AIR POLLUTION IN KARACHI ITS CAUSES AND EFFECTS ON HUMAN HEALTH

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ABSTRACT

Air Pollution is one of the main problems of urban area of our society. Air pollution occurs when so many contaminants are released by the industries and motor vehicles. Karachi is one of the top 10 cities of the world which has the highest level of pollutants packed into the air. Air pollution is affecting the health of common men. People often suffer in respiratory diseases like asthma, lungs diseases and cancer etc. It has become a serious health hazard for Karachiites. In the present research paper, the researcher has tried to explore causes of air pollution and its effects on human health. It has been observed that the number of private vehicles is increasing day-by-day due to lack of good public transport facilities. The roads are not broad enough to allow this big number of vehicles run comfortably. In near future there is no hope for extension of roads so on the basis of findings some recommendations are made, and by implementations of those the effects of air pollution can be minimized. But sincerity and commitment is required for it.

***Key Words*:** *Air Pollution, Vehicles, Health, Karachi*

INTRODUCTION

We know that the health of a common person of urban areas, particularly of Karachi is not satisfactory. Due to one or other reason 95% people are suffering various diseases. Apart from other reasons, one of the main causes is air pollution.

Today air pollution is the most pressing and challenging problem of Karachi, we have ever had. There are many factors,

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however, rapid growth of unplanned population, urbanization and heavy increase in vehicles and lack of good public transport are leading factors. It regarded as the main factor, contributing to damage the ozone layer. Due to the high temperature during the day; warm air raises carrying smoke from factories, sub standard vehicles are discharging grade smoke and other pollution in the air. The external forces do not control the dirty air may rise more than 15 kilometers from the earth frequently.

"Air pollution occurs when so many contaminants are released into the atmosphere that the recycling and cleansing functions begin to break down. Pollution is concentrated most notably in cities and towns where most people live."[1]

As compared to other cities of Pakistan, Karachi is the most polluted city of the country. Karachi is among the top 10 cities of the world with the highest level of lead poisoning. It is due to rapid growth of population without any planning. Other provincial capitals are not too far behind where the high level of pollutants Speared into the air is concerned."[2]

A national survey on Pollution was conducted in 1999, according to that, "almost 600 tons of lead was released into the air by about 4 million vehicles in addition to various other gasses and elements, including carbon, nitrogen oxide and sulphuaric acid. The result of the poisoning of the atmosphere has taken its toll on city dwellers."[3]The central area of Karachi, particularly Saddar, Garden, M.A. Jinnah road, Liaquat road, Tower, Lasbala and Liaquatabad are highly polluted.

"A government study reveals that, 40 percent of urban cities are directly affected by air pollution. The impact on health is proving to be devastating as toxic emissions, with the high carcinogenic lead content, has led to a series of ailment from respiratory disorders and stain allergies to low IQ even mental retardation among children."[4]

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[1] - Khalid Mahmood, *Social Problems of Pakistan* (Karachi: Kifayat Academy, 2003), 258.
[2] - Ibid., 259.
[3] - Ibid.
[4] - Ibid.

The laws exist to control and reduce the level of industrial and vehicular emissions which are discharging harmful wastage and polluting the air. Unfortunately, due to one or the other reason administration and law enforcing agencies are not playing their role to control the air pollution.

However, the mass awareness is increasing to involve the public in respect to environmental guide lines. Without serious participation of citizens, the government will not be able to achieve the result to minimize the pollution in Karachi.

Definition

Generally Pollution can be defined as: The presence of contaminants or pollutant substances in the air which affect human health or welfare and produce other harmful environmental effects.

