Observation and Research on: Psycho-physical Effects of Environment Pollution on the Health of Kabul Citizens

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Abstract

Observation and Research on Psycho-physical Effects of Environment Pollution was a field study which examined the effects of air, water and solid waste pollution on health of Kabul citizens. The achieved data show that the environmental pollution has the same effects on both mental and physical health and can intensify mental disorders including sleep disorders, aggression, depression, anxiety and somatic symptoms. The environment pollution is the main cause of physical illness including allergy, bronchitis, asthma, food poising, typhoid, worms, parasitic diseases, helicobacter pylori etc.

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Abbreviation

FOPD	Fekr Organization of Psychosocial Development
HBS	Heinrich Boll Stiftung
CM	Carbon Monoxide
NEPA	National Environment Program for Afghanistan
UN	United Nation
CSO	Central Statistic organization
WHO	World Health Organization
UNEP	United Nation Environment Program
SO	Somatic Symptoms
AI	Anxiety / Insomnia
SD	Social Dysfunction
SD	Severe Depression
AG	Aggression
GHQ	General Health Questionnaire

INTRODUCTION

The effects of environmental pollution on public health cannot be overlooked because having a healthy and beautiful environment free of any contamination provides the ground for everybody to achieve their maximum physical and mental growth. In such an environment several diseases that can cause physical and mental problems to normal growth are also reduced.

Environmental pollution does not only harm human life, but it also affects all aspects of the mental, social, economic and physical changes in various ways and threatens healthy green life. The psychological dimension of environmental pollution increases the depression of individuals and improves hostile behaviors, while the green environment and free of contamination relieves harmful emotions, increases the power of control and management of trauma. The healthy and clean environment also facilitates appropriate social function of individuals and provides an environment in which people can deal with the problems of everyday life and gain the ability to cope with the pressures of life by spending time in the natural environment, and tolerate and mange mental stress in good manner.

In fact, mankind is the only creature that consciously and unconsciously damages the environment. The human activities's consequences not only threaten human life but also endanger the habitat of other creatures on this planet. Deforestation, reduce of basic resources, growth of industrial and civilian wastes has created unsafe environment that has made living difficult for all creatures on the ground.

Unfortunately, many people do not care about the purity of their environment, while the environment provides the most important humans' needs, including the need for food and water. In spite of knowing this, in the last few decades, as the population has grown, the process of utilizing land resources has also increased, which has led the environment to suffer ruin and pollution.

Now environmental pollution has become a global problem. Notwithstanding huge expenditures in the preservation of environment, deadly pollution has been increasing in various environments and environmental pollution has become a serious and tangible threat to living animals. Environmental pollutions, for instance, can give rise to respiratory diseases, internal infections caused by water pollution and solid wastes, and mental disorders resulting from physical pain.

There is a lot of research in the field of environmental pollution that each of these studies has examined the issue of pollution from various aspects. The problem that has been seen in this regard is the excessive expansion and complexity of the environment and pollution, which has led the research to take on more theoretical aspects. But what is important here is the effects of environment pollution on health that have caused physical illnesses, such as parasitic and microbial diseases, or various types of cancers for many. Hence, environmental pollution can also be considered as a serious threat to mental health of the inhabitants of the earth.

This research is conducted with collaboration of a team of researchers who are expert in the field of environment and laboratory sciences, and psychology with a high degree of expertise. This is the first organized study in Afghanistan that has tried to examine environmental pollution and its impacts on public health. It also provides a platform for environmental advocacy activities in Afghanistan. It is hoped that this research will be able to pave the way for activities that can improve the mental and physical health of Afghan society.

PROBLEM STATEMENT

The environmental crisis has become a serious issue today which is the result of the unreasonable interference and productivity of human beings in the nature that has generated the magnitude and importance of the subject for the scientists' attention to rescue it. (Clarke 1379: 1). Today, it is a danger that humans are destroying their livable and cultivated grounds. Human activities are progressing more and more, while their mistakes and misplaced use of forces destroy the world (Antarctica 1985:119).

Figures show that 22-23% of the Afghan population is concentrated in Kabul, a city built for only a million people, 7 million people is living in it now. On the other hand, the city that was built for 75 thousand vehicles, today, 480 thousand vehicles are traveling every 24 hours. Currently, the environment in large cities of the country, especially Kabul, is so polluted that, according to the Ministry of Health, more than 3 thousand people die annually as the result. (Key Group, Mlahat A, January 2014).

Today, the environmental pollution is a global issue and is causing widespread problems around the world, this study, with regards current situation, intends to provide solutions to existing problems. For this purpose, the research has been carried out with the aim of investigating the effects of environmental pollution (air, solid wastes and water pollution) on general health (physical and mental health) and strives to prove the harmful effects of environmental pollution by proving its research theories.

This scientific research has observed three theories:

- ✓ Environmental pollution (air, solid waste and water) effects on physical health.
- ✓ Environmental pollution (air, solid waste and water) effects on mental health.
- ✓ There is significant difference between the mean mental health score of female with the mean mental health score of males.

LITERATURE REVIEW

The population of Kabul breathing polluted air has horrific consequences on their health. According to medical researchers, the air pollution can cause or exacerbate a number of serious diseases among inhabitants of an air polluted city. These diseases include ischemic heart diseases, stroke, hypertension, and a number of respiratory diseases and birth defects. Those who are at highest risk of being affected by air pollution are children, the elderly and patients who already have diabetes, heart disease and respiratory disease. Air pollution can also affect fetus in the mother's womb. A large study in Los Angeles showed that carbon CM (Carbon Monoxide) can increase birth defects. It is of great concern that the high concentration of CM in Kabul may increase birth defects in Kabul. (Sher Ali, Article published in Afghanistan news, 20 June 2013).

In addition, the legacy of conflict that has plagued Afghanistan and its people for nearly 30 years has damaged not only the country's society and institutions, but also its environment. The main impacts are the depletion and overuse of important resources (forests, biodiversity, water), which exacerbates the stressful socio-economic conditions and the impact of natural hazards; reduced access to natural resources; violation of law; collapse of traditional governance systems and processes; pollution with toxic rocket fuel, spilled oil and land mines, making essential land and pastures unsafe to use. (NEPA, Afghanistan Environment, 2008)

Today almost 80% of the country's population (19 million people) lives in rural areas. That portion of the population, which relies heavily on productive natural resources, is extremely vulnerable to the impacts of local and global phenomena (such as droughts, natural disasters, climate change and desertification) and the degradation of natural resources through erosion and pollution of soil and water. The influx of returning refugees, sheer population growth, and the creation of new refugee environment and internally displaced persons – as a result of droughts, natural disasters, climate change and desertification – could exert additional stress on natural resources. (NEPA, Afghanistan Environment, 2008)

Students at Environment Science Faculty study core subjects as faculties' curriculum and it is also updated. Aspect of global environment issues has widened and it has moved to its dangerous stages. Global warming, increasing desertification, deforestation, rising greenhouse gases, depletion of atmospheric ozone layer, melting Himalayan and polar ice caps, extinction of different animals and plants species, air and water pollution and a number of other problems are the main subjects of environmental issues today. Also using natural resources is considered a critical issue which treats earth with scarcity of freshwater, reduction of arable land, consumption of fossil fuel and even threat of oxygen availability.

Major impact of climate change and environment degradation is the increase of unexpected geological and climatic disasters and hazards, such as landslides, frequent flooding, droughts, thunderstorms, tornadoes, hurricanes, spread of various disease epidemics and so on. Comparatively, natural disasters such as earthquakes, tsunami, and wildfire have also accelerated much with increasing environmental issues (Kabul University, Faculty of Environment Science, 2013).

Some of these water-borne diseases are Typhoid, Cholera, Paratyphoid Fever, Dysentery, Jaundice, Amebiasis and Malaria. Chemicals in the water also have negative effects on our health. Pesticides – can damage the nervous system and cause cancer because of the carbonates and organophosphates that they contain (The World Count, Apr 15, 2014).

Air pollutants can be in the form of particulate matter which can be very harmful to human health. The level of effect usually depends on the length of time of exposure, as well as the kind and concentration of chemicals and particles exposed to. *Short-term effects* include irritation to the eyes, nose and throat, and upper respiratory infections such as bronchitis and pneumonia. Other symptoms include headache, nausea, and allergic reactions. Short-term air pollution can aggravate the medical conditions of individuals with asthma and emphysema. *Long-term health effects* can include chronic respiratory disease, lung cancer, heart disease, and even damage to the brain, nerves, liver, or kidneys. Continual exposure to air pollution affects the lungs of growing children and may aggravate or complicate medical conditions in the elderly. (eSchooldtoday in association, 2008-2015).

Foday Pinka Sankoh (2013) examined the environment and health impacts of households living around (nearby) and away (far away) from the Granville Brook dumpsite in Freetown, Sierra Leone. Results from the analysis of data revealed that both nearby and far away residents suffered from related diseases due to the location of the dumpsite closer to their settlements. It was discovered that residents less than fifty meters from the dumpsite are mostly affected by the dumpsite. Hence they were victims of malaria, chest pains, diarrhea, and cholera, irritation of the skin, nose and eyes. This state of health of respondents in this study can be linked to pollution from the dumpsite. It was also noted that the extent of air and water pollution is worse in the raining season as a result of offensive and disease-carrying odor, as well as ground water pollution. In the dry season, the smoke from the incineration of the dumpsite is an important source of air pollution for people living far away from the dumpsite. They therefore complained about chest pains. The study therefore concludes that the dumpsite should be properly located and managed to minimize its effects on the environment. For improved health status of the populace living less than fifty meters away from the dumpsite, it is a matter of must for the Freetown City Council to resettle such persons. In the long term, efforts to provide low cost houses situated in a clean environment is a priority that the City Council must pursue vigorously to enable the poor to live in affordable yet clean environment. People need to be educated by health motivators about the effects of dumpsites on their health. (Foday Pinka Sankoh, 2013)

RATIONALE

Afghanistan has one of the fastest growing populations in the world with annual rate of 2.03 percent (UN). According to CSO (Central Statistic organization) (2013), among the total 27 million population of Afghanistan, 42.3 percent is young people under 15 years old, 55.3 percent is persons between 15 and 64 years old, 2.4 percent is persons above 64 years old.

According to a 2015 estimate, the population of the Kabul city was around 3,678,034 people which include all the major ethnic groups. One of the biggest challenges that Afghanistan is facing today is the environmental pollution and its effects on health. This challenge becomes more serious when we understand that the large number of Afghan people are living in urban area and are deprived of healthy drinking water, effective solid waste management system and are breathing polluted air especially in winter, so effects of environment contamination is a big concern for number of reason as follow:

1. Afghanistan faces a number of basic environmental health challenges, including: unsafe drinking-water; inadequate sanitation facilities, drainage and water supply; improper solid and hazardous waste

management; chemical contamination; poor air quality; and unhygienic food handling at all stages of supply, storage and transport (WHO, 2012).

2. Water-borne diseases account for the deaths of 3,575,000 people a year! That's equivalent to a jumbo jet crashing every hour, and the majority of these are children. (The World Counts, 15 April, 2014)

3. A 2010 report on nutrients in ground and surface water by the U.S. Geological Survey found that nitrates were too high in 64 percent of shallow monitoring wells in agricultural and urban areas. Nitrate, a compound found in fertilizer, often contaminates drinking water in agricultural areas. Infants who drink water too high in nitrates can become seriously ill and even die. Symptoms include shortness of breath and blue-tinted skin, a condition known as blue baby syndrome. (US Environment Protection Agency, 2016)

4. The effects of environmental pollution on humans are mainly physical, but can also turn into neuron-affections in the long term. The best-known troubles to us are respiratory, in the form of allergies, asthma, irritation of the eyes and nasal passages, or other forms of respiratory infections. Notably, these frequently spread affections can be observed when air pollution is high in cities, when the weather gets hot, for instance. On top of that, environmental pollution has been proven to be a major factor in the development of cancer. This can happen for example when we eat residue of pollutants used in the production of processed foods, or pesticides from the crops. Other rarer diseases include hepatitis, typhoid affections, diarrhea and hormonal disruptions. (Conserve Energy Future, 2016)

5. This pilot study has linked environmental pollution to public health. Soil samples analyzed from locations adjacent and within the dumpsite show high levels of heavy metals emanating from the site in particular lead, mercury, cadmium, copper and chromium. At the same time, a medical evaluation of the children and adolescents living and schooling near the dumpsite indicates a high incidence of diseases that are associated with high exposure levels to these metal pollutants. For example, about 50% of children examined who live and school near the dumpsite had respiratory ailments and blood lead levels equal to or exceeding internationally accepted toxic levels (10 μg/dl of blood), while 30% had size and staining abnormalities of their red blood cells, confirming high exposure to heavy metal poisoning. (UNEP)

To achieve a healthy population, we need to have a healthy environment which drives the development in the country. Hence, we need to invest now on environmental and reproductive health. At the first step of healthy environment is a study which shows us the effects of pollution on health and enables us to advocate change in the environment where everybody accesses a healthy place to work and live.

This research project is designed to fill this gap and plans to prepare for the academicians a base to advocate change in the environment, anyway, more challenging is the task of developing underlying models of how the built environment can affect mental health.

OVERALL GOAL

To identify the effects of environmental contamination on health that helps the advocacy group to bring positive changes in environment.

PRIVACY AND CONDIDENTIALITY OF RESEARCH

Personal information such as name, contact numbers, etc. has not been inquired. This survey is self-reported and after filling the questionnaire, they put the filled questionnaire inside a box which we designed for maintaining the confidentiality of information.

Additionally, data such as name, by which individual can be identified never was neither on interview sheet, nor on computerized data. Moreover, interview sheets were disposed of after completion of data entry. Data file is protected by password and stored only in 1 computer in the project office with proper back-up. It won't not have used in any other computers or transferred to any person.

STATISTICAL SOCIETY & SAMPLING

The target population of this survey was all people of Kabul city. There was no definite single indicator or incidence for this survey; additionally, this research was looking for the effects of contamination in environment on mental and physical health, so in this section we considered to target population of research separately:

For physical health the total sample size of survey was 880 people consisting of both male and female aged between 18 to 35. There was no especial formula to calculate the sample size of physical health and it is calculated based on budget and existence project facilities.

For mental health, 1,100 samples were required for the survey with 5% precision and 95% confidence level (50 people for each district). Because of the nature of cluster sampling, required sample size is doubled (2,200), as the design effect, to obtain the same level of statistical condition, so 2,200 samples were enough for mental health survey.

Sampling method:

1. Water sampling

Totally 66 samples (3 samples for each district) are taken accidentally. For each water sample collected a minimum of 1-liter water, which completely fills a bottle.

Based on sampling methodology of research, first of all, all villages of each district listed and entered in Excel Sheet, Then, 3 villages were selected among them randomly. In this method all sectors for each district have the equal chance to participate. The selected villages were sectors where we took water samples from.

2. Blood & faecal sampling

Totally 880 blood & faecal samples were provided. We informed participant about the goal and objective of research. Each person agreed to the terms and conditions of research.

Then, in each district all the villages of the district were listed and the number of the people to be interviewed in each districts were equally distributed among the randomly selected villages of a district. Because of the unavailability of accurate and reliable information about the number and population of villages this was carried out during the field work well before the data collection.

Once the villages were randomly selected within the districts, households within each village were selected using the system of random selection methodology, in which a male or a female member of every third household was interviewed in the village. The mosque within the village considered as the center of the village and the male members of the survey team moved towards the East (Sun-Rise Direction) while the female members of the survey member of the survey team moved towards the West (Sun-Set Direction). If the number of households was limited in these two directions from the center of the village (Mosque) then the female members moved towards their right hand (face towards the sun set) and the male members moved towards the left hand side (face towards the sun rise). Each survey team drew a map of the village and their movement directions and it attached with the data collection forms of the village. The households (from which members were interviewed) were marked by the survey team and the supervisor visited the village for data quality assurance purposes to ensure the data was collected from the village properly.

3. Mental health sampling

Totally 2,205 mental health questionnaires are filled out by 6 research workers from 22 districts of Kabul province. We select the exact location for collection data accidentally, so all population of studied districts had the equal chance to participate. The informed consent form was filled out before starting the organized interview and they were informed about the goal and objective of research as well. If they agreed, they would be included; otherwise, they would be excluded.

Based on sampling methodology mentioned above, the research team collected mental health data from those villages that we have taken water samples and faecal and blood samples. (the other sectors of each districts were included as required).

RESEARCH TOOL

This study was looking for the effects of contamination of environment on psychical and mental health, so the tool of collection data was different as follows:

- For psychical health: the main tool for collection data was blood & faecal examinations.
- For mental health the main tool was General Health Questionnaire-28 that is self-report questionnaire provided by Goldberg in 1972, but the researchers of this study added 7 more items in this questionnaire to measure the aggression as a result of environmental pollution. Ttherefore, GHQ consists of 35 items and 5 sub-scales as follows:
    - ✓ Somatic Symptoms
    - ✓ Anxiety/Insomnia
    - ✓ Social Dysfunction
    - ✓ Severe Depression
    - ✓ Aggression

RELIABILITY OF GHQ

The General Health Questionnaire-28 (GHQ-28) is self-report screening measure used to detect possible psychological disorder. The GHQ-28 identifies two main concerns: (1) the inability to carry out normal functions; and (2) the appearance of new and distressing phenomena (Goldberg & Hillier, 1979).

Numerous studies have investigated reliability and validity of the GHQ-28 in various clinical populations. Test-retest reliability has been reported to be high (0.78 to 0.9) (Robinson & Price 1982) and internal reliability have both been shown to be excellent (Cronbach's a 09-0.95) (Failde & Ramos 2000). High internal consistency has also been reported (Failde & Ramos 2000). The GHQ-28 correlates well with the hospital Depression and Anxiety Scale (HADS) (Sakakibra 2009) and other measures of depression (Robinson & Price 1982).

In the Slovak sample the Cronbach's alpha coefficients of reliability of the subscales vary around 0.82 and the internal consistency of the total scale is 0.92. The mean inter-item correlations, which can be regarded as an indicator of the homogeneity of the scale, were also computed. In the Slovak sample the mean inter-item correlations are rather high. (Iveta Nagyova, Boudien Krol, Angela Szilasiova, Roy E. Stewart, Jitse P. van Dijk and Wim J.A. van den Heuve, 2000).

In this study, researchers have reported the reliability of GHQ-35 designed for this study to be high (Cronbach alpha 0.84) (Payandehnik, Aug 2016) and internal consistency between GHQ sub-scales has been reported 0.74 by Cronbach's alpha (Payandehnik, Aug 2016).

DATA ANALYSIS

This study has examined the effects of three types of pollution including air, water and solid waste pollution on physical and mental health of Kabul citizens. The key issue in this research has been to prove that environment pollution can be a hazard to health (mental and physical). In order to prove this problem, a laboratory culture was used to measure the amount of water pollution in the drinking water. Unfortunately, due to lack of facilities, it was not possible to measure air pollution. Solid waste pollution is visually seen across studied areas.

1. Laboratory culture and water pollution

Physical, Chemical and Biological pollution of drinking water in 22 districts of Kabul

Based on data analysis, physically, almost all samples taken categorized as hard water. Long term usage of hard water causes liver and kidney diseases. But chemically, about 10% of the total samples are contaminated with Nitrate, Nitrite and Ammonic. Finally, Results show that a third of the total samples was contaminated with Total Coliform.

The finding of research shows that there is not any contamination in drinking water samples of districts 3, 6, 9, 13, 14, 21, 22 and the drinking water of these districts of Kabul are potable. But, the drinking water of district of 1, 2, 7, 16, 18 are not potable and completely contaminated with Total Coliform. The water of these districts need filtering before it can be used as drinking water. Finally, two thirds of samples taken from districts 8, 11, 18 were contaminated with Total Coliform and need to filtering before it