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ASSESSING THE AWARENESS OF PEOPLE ABOUT INDUSTRIAL AIR POLLUTION AND ITS EFFECTS ON HUMAN RESPIRATORY SYSTEM

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ABSTRACT

The relationship between human being and environment is a two way process. If one is disturbed, other will automatically be the victim. The present study is conducted to assess the awareness about the industrial air pollution among the people living besides the industries and to illustrate the effects of ill-environment on the health of human beings regarding their respiratory system. The environmental components involved in infectious diseases. Also many other ailments like asthma and other respiratory diseases are known to be environmental linked. Keeping in view the importance of this aspect a research to assess the awareness of people about industrial air pollution and its effects on human's respiratory system was designed. 90 households were selected by using purposive sampling technique. The tool of data collection for Survey was a semi structured interview schedule. Chi- square test was used and percentages calculated for the analysis of data, which were indicating that those people who lived near industrial area were affected more due to industrial air pollution than those who lived far away from industries. Results illustrated that majority of the respondents (91.1 percent) were aware about reasons of air pollution in their area. However, 88.9 percent respondents were aware about the effects of industrial air pollution. Greater part of respondents (90.0 percent) faced respiratory health

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problems due to industrial smoke. Majority of respondents (83.3 percent) felt hurdles in their routine work and social life due to industrial smoke.

Key Words: Awareness, Industrial air pollution, Pollutants, Respiratory system, Asthma.

INTRODUCTION

Rapid industrialization, urbanization and mechanized transport are introducing new and disturbing elements into the environment. A variety of factories, chemical industries, machines are adding to environmental problems and vehicles as well as industrial smoke are causing wide spread respiratory diseases and discomfort. The industrial air pollution first realized as a major problem during the Industrial Revolution in Europe. Industrial pollution is particle especially waste gases like carbon monoxide, sulfur oxides and nitrogen oxides which are the waste products of industry and end up in the air. Industrial emissions are the second largest pollutants of the atmosphere after automotive exhausts. Industries are the major pollutants. For example petroleum refining, metal smelting, iron and steel mills, grain mills, and the flour handling industry. These industries create a dangerous environment for the human. The burning of fossil fuels is a major cause of air pollution (Khan, 1992). Environmental pollution means pollution of the environment due to release of any substance from any process which are capable of causing harms to man and other living organisms supported by environment (Hussain,1998).

Respiratory system has a vital role in human body. The primary function of respiratory system is to deliver oxygen (through breathing) to all parts of the body along with blood. Breathing is achieved through the mouth, nose, trachea and lungs. When we breathe, we inhale oxygen and exhale carbon dioxide (Fritz, 2001). This exchange of gases is the respiratory system's means of getting oxygen to the blood. So, respiratory system plays a major role in human to become healthy or unhealthy. Now if the air will be polluted, we cannot expect a person to be healthy. And in this case a person becomes victim of diseases especially asthma and lung cancer. Asthma is a chronic (long-term) lung disease that burn and narrows the airways. Asthma causes frequent periods of wheezing (a whistling sound when one breathes), chest tightness, shortness of breath, and coughing (Aston, 2001). The coughing often occurs at night or early in the morning. Asthma affects people of all ages, but it most often starts in childhood. In the United States, more than 22 million people are known to have asthma (Pope et al. 2005). Nearly 6 million of these people are children**.** Lung cancer is one of the top most causes of cancer-related death in men and the second most common in women. Lung cancer is responsible for 1.3 million deaths worldwide annually. Nowadays industrial air pollution is considered the root cause of lung cancer. Therefore the localities living near the industries are extremely disturbed by industrial air pollution.