In the economic survey of Pakistan, the air pollution is defined, "Air pollution is the incidence of concentration of individual pollutant (overtime) by source i.e. transportation stationary, fuel combustion, industrial process, solid waste disposal, mines oil and gasoline production"[5]

Agarural defines, "The presence in the outdoor atmosphere of one or more contaminants such as dust, fume, gasses, mist, odor, smoke, vapors in Quantities"[6]

According to World Health Organization (WHO),

"Air pollution may be defined as substance but in to air by the activity of mankind into concentration sufficient to cause harmful effect to his health, vegetable, property or to interfere with the enjoyment of his property. Unwanted particles mist or gasses put into the atmosphere as a result motor vehicle exhaust, the operation of industrial facilities or other human activities."[7]

The engineer's joint council of USA has defined, "Air pollution means for present in the outdoor atmosphere of one or

[5] - Government of Pakistan, *Environment static of Pakistan* (Karachi: Economic Survey of Pakistan, 2004-05), 280.
[6] - Agrural, K. C., *Pollution* (New Delhi: Ashish Publishing House, 1987), 102.
[7] - http//www. Chesapeakbay.net/air.pollution.hotmail.com (accessed on November 11, 2012).

more contaminant, such as dust, fumes, gas, mist, odor, smoke or vapor inequalities of characteristics and of duration such as to be injurious to human, plant or animal life."[8]

Air Pollution in Pakistan

Air pollution particularly in urban areas of Pakistan, is certainly not a new issue. In the past the use of coal in the industries and fire wood for cooking in cities was beginning to escalate. "The problem of poor urban air quality even as early as the end of the 16th century was well documented. During the 18th and 19th centuries with the beginning of industrial revolution most of the industries were based on coal and most of them are located in towns and cities. These industries discharge carbon, smoke and other contaminated elements which is the main cause of urban air pollution. This pollution level often reaches a very high degree. During the foggy weather and humidity conditions, the air pollution level escalated and smog ratio increased. This also affects the human being and other living creatures. Its effect on buildings and vegetables has become obvious."[9]

Pollution Control Acts

Time to time various acts and laws have been framed to control and minimizing the pollution.

"The 1975 Public Health Act contained a smoke abatement section to try and reduce smoke pollution in urban area. During the first part of the 20th century, tighter industrial controls led to a reduction in smog pollution in urban areas. Another 1962 Smoke Abatement Act was aimed at reducing smoke emission from industrial source, but unfortunately despite the declining importance of coal as a domestic fuel, pollution from domestic sources remained significant. In 1952, this resulted in around 4000 extra deaths in the city. It led to the introduction of the Clean Air Act of 1956 and 1968. These Acts introduced smokeless zones in urban areas with a tall chimney policy to disperse industrial air pollution away from urban areas into the atmosphere.

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[8] - Krewski, D., Reanalysis of Howard 6th Cities Study and the American Cancer Society (Cambridge: Cambridge University Press, 2003), 39.

[9] - http//www.ocemu.ak.uk.hotmail.com (accessed on September 13, 2012).

Following the Clean Air Act, air quality improvements continued throughout the world in 1970s. Further regulations were introduced through the Control of Air Pollution Act, 1974. This included regulation for the composition of motor fuel and for the sulphur contents of industrial fuel oil.[10]

However, due to lack of transport facilities in the city after 1980, the numbers of motor vehicles and motorcycles have been increasing. It is stated that every day more than 200 motorbikes are registered in Karachi. The people are facing problem traffic jam and due to that many of hours are wasted every day to reach their destinations.

"In the early 1980s, the main interest was the effect of lead pollution on human health, but by the late 1980s and early 1990s, the effects of other motor vehicles pollutants become a major concern. The 1990s have seen the occurrence of the winter time and summertime smog. These are not caused by smoke and sulphur dioxide pollution but by chemical reaction occurring between motor vehicles pollutant and sunlight. These are known as photochemical smog.[11]

To achieve air quality throughout the world and reduce the air pollution 'in 1995, the Government passed its Environmental Act, requiring the publication of a National Air Quality Strategy to set standards for the regulation of the most common air pollutants published in 1997.[12]

Causes of Air Pollution

There are many causes and sources which are responsible for air pollution. The main source particularly in Karachi is many defective vehicles which discharge heavy smoke. There are two stroke engines in auto-rickshaws and old buses which are illegally plying in the city. These vehicles produce excessive carbon monoxide and lead, these two are the important pollutants which are being released into the atmosphere. The percentage of gasoline

[10] - Ibid.
[11] - Ibid.
[12] - Ibid.

is also very high which aggravates the situation. It is not out of place to say that Karachi is at the high risk of air pollution. The registered vehicles in Karachi can be observed from the following table. The vehicles are registered under the Excise & Taxation rules, Government of Pakistan. As a Part from this, a good number of vehicles playing in Karachi, are registered in other cities. Numbers of unregistered vehicles are also observed in the city.

