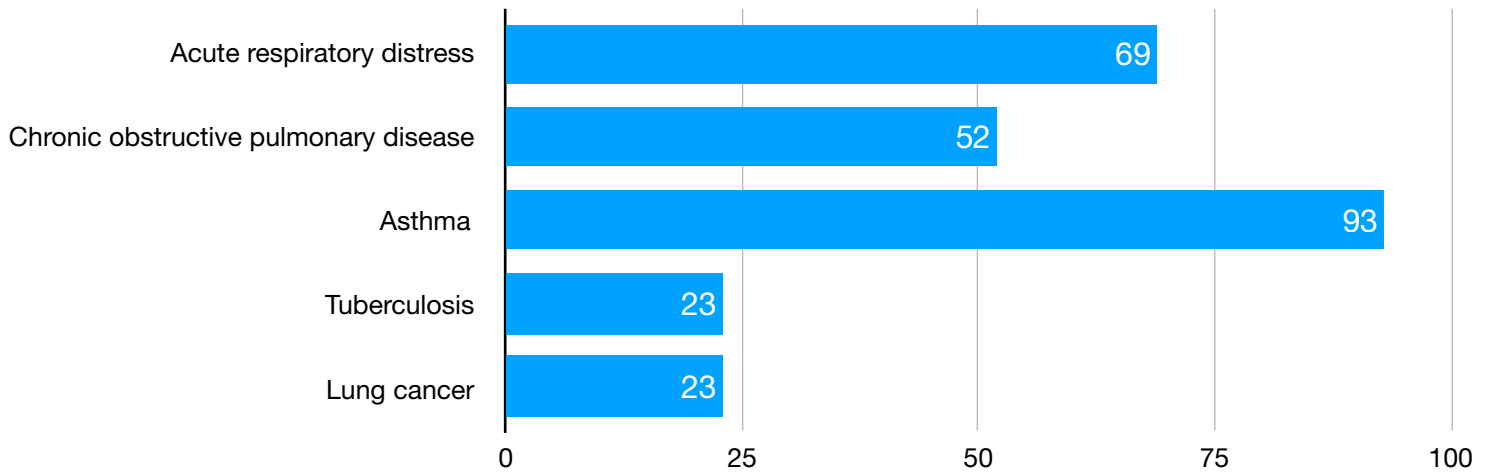
The form contains age group, duration of work in power station, site of work, working experience in thermal power, plant, respiratory diseases, workers suffering from associated comorbidities , the presence of sensorineural hearing loss or noise, induced hearing loss or any skin manifestation in the primary medication or treatment for the above mention also the preventive measures taken or provided by the industrial management us about the annual check up conducted by industrial management. It has information about site of work which is indoor or office work and outdoor or field work

For analysing the presence of disease according to study variables , the disease were categorised into acute and chronic respiratory distress, Asthma, tuberculosis and lung cancer.

The most common associated comorbidities includes hypertension, followed by eyesight, diabetes, heart diseases. Also the survey recognises sensorineural, hearing loss or noise in this hearing loss or any skin manifestation present.

The primary source for treatment includes government, hospital and services and private hospitals. The preventive measures given by industrials management includes face mask, industries, uniform and shoes, gloves etc. Also, we get to know whether the annual check up was done once or twice or no check up was done.

Respiratory diseases workers suffering from :

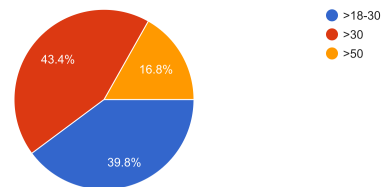


SURVEY, ANALYSIS AND RESULT

With the help of information collected from the above survey, analyse the scenario.

Age group- most common age group includes more than 30 years of age which has up to 43.4% followed by 39.8% of age group more than 18-30 Yr followed by 16.8% more than 50 years of age.

Age group (वयोगट)
256 responses

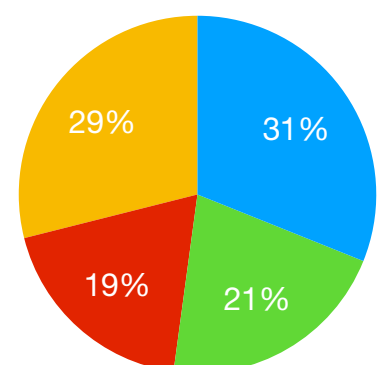


Duration of work in power plant-the most common duration of work includes 8 to 10 hours(40.2%) daily basis followed by 30.1% of 10 to 12 hours. The workers working for more than 12 hours or more susceptible to respiratory distress, as there is increase in exposure, more is the risk of disease. These are the workers which works on shift basis which gets more than 12 hours daily exposure.

Site of work- we can interpret that most of the workers works in field or outdoor and about for 16.9% works in both indoor and outdoor site. In indoor site or office work, most of the work as a woman and outdoor site mostly are men's having more exposure to dust and harmful particles causing various health hazards.

Also, we can see that the person is having more than 20 years of experience in thermal power plants has more exposure to cold, ash and fumes are suffering from asthma and acute lower respiratory distress. Workers having experience of 5 to 10 years also having exposure to lung parenchymal diseases.

