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A Study on Health Effects of Industrial Air Pollution Among General Public Living Near Industrial Areas in Kerala

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ABSTRACT

Air pollution seriously affects and damages human being and material sources such as building, various sculptures, and also vegetation because of the particulate matter dispersed in it or gaseous pollutants completely mixable with it in all proportions. Gaseous pollutants such as SO2, NOx, CO2 etc., spread in air are the major sources of air pollution. Industries in India are one of the major contributors of pollution. The air pollution causes health problems in the workers and residents in places near the industrial area. Now the situation is zero pollution can be achieved only with zero production. The control can be made only by each individual of the universe. In the absence, the government has its own responsibility to control pollution from various sources through proper implementation of environmental act. Therefore, it is essential to study the air quality in the surroundings of the industries and health issues of the general public in the industrial area.

KEYWORDS: Air pollution, public health impact and vegetation.

INTRODUCTION

Air pollution is one of the serious problems around the world. Air pollution is solely responsible for 6.5 million death each year around the world [1]. The problem of air pollution derives its importance and severity through the activities of human. In economic point of view, industrial development is essential for the better development of every country, by the maximum use of natural resources. In India the rapid growth of industrialization, urbanization along with population has placed a serious pressure on country's infrastructure and its natural resources. While the rapid growth of industrialization and urbanization causing serious air pollution problem in one side, the side the pressure on natural resources causing hindrance to the development of rural India. While the development of industrialization has contributed significantly to the economic growth, it has done so at a price to the environment. Not only industrial pollution increases public health risk, it also consumes significant portion of India's gross domestic product, by the way of abatement effort. So an urgent need of preventing and controlling, of air pollution is essential for the country, which can be done only with the proper and strict implementation of environmental law. The essential of environmental act recognized very late throughout the world. In India, the environmental awareness and activities has increased only after the Bhopal tragedy (1984), which made the pathway for the creating environmental Act in 1986, and the act was enshrined in the 42nd amendments to country constitution in 1976. The Ministry of Environment and Forest (MoEF) tasked with the overall responsibility for administering and enforcing laws and policy, by adopting integrated

environmental strategies into any development plan for the country. As such, the reduction of industrial pollution has become the main responsibility of MoEF.

STATEMENT OF THE PROBLEM

Environmental Pollution is creating a large issue around the world. Especially Air pollution is a familiar environmental health hazard. Environment pollution is said to be the cause of modern technological development, rapid growth of industrialization and Urbanization. When the National Ambient Air Quality Standards were established in 1970, air pollution was regarded primarily as a threat to respiratory health. Air pollution seriously affects and damages human being and material sources such as building, various sculptures, and also vegetation because of the particulate matter dispersed in it or gaseous pollutants completely mixable with it in all proportions. Gaseous pollutants such as SO2, NOx, CO2 etc., spread in air are the major sources of air pollution. Industries in India are one of the major contributors of pollution. The air pollution causes health problems in the workers and residents in places near the industrial area. Now the situation is zero pollution can be achieved only with zero production. The control can be made only by each individual of the universe. In the absence, the government has its own responsibility to control pollution from various sources through proper implementation of environmental act. Therefore, it is essential to study the air quality in the surroundings of the industries and health issues of the general public in the industrial area..

The study is conducted to identify the effect of air pollution and the related disease on human health in Kerala.

METRIALS AND METHODS

The industry which causes serious air pollution problems are chemical, petroleum refining, fertilizer, cement, clay, dye and agro industries. Hence, the sample units selected from the similar industries.

The study carried in industrial areas allover in Kerala during the year 2007-2008. The study was conducted on general public with all most all aged groups.

SAMPLING METHODS

Kerala state comprises three parts namely Northern Kerala districts, the Central Kerala districts and the Southern Kerala districts[1].

From each parts red category industries were identified and using judgement sampling method 50 industries were selected randomly from the state. From each industrial area 10 general public and one doctor from each area were selected for the survey. Among the Doctors general, professional and others are included.

Primary data collected with the help of structured questionnaire and the data were collected from general public who are residing in the industrial area and doctors who are serving in the area also included.

HYPOTHESIS

The following hypothesis have been formulated for the study

1. There is no association between the type of unit and the reach of industrial gases, dust and soot in the house.
2. There is no association between distance of the factory and the reach of gas, dust and soot into the house.