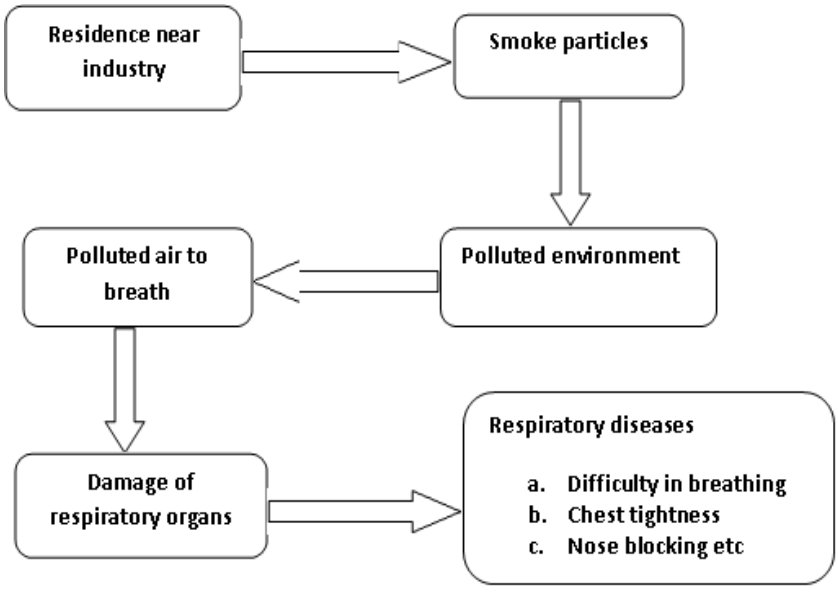

Figure-1.1. Schematic presentation of industrial air pollution and respiratory disease

Effects of Industrial Air Pollution on Human's Respiratory System

The effects of industrial air pollution on the environment are same as any other pollution is harmful to the environment as well as for the human beings. It is very important to know that industrial air pollution has also no boundary like the air pollution. Because it has no borders so, it travels easily from its sources. It also has been approved by the data collected from the relevant field of this study, as people said that smoke particles fly in the air even falls like snow falling in the houses and on the people being studied. These particles were also seen by the researchers practically, during their visit for data collection in that industrial locality. These pollutants are especially harmful to the human respiratory system. Each day we breathe about 20,000 times. All of this breathing couldn't happen without the help of respiratory system, which includes the nose, throat, voice box, windpipe, and lungs. With each breathe, living beings take in air through nostrils and mouth, and their lungs fill up and empty out. As air is inhaled, the mucous membranes of the nose and mouth warm and humidify the air. Even if the air they breathe is dirty or polluted, their respiratory system filters out foreign matter and organisms that enter through the nose and mouth. One cannot expect to remain healthy living in the polluted air. The respiratory system is by far the most important route for entry of air pollutants into the body and thus becomes their primary target. Respondents also shared their views regarding the problems created because of the pollutants of paper industry like, breathing problems, wheezing, as well as nose blocking and chest tightness.

METHODOLOGY

The universe of the present research comprised of industrial residential area of Lahore road Sheikhupura city. In the present study the purposive sampling technique was applied. Total sample of 90 households were selected from the residential areas of Lahore road Sheikhupura near the paper industries. Careful sampling method means that often the information presented by the sample can be overviewed and generalized with great accuracy to the whole population under study. For that reason, the researchers adopt the purposive sampling method to draw the sample from the whole population. Household's member (age of 20 to 50) is taken for the sample. For the population those households were included as a respondent both married and unmarried who are living in the industrial area for more than 05 years and who were 20 to 50 years old. Survey was used by the researchers. A semi structured Interview Schedule is being used as a tool of data collection in the field for research.