Registered vehicles

period	***private***	***commercial***	***Motor cycle***	***total***
July 2000 - June 2001	16415	4446	7137	27998
July 2001 - June 2002	16868	3401	7720	27989
July 2002 - June 2003	22505	3629	13571	39705
July 2003 - June 2004	33906	7879	41374	83159
July 2004 - June 2005	45523	12614	65762	123899
July2005 - June 2006	60502	13907	91502	165911
July 2006 - June 2007	69412	8127	110487	188026
July2007 - June 2008	60017	10866	122919	193802
July 2008 - June 2009	32563	8169	100597	141329
July 2009 - June 2010	44307	19084	128856	192247
July 2010 - June 2011	49062	32301	159798	241161
July 2011 - June 2012	53677	26492	166189	246358
Grand Total	**504757**	**150915**	**1015912**	**2571584**

(Source, Motor Registration Civic Centre Karachi 2009-2012)

The above registered vehicles list was provided by the Motor Registration Wing City District Government Karachi. The table has shown the various registered vehicles during 2000 to 2012 year wise. The total registration of new vehicles during the year July 2000 to June 2001 was 27998, it can also be observed from the table that every year the number of registration has been increased; during the year 2011 to 2012 was the highest 246358. The registered car/private vehicles were 53677 and motor cycles were 166189. The question is, has the government extended the roads where these vehicles will play? Today the public is facing the problems of traffic jam due to heavy traffic. It is cause of heavy air pollution that affects the human health.

All these vehicles ply in the various part of the city. They have been the main cause of polluting the environment. Particularly which are not properly fit and in good condition, or one not properly tuned. The highly polluted areas of Karachi during the peak rush hours are Saddar, Empress Market, M.A.Jinnah Road, Boultan Market, Tower, I. I. Chandrigarh Road, Shahrah-i-Liaquat, Eid-Gah, Garden, Lasbella Bridge, Teen Hathi Bridge etc. No doubt due to construction of over head bridges and under passes, the flow of traffic became better during the last decade, but the numbers of vehicles has also increased very rapidly.

Air pollution is a man-made problem. The nature has given thinking ability to the human beings. It is our responsibility to use the mind and ability for the welfare of humanity and betterment of environment. The main factors, responsible for the air pollution are stationary sources, area sources, mobile sources, agriculture sources and natural sources.

Stationary Sources

A stationary source of air pollution to an emission sources those cannot move (i.e., utilities, chemical and manufacturing industries and factories) often stationary sources are defined as

large emitters who discharge consistent qualities and quantities of pollutants.[13]

Area sources

The term area source is generally used to describe the many small unit stationary sources located together whose individual emissions may be low but whose collective emission become very significant and harmful. Specially, area sources are those that emit less than 25 tons per year of any combination hazardous air pollutants, or less than 10 tons per year of any single hazardous air pollutants.

Mobile Sources

In Karachi, particularly in centre city areas, the mobile pollution is increasing day by day. A mobile source of air pollution refers a source that is capable of its own power. In general mobile cause imply on the vehicles plying on the roads. In addition to these transport there are non-road and off-road types such as gas-powered lawn tools and mowers, farm and construction equipment, recreational vehicles steamers, air crafts, trains and air conditions functioning in the city.[14]

Natural Sources

Natural sources of air pollution are sources not caused by people or their functioning. An erupting volcano emits particulates matter and gasses; forest and prairie fire can emit large quantities of pollutants plants and trees hydrocarbons and dust storms can create large amount of particulate matter. Wild animals in their natural source of pollution given that there is a certain amount of natural pollution it is very important to control the (excess) pollution caused by men activities.[15] But the natural source of air pollution does not affect the Karachi as such.