3. There is no association between distance of factory and manifestation of illness.

SUMMARY OF FINDINGS

GENERAL PUBLIC:

- Majority of the respondents are mid age group (40-50)
- Among the general public 40 percent of the respondents are doing own business, another 40 percent of the respondents are working in private company and the remaining 20 percent of them are government employees.
- majority of the respondents are residing close (.25 km radius – 2km) to the factory premises, where there is a chance, that pollution can harm the people.
- odour from the industries is perceived by the public in the industrial area.
- Members of the public are suffering from one or another air pollution related disease. 47 percent are suffering from cough, 35.2 percent are suffering from headache and 17.8 percent are suffering from Grit in the eyes.

OPINION OF THE GENERAL PUBLIC (LIKERT'S FIVE-POINT SCALING TECHNIQUES):

- effect of animal's vegetation and domestic utensils due to industrial air pollution

Chemical industry 270/500*100=54%
Agro industry 245/500*100=49%
Cement industry 260/400*100=65%
Rubber industry 170/500*100=34%
Other 250/600*100=41.6%

air pollution from chemical and cement industry highly affects animal vegetation and domestic utensils. Hence it is clear that the pollution from the industries affect not only human beings but also animals and domestic utensils, which leads a heavy economic problem among the public due to air pollution.

- In case of effect of GAS, DUST AND SOOT INTERFERE INTO THE FLATS

Chemical industry 365/500*100=73%
Agro industry 270/500*100=54%
Cement industry 232/400*100=58%
Rubber industry 287/500*100=57 %
Other 445/600*100=74 %

interference of gas, dust and soot from the factory into the house is high, where pollutants harm public who is residing in the surroundings of the units

Hypothesis testing:

Null hypothesis: *There is no relationship between Type of the unit and reach of gas ,dust and soot into the house*

Type of the unit and reach of gas, dust and soot into the house

Chi-Square Tests

	Value	df	p-value
Pearson Chi-Square	41.52	4	.000

Significant at 1% level (p less than=0.001)

The calculated value is 41.52 @ 1% level it is found to be significant. Hence the hypothesis is rejected. the air pollution from different industries harms the public, by means of gas, dust and soot.

***Null hypothesis**: There is no relationship between Distance from the factory and reach of gas, dust and soot into the house*

Distance from the factory * reach of gas, dust and soot into the house

Chi-Square Tests

	Value	df	p-value
Pearson Chi-Square	377.036	3	.000

Significant at 1% level (p less than=0.001)

The calculated value is 377.036 @ 1% level it is found to be significant. Hence the hypothesis is rejected. Therefore it is clear that there is a significant relationship between Distance from the factory and reach of gas, dust and soot into the house.

***Null hypothesis:** There is no relationship between Distance from the factory and manifestation of illness*

Distance from the factory * manifestation of illness

Chi-Square Tests

	Value	df	p-value
Pearson Chi-Square	719.380	6	.000

Significant at 1% level (p less than=0.001)

The calculated value is 719.380 @ 1% level it is found to be significant. Hence the hypothesis is rejected. Therefore it can be concluded that there is a significant relationship between Distance from the factory and manifestation of illness.

PRACTICING PHYSICIAN

- Majority of the employees and general public residing around the industrial area suffering from various diseases such as Respiratory, Heart disease, asthmatic complaint, chronic bronchitis impaired vision, Headache, Irritation of eyes, Attaches nocuous, Membranes, Pulmonary, Emphysema etc.
- physicians are getting cases above 5000 per year.
- Majority of the respondents are having medical expenses above 100 per day which will heavily affect their economy
- Some of the patients are given treatment in their own hospital.
- children and old age groups are mostly affected due to air borne disease and factory workers are severely affected due to air borne disease followed by households and public.
- almost all the peoples are suffering from air borne disease particularly male gender are mostly affected.
- Finally it is found that majority of the respondents are helped by the company for their treatment, but not all the respondents are helped, may be due absence in informing to the company regarding their disease.
- Majority of the disease is caused by pollution from factory.

SUGGESTIONS

In the light of identified sources, the following suggestions are extended.

1. In big industrial centers and industrial estates where number of industries is situated can take up the

group task of environmental preservation activities by maintaining green belts and recycling activities.