RESULTS AND DISCUSSION

Demographic Information

It is find out that majority of our respondents are females, which is 52 and 58 percent of the total population. The remaining 38 (42 percent) respondents are males. The analysis of respondents in terms of age shows that 32 respondents fall in the category of 41-50 years that is 36 percent of the total sample. Twenty (22 percent) respondents from the sample are in the category of 31-40 years. The frequency of the respondents, which are in the category of 20-30 years, is 30 (33 percent) while the frequency of respondents that is above 50 years is eight (nine percent). It is observed in the whole study that 34 respondents are illiterate which 37.8 percent from the total sample are. The respondents that have primary education are 16 (17.8 percent), whether only eight (nine percent) respondents have middle education. Our general findings reveal that 22 respondents have matriculation qualification that is (24.4 percent) of the total respondents and only 10 (11.1 percent) respondents has intermediate education. In respect of respondent's marital status 84 (93.3 percent) respondents are married which is huge majority of the total respondents and the six (seven percent) respondents are unmarried which is minority of our respondents. During the data collection, it is commonly observed that 50 (55.6 percent) respondents have the monthly income in the category of 0-10000 it means most of the people have low income and are living in a miserable condition, while 16 (17.8 percent) respondents have income in the category of 11000-20000. Twenty-four respondents (26.7 percent) have the monthly income in the category of 21000-30000. Our general findings also show that 28 (31.1percent) respondents are females and homemaker while 30 (33.3 percent) respondents have a job in both the private and the government organizations. Thirty (33.3

percent) people from the total sample are farmers they have their own business in the form of farming. Only a very low frequency two (two percent) consisted on students.

General Findings of the Study

A majority of the respondents (60 percent) have been living in industrial zone for 30 years or more than 30 years, while 20 percent respondents fall in the category of 20-30 years whereas 13 percent respondents are in the category of 10-20 years. 46 respondents, which are the 51 percent of the total respondents, said that they did not have any intention to migrate to a different location from this industrial area due to industrial smoke and due to their kith and kin or their lands. While 46 percent respondents replied that, they have an intention to go to anywhere else from this locality. Only 3 respondents (three percent) replied that they do not know whether they have to migrate to different area or not.

Data clearly indicates that majority (91 percent) respondents have awareness about the main reason of pollution in industrial area while 4.4 percent respondents have no awareness about the main reason of pollution. A huge majority (90 percent) of respondents from the selected sample that are facing various types of health problems because of industrial air pollution, whereas six percent respondents replied that they are not facing respiratory health problems due to industrial air pollution. Only four percent of the respondents are completely unaware about the industrial air pollution and the respiratory health problems. They do not know about this phenomenon. The above data also shows that majority of the respondents are facing respiratory health problems due to industrial air pollution and minority is not facing respiratory health problems living in this industrial zone.

There are 63 (seventy percent) respondents who replied that industrial air pollution has great effects on people who are living near the industrial area. The purpose of this question was to understand that to what extent people are affected by the industrial air pollution in adjacent localities. Almost 26 percent respondents of our sample feel that industrial air pollution is affecting people to some extent. It has not much role for effecting people. Percentage of those respondents who replied that industrial air pollution has no affect on people living near the industries is four percent of the total respondents. 83.3 percent of the respondents from the sample replied that industrial smoke creates disturbance in their daily works and it is the majority of respondents. According to 12.2 percent respondents, industrial smoke does not create a problem in their routine works. Only a very small percentage (four percent) of respondents does not know that industrial smoke is creating hurdles in their routine work or not.

83 percent respondents believed at great extent that respondents become the victim of respiratory diseases living in the surroundings of industries and industrial air pollution performs a major role in prevalence of respiratory diseases in humans, whereas 11 percent respondents replied that industrial air pollution plays role at some extent to prevail the respiratory diseases in humans, rest of six percent respondents replied that there is no role of industrial air pollution in the illness of respiratory systems. 68 percent of the respondents said that they feel their nose block due to the industrial smoke at great extent residing near the industrial locality, while some respondents (27 percent) replied that they have such feelings at some extent. The remaining six percent of the respondents replied that they have no feelings about their blocked nose. A huge majority of the respondents which is 84 percent complained that they feel irritations in their eyes at a great extent living near the industrial zone. Only 10 percent of the respondents told that they have eyes problems at some extent living in this area. The rest of the respondents (six percent) in this table explained that they have no eyes problems due to industrial smoke or by living in the industrial area. So, a large number of the respondents have eyes problems to a great extent.