The following table shows the significant Air pollution causes and affects the human health.

[13] - www.chesapeakebay.net/air-pollution.htmail
[14] - Ibid.
[15] - Ibid.

AIR POLLUTION CAUSES AND EFFECTS

Nature of Pollutants.	**Effects on human health.**	**Impact**
Carbon Monoxide	Reduced visual acuity and sensory discrimination. Reduce respiratory function.	Traffic accidents, Asthma, Bronchitis, Aggravation agama, Arteriolerotic disease.
Sulpher dioxide sulphate	Irritation of respiratory system, reduce its function	Excess mortality, Emphysema, Bronchitis, other respiratory disease.
Nitrogen dioxide nitrates	Irritation or respiratory tract, reduce respiratory function, reduce resistance to infection	Bronchitis, other respiratory illness, hypertension, excess mortality, heart disease suspected.
Oxidants	Irritation of eyes, respiratory tracts	Bronchitis, Asthma, Emphysema, difficulty in breathing.
Hydro carbons	Some are irritation to eyes, respiratory tracts/function	Cancer.
Particulates	Irritation of eyes, respiratory tracts	Excess infant mortality, respiratory disease, some types of cancer.

Source: (http/www.infoplease.htmail.com)

The following table indicates the picture of diseases/symptoms associated with air pollution.

DISEASE/SYMPTOMS ASSOCIATED WITH AIR POLLUTION

Diseases	**Associated pollution**
Total cancer, cancer of respiratory and digestive system	Sulpher dioxide, Sulphates, particulates, benzo, pyrene, asbestos, ambient air pollution, also numerous other agents incidence is localize such as nickel, beryllium, chromium
Respiratory disease mortality and morbidity	Particulates, Sulpher dioxide, nitrogen dioxide, smoke auto exhaust.
Bronchitis	Particulates, sulpher dioxide, nitrogen dioxide, smoke auto exhaust.
Pneumonia	Soot fall, \smoke, Sulpher dioxide, Sulphate.
Tuberculosis	Sulpherdioxide, particulates.
Emphysema	Ambient air pollution, nitrogen dioxide.
Cardiovascular morbidity, mortality	Ambient air pollution, Sulpher dioxide, Sulphate, particulates.

Source: (http/www.infoplease.hotmail.com)

Air Pollution Causes, disease and its Effects

Air pollution occurs when so many contaminants are released into the atmosphere that the recycling and cleaning functions begin to breakdown. As the tide of chemicals born of the industrial age has arisen to our environment, a drastic change has come about in the nature of the most serious public health problem. Only yesterday mankind lived in fear of the scourges of smallpox, cholera and plague that once swept nations before them. Now our major concern is no longer with the disease organisms that once were omnipresent; sanitation better living condition and new drugs have given us a high degree of control over infection disease. Today we are concern with a different kind of hazard that

links in our environment, a hazard we ourselves has introduced into our world as our modern way of life evolved.[16]

There are number of diseases in which the people are suffering due to air pollution. There is a growing concern that human destruction of the environment is responsible for exacerbating, if not cause of any illness. Many authors blame global warming and ozone depletion for increase in the incidences of skin cancer, malaria and other victor born disease. Some argue that chronic illnesses such as asthma and allergies are directly related to the air pollution.[17]

Diseases due to air pollution

During the last two or three decades air pollution and its effects on health have been the subject for researchers to explore the pollutants such as air borne particulates matter and ozone have been associated with increases in mortality and hospitals admissions due to respiratory cardiovascular disease. These effects have been found in short-term studies, which relate day-to-day variations in air pollution and health and long-term studies, which have followed cohorts of exposed individuals over time. Effect have been seen at very low levels of exposure, and it is unclear whether a there should concentration exists for particulates matter and ozone below which no effect on health are likely. Here we will discuss some disease and their serious adverse effect on human body due to air pollution.

1. Effect on earth

Air pollution can affect human health in many ways both in short and long terms. Young children and elderly people often suffer more from air pollution, they have health problems such as asthma, heart and lung diseases, may also suffer more when the air is polluted.[18]

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[16] - http//www.keepmedia.hotmail.com (accessed on November 16, 2012)
[17] - Ibid
[18] - Faiza Iqbal, *A Study of Awareness about Air Pollution regarding its cause and effects on People* (Karachi: University of Karachi, 2005), 21.

Skin Diseases

Air population causes skin diseases, irritation of eye, reduces resistance to infection factor enhancing infections disease transmission are suitable environmental condition (elements and habitat) for both disease pathogens. Despite significant achievement at both national and international levels. With regards to the control and prevention of a number of infections diseases.[19]

Respiratory Diseases

Respiratory system is very important in human body. It supplies oxygen to clean the blood to supply in all parts of the body. The respiratory system functions through breathing. When we breathe we inhale oxygen and exhale carbon dioxide. This exchange of gases purifies the blood.[20]

The question is, do we inhale clean and fresh air? Due to polluted air our respiratory system causing cough, nausea, shortness or breath, pulmonary congestion and lung function. It leads towards chronic diseases such as asthma and bronchitis. It damages tissues of lungs and in tests such as the determination of carbon monoxide in blood. Air pollution affects respiratory system both directly and indirectly.

Asthma

Asthma is a very common disease in Karachi. More than 3million people are suffering from it. It can occur in people of any age but it is most likely to develop in children by the age of 5, and in adults during their 30s. People over 65 are also prone to the disease. Asthma is an allergic condition that is often inherited by children from their parents.

Asthma sufferers have sensitive airway and it disrupts the transport of air in and out of the lungs. Asthma sufferers have sensitive airway which become inflamed and narrowed under certain conditions. The inflammation is caused by the body's immune system, in order to counteract that irritant. When

[19] - Ibid.
[20] - Ibid.

inflammation occurs it becomes difficult for oxygen to reach the lungs. Consequently asthmatic may experience difficulty in breathing.[21]

Lungs disease

The lungs are the main organ of the respiratory system. During respiration, the oxygen is taken into the body and carbon dioxide is breathed out. The red blood cells are responsible for picking up the oxygen in the lungs and carrying the oxygen to all body cells that need it and pick up the carbon dioxide which is a waste gas product produced by our cells. The red blood cells transport the carbon dioxide back to the lungs. The spectrum of functional and pathological responses of the lungs to various kind of exposure in wide chronic non-specific lung disease in the result of lung term exposure to air pollution many of the occupational and environmental exposure can precipitate and aggravate asthma.[22]

Lungs cancer is also lined with air pollution in Karachi. It is linked with industries, traffic chemicals, Paper and Petroleum industries and dominates the environment. It's implicated a still other occupation, related disease including black lung disease in coal mines and chronic bronchitis and emphysema among textile workers. These are old due to air pollution and negligence and lack of awareness of people.

A research "study of awareness about air pollution regarding its causes and effects on people;" was conducted by a research scholar Faiza Iqbal from department of Sociology University of Karachi in 2005-06 for master degree. According to the finding and respondent's opinion, air pollution is the cause by the heavy traffic in the city.

[21] - Madeha Ejaz, A Social Study of the Impacts of Air Pollution on Health Conditions of Shopkeepers of Nazimabad, Karachi (Karachi: University of Karachi, 2006), 21.

[22] - Ibid., 22.

Respondent's Response. Heavy traffic is cause of Air Pollution[23]

Categories/response	***Frequency***	***Percentage***
Yes	94	90.91%
No	16	09.09%
Total	110	100.00%

According to the above table the highest 90.91%respondents considered that heavy traffic creates air pollution in the city. While only 9% respondent's answer was no, It was due to lack of awareness.

Another finding of the study shows that air pollution effects on the working efficiency of the people.

Air Pollution effects Working efficiency[24]

Categories/response	***Frequency***	***Percentage***
Yes	91	82.73%
No	19	17.27%
Total	110	100.00%

28 (Faiza.2005-06, 68)

The above table shows that majority of respondents i.e. 82.73% are fully aware about air pollution is being harmful for human life. But they do not take care of it.

The opinion of the respondent's about air pollution due to the congested areas is given in the following table.

Air Pollution due to Congested Area

Categories/response	Frequency	Percentage
Yes	80	72.73%
No	30	27.27%
Total	110	100.00%

According to the above table, a significant majority of the respondents i.e. 72.73% was with the view that congested pollution area is creating air pollution which affects their health.

[23] - Faiza Iqbal, *A Study of Awareness about Air Pollution regarding its cause and effects on People, 70.*
[24] - Ibid., 22.

All the studies and survey findings shows that during recent years an increasing focus has been directed towards the adverse effects on the human health which associated with ambient air pollution. It affects the respiratory and cardio vascular system, resulting in symptoms, exacerbations of disease and even majority people suffers with it.

CONCLUSION

Karachi is the largest industrial and commercial city of Pakistan. It contains about 22million people. The economy of the country is depends on Karachi. It is largest source of employment. People from all over the country come to Karachi in search of jobs. It is estimated that the population of the city is increasing about 6% per year. The city has expanded from 250 kilometers in 1972 to 335 kilometers, in 1982 and more than 600 kilometers in 2011. The transport and industries have expanded very rapidly. Numbers of small industries are working in the residential areas of the city which is the main cause of air pollution. The vehicles produce excessive carbon monoxide and lead which are released into the atmosphere. The percentages of these gasses are very high, that is harmful for breathing. We can say that Karachi people are inhaling poison, due to that 90% people are suffering from one or other disease.

The air pollution is cause of many diseases such as skin disease, irritation of eyes, reduced resistance to infection, and factor enhancing, infectious disease transmission. It also affect respiratory system damage the lungs that leads towards lungs cancer. Asthma is also developing due to air pollution. After some time these diseases are come complicated.

It has been observed that numbers of vehicles playing in Karachi are not proper tuned and these discharge smoke. Law enforcement agencies are also responsible for this act. Lack of awareness is also reason for air pollution. Social commitment and sense of responsibility is also necessary to address the issue of air pollution.

RECOMMENDATION

The study shows that air pollution in Karachi is one of the main problems. It is generated by industries and motor vehicles.

Air pollution is affecting our health in many ways, both in short and long-terms. People are suffering in asthma, emphysema, bronchitis, respiratory disease, cancer and many other diseases. These are harmful for human life. We can not sweep over the air pollution from the city but some efforts can be made to minimize the pollution, if following recommendation may be implemented.

1. A good number of vehicles plying in the city are not proper tuned. These should be tuned and mechanically fit when ply on road.
2. The law enforcing agencies should take care of such vehicles as are defective and discharge smoke should be banned.
3. The law is there but it is not implemented properly, due to that, defective vehicles are on the road and factories are discharging/smokes which is harmful for human life.
4. With the mutual agreement of administration, the foot paths and more than 50% road are encroached by the shopkeepers and hackers due to which, not only pedestrian face much difficulties in walking but the movement of traffic also get effected. With the Jam of traffic the vehicles discharge smoke which pollute the air. The encroachment should be removed from the road sides and foot paths to make the flow of traffic smooth.
5. The small cottage Industries should be established in the other parts of the country so that the people have employment at their home town and do not move towards big cities. It will help to control the increase in population of cities
6. Mass education is also necessary to educate the common people about the harmfulness of the air pollution. The media should be used for this purpose.
7. Parents should also train and guide their children that they live in clean and healthy environment.
8. Gardens and parks should be planned in every mohallah/block/wards and these should be maintained properly.

9. No objection certificates (NOC), should not be issued to any housing society in which space for parking is not given and it should be developed according to the specification.
10. Public transport, particularly local trains should be restarted so that majority of the people may feel convenient to travel and do not use their own vehicles. It will also reduce the unnecessary public transport of the city.
11. Garbage should be collected regularly and disposed of properly to keep the city clean.
12. People should be motivated for the plantation in their areas and to take care of these trees. This will be helpful in minimizing the air pollution in future. It will be possible when our public and government will be committed and serious to minimize the air pollution.
13. People should be advised to use masks when they move in the city and in polluted air.
14. To make Karachi clean and green is in the hands of Karachites.