Associated comorbidities



Associated comorbidities-includes diseases such as



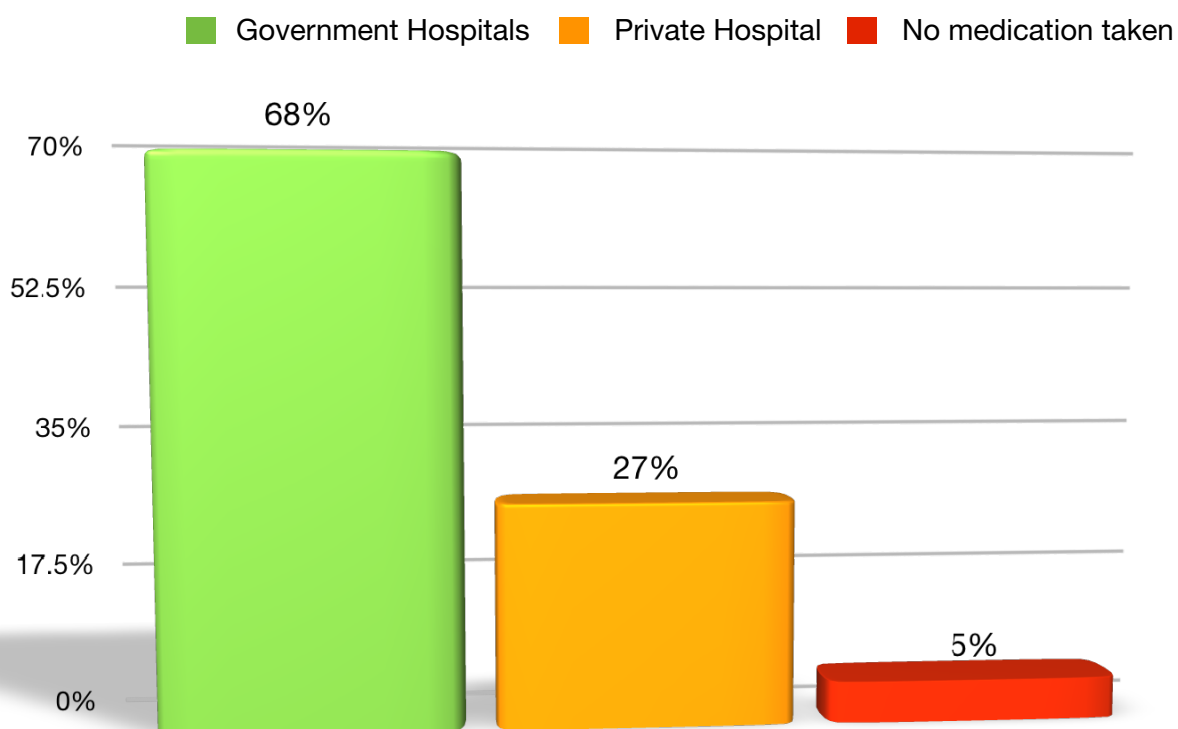
hypertension, diabetes, heart related problems, eyesight diseases. So we can interpret that most of the workers are having hypertension due to day to day life activities followed by eyesight for playing due to harmful fumes and ash dust which gets into the eyelids and cause various diseases such as conjunctivitis.

Due to heavy use of machinery, workers get exposed to loud noise which can cause noise induce hearing loss and sensorineural hearing loss. However about 36.7% of the workers are suffering from noise induce hearing loss

In 31.6% workers we can see skin manifestations like allergic, dermatitis, rash and haemorrhages, which is due to increase in temperature and poor ventilation in working environment

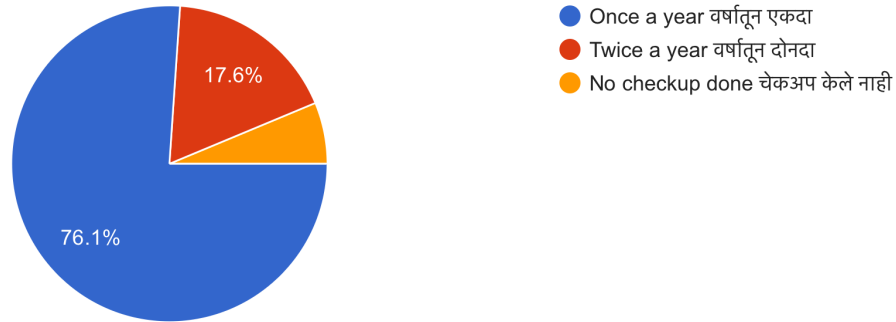
Primary medication and Treatment - *We also recorded the primary medication and treatment for the workers. We got to know that most of the workers takes primary medication from government hospital services, (68%). Private hospitals and clinics includes (27%).*

The preventive measures taken from workers includes facemask and gloves (71.5%) and industrial uniforms and shoes consist about 44.1% and 46.9% respectively. Survey also consist of annual check up in which 76.1% has done their annual checkup once a year and 17.6% twice a year also 6.3% has never get their annual checkup done



Annual check up done वार्षिक तपासणी आहे का?

255 responses



CONCLUSION

We have got to the conclusion that the most common health hazard in thermal power plant includes disease of respiratory system, such as asthma and acute respiratory distress. Other studies have also reported health problems in those exposed to dust polluted by thermal power. Plants also report says call ash and fumes impairs the airway and increases the bacterial growth

Also preventive measures have been taken to reduce the health hazards but not to a great extent

The rate of health hazards can be decreased by increasing the ventilation and providing better healthcare facilities to the workers. Also early diagnosis helps in reducing the mortality rate. proper sanitisation and hygiene can also helps in bringing good outcomes.

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