71 percent of the respondents have troubles in breathing at great extent, while about one forth (26 percent) of the respondents replied that they have difficulties in breathing at some extent. Only a very small percentage (three percent) has no difficulties in breathing. So it can safely be concluded on the basis of table 5.13 that industrial air pollution has great effects on human's respiratory systems because majority of the respondents have troubles in breathing while living in the polluted area. 71 percent of the total sample replied that they have a voice problem. They feel severity in voice at great extent while talking. Table-1 also shows that 21 percent of the respondents feel severity in voice at some extent. The minority of the respondents (eight percent) have no difficulty in their voice while talking. So, on the basis of above figures we can clearly conclude that industrial air pollution plays much role for creating the voice problems in humans. 57 percent of the respondents of our total sample have severe coughing for more than two weeks and it is the outcome of industrial air pollution especially with the reference of paper mills. Our 36 percent respondents told that they are not the victims of severe coughing, the rest of the respondents (eight percent) do not know whether they have harsh coughing for more than two weeks or not. They do not know about the severe coughing. 52 percent of the respondents expressed their feelings by saying that they feel weakness and due to this weakness they feel that their weight has been loosed, while 40 percent of the respondents replied that their weight does not decrease. The remaining eight percent of the respondents do not know whether their weight is decreasing.

54 percent of the respondents from the total sample replied that they have experienced the pneumonia or bronchitis because many times they have become the victims of pneumonia or

bronchitis due to industrial smoke. On the other side 36 percent respondents told the researchers that they do not feel the repeated episodes of pneumonia or bronchitis. Only the 10 percent respondents do not know about the attacks of pneumonia or bronchitis, they are ignorant about this concept. 69 percent of the respondent of the total sample replied that at great extent they feel tightness of chest while breathing living in the industrial locality, while 24 percent of the respondents told that they feel tightness of chest to some extent. Only a very small percentage (7 percent) of the respondents falls in the category of not at all. They have no feelings of chest tightness. 52 respondents which are 58 percent of the total respondents have no awareness about the existing laws of the Government regarding industrial air pollution, while 40 percent of the respondents replied that they have awareness about the policies and laws of the Government with reference to industrial air pollution. Rest of the two percent does not know the governmental laws regarding industrial air pollution which is a very small portion of our total sample.

Testing the Hypothesis

H_1: There is an association between industrial air pollution and the respiratory diseases.

Ho: There is no association between industrial air pollution and the respiratory diseases.

Level of significance $\alpha = 0.05$

Table-1. Cross tabulation

Effects of Industrial air pollution on the respiratory health Problems					
		Effects of Industrial air pollution			
		To a great extent	To some extent	Not at all	Total
Respiratory Health Problems due to Industrial air pollution	Yes	56	23	2	81
	No	4	0	1	5
	Do not know	3	0	1	4
Total		**63**	**23**	**4**	**90**

Symmetric Measures			
		Value	**Approx. Sig.**
Nominal by Nominal	Phi	0.331	0.042
	Cramer's V	0.234	0.042
No. of Valid Cases		90	

Note: P- Value = 0.042 < 0.05, X^2 value = 9.886, P-value = 0.042

The above mentioned table indicates that p-value is 0.042 and the level of significance is 0.05. As P-value is less than alpha (0.05) therefore null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted. This concludes that there is a significant relationship between these two variables

and both are not independent variables. In other words we can say "more the industrial air pollution more will be the chances of respiratory diseases".

Test-2

Ho: There is no association between effects of industrial smoke on adjacent locality and the health problems due to industrial smoke

H_1: There is an association between effects of industrial smoke on adjacent locality and the health problems due to industrial smoke

Level of significance $\alpha = 0.05$

Table-2. Cross-tabulation

Health Problems due to Industrial Smoke * Industrial Smoke effects Adjacent Locality Cross tabulation

		Industrial Smoke effects Adjacent Locality			
		To a great extent	**To some extent**	**Not at all**	**Total**
Health Problems due to Industrial Smoke	Yes	56	23	2	81
	No	4	0	1	5
	Do not know	3	0	1	4
Total		**63**	**23**	**4**	**90**