2. Emissions from a particular or from a group of industry are in fact polluting the atmosphere. With the available resources and know how the industries can utilize them to a maximum extent in order bring down the pollutants, on a quantity basis than individual basis.
3. Industrial area should be properly planned to minimize the effect of pollution, and the panchayat authorities should give more role in controlling pollution, where every panchayat can have a close watch on local industries.
4. Policies and programme may be evolved for promoting and supporting different forms of non-polluting alternative source of energy.
5. Environmental audit is to be made compulsory in the industrial units in order to prevent accidents caused by hazardous chemicals.
6. There may be effective supervision and improvement of engineering control hazards.
7. There may be improved analytical techniques of monitoring polluting industries.
8. Govt. should provide economic incentives to industrial units to enforce pollution control in accordance with the provision of Air act 1981.
9. Meteorological stations and pollution monitoring stations have to be established both by industrial and other agencies concerned with air pollution control, and may establish research and development effort on pollution control system.
10. The industries should implement new technologies to control pollution and investment should be promoted to technological up gradation.
11. There may be compulsory periodic medical check-up to ascertain the health problems of the workers at the earliest.
12. The workers may be educated about the risks involved in the job and the importance of the personnel protection.
13. Pollution control board can appoint local area environment committees adopt in the role of facilitator for industries to maintain good environmental standards.
14. The state can develop environmental infrastructure required to maintain air quality in the industrial area.
15. A close cooperation between the main equipment designer and the experts in the field of air pollution control can be highly beneficial.
16. Regular checking of some parts of the equipment as well as checking of the availability of the required utilities should be carried out so as to minimize maintenance shutdowns. Facility for on-line maintenance can also be arranged so as to avoid any shutdown.
17. A system of pollution allowances based on trading emission rights has to be established to attempt the use of free market to reward pollution reductions.
18. Training and awareness programme can be given regarding operation of equipment to minimise energy use and material waste.
19. Detecting day to day care on process and minimising material lose to air.
20. Making free forums between employees and supervisor to identify and reduce the waste.
21. Collaboration among chemist, engineers and environmental staff can identify, and minimise the air pollution problems.

CONCLUSION:

Pollution control efforts in India have a long history way back to British rule. Several enactments such as the sore nuisance act 1853, the Indian penal act 1860, the Indian easement act 1882, the Bengal smoke nuisance act 1905, the Bombay smoke nuisance act 1912 and the motor vehicle act 1939 were some of the pioneering legislative enactment passed during those days to tackle with the pollution. These were mearly a piecemeal approach to environmental regulation based on law of torts. Action against pollution could only be taken by courts on the basis of proper representation by the effected people. In this scenario litigation prolonged and penalties hardly served as a deterrent. In the post-independence period there was a plethora of legislation attempted to deal with the pollution. This includes Factories act 1956, industries (development regulation) act 1951, the river board act 1956, and the merchant shipping (amendment) act 1970 and the radiation protection rules 1971. This entire act dealt incidentally with pollution and proved ineffective. With the passing of Air prevention of control act in 1981 the need was felt for an integrated approach on pollution control. The water pollution boards were there by authorised to deal with air pollution II and where hence forth called central/state pollution control boards.

The Bhopal gas tragedy, which occurred 3 rd Dec 1974, precipitated the tightening of environmental law. In 1985 the dept. of environment was transformed to Ministry of Environment, and forest with great powers. The comprehensive act called the Environmental (protection) Act was passed in 1986 covering water, air, land and its inter relationship.

In spite of this entire pollution problem in the country reached tremendous dimensions. If necessary steps are not taken to meet the challenges and tackle these crises there will be further environment deterioration, which will dangerously affect the human life, animal life and all other species. There is a need to have national thinking and policies and programmes are to be framed executed and assessed accordingly.

Industrial activities are inevitable for the economic development of any region and it can't be prohibited for reasons of great benefit to mankind. So industrialization and environmental protection should go hand in hand. Only regulation and control can't be an equitable solution for air pollution. It is well known that legal control do not offer any guarantee for a complete cure. Human awareness creating a culture to preserve and protect environment will lead to a civilization, which care the preservation and maintenance of environment. Let us hope a better tomorrow with a pollution free environment.

Pollution and health: a progress update - The Lancet Planetary Health

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