Symmetric Measures			
		Value	**Approx. Sig.**
Nominal by Nominal	Phi	.331	.042
	Cramer's V	.234	.042
No. of Valid Cases		90	

Note: P- Value = 0.042 < 0.05, X^2 value = 9.886, P-value = 0.042

The above mentioned table indicates that the p-value is .042 and the level of significance is 0.05. Because the p-value is less than alpha (0.05) we are able to reject the null hypothesis (H_0) and are able to accept the alternative hypothesis (H_1). So we can conclude that there is a significant relationship between these two variables and both are not independent variables. In other words we can say that as much as people will be living near the industries, the industrial smoke will affect their health and people have more health diseases as compared to different location and it is testified by applying the Chi square test. After accepting the alternative hypothesis the next step is to find out the degree of association between these two variables. Cross tabulation shows that it is a 3*3 table and in this situation we will see the value of Cramer's V which is 0.234. This value

shows that there is a weak association between living the adjacent locality of industries and the facing of health problems.

Test-3

Ho: There is no relationship between years of living and feelings of chest tightness.

H_1: There is relationship between years of living and feelings of chest tightness.

Level of significance $\alpha = 0.05$

Table-3. Cross-tabulation

Feelings of Chest Tightness * Years of Living Cross tabulation						
		Years of Living				
		More than 30 years	**20 to 30 years**	**10 to 20 years**	**Less than 10 years**	**Total**
Feelings of Chest Tightness	To a great extent	31	14	11	36	62
	To some extent	20	2	0	0	22
	Not at all	3	2	1	0	6
Total		**54**	**18**	**12**	**6**	**90**

Symmetric Measures			
		Value	**Approx. Sig.**
Nominal by Nominal	Phi	.384	.039
	Cramer's V	.272	.039
No. of Valid Cases		**90**	

Note: P-Value = 0.039 < 0.05, X^2 value = 13.282, P-value = 0.039

The above cross-tabulation shows that the p-value is 0.039 which is less than from level of significance (0.05). Now the p-value is less than alpha (0.05) we will reject the null hypothesis (H_0) and will accept the alternative hypothesis (H_1). This reports that there is a significant relationship between these two variables. We may say that if a person has been living for a long time in the industrial location, he has more chances of the chest tightness which is one of the indicator to measure the respiratory diseases. Because our hypothesis is accepted that year of living effects on the chest tightness, we will see the value of Cramer's V for the degree of association. The value of Cramer's V (0.272) tells us that there is a weak association between these two variables.

CONCLUSIONS

The study is an attempt to see the awareness of people about industrial air pollution and its effects on human's respiratory system. We find a relationship between the residence in industrial area and respiratory diseases. However, relationship is weak between living near the industries and having health problems due to industrial smoke. Results show that 83.3 percent respondents acknowledged

that industrial air pollution is responsible for problems in their respiratory system. The people who live far away from the industries have less chances of being effected from industrial smoke. As industrial smoke does not play much role to disturb them i.e. psychologically, financially and physically. Industrial smoke is the main reason of industrial air pollution. Both of the populations (in industrial and non industrial zone) are aware of the effects of industrial smoke. The residents of industrial zone are in front of many health issues but they are not changing their residence due to financial factors. Respondents highly acknowledged that industrial smoke badly affects their daily life for example they told black smoke emitted from paper industries fall in their houses like snow. They neither sit in their courtyards and nor cook food. They cannot dry their clothes in the open air and it is difficult for them to sleep in courtyards. Moreover, due to black particles their crops are damaging, their houses and roofs have completely become black, their clothes become black and all these become a financial burden for them. Due to health problems they had to go for doctor which also increases their expenditures. It is also concluded from the research findings that majority of the respondents recognized industrial air pollution plays major role in the illness of respiratory system. As the respondents are living in deteriorated conditions in Sheikhupura's industrial zone, they protested against this industrial pollution every year. However, no governmental agency took notice of their protest. So, the majority of the respondents both in industrial and non industrial zone are not satisfied with the existing governmental laws of industrial air pollution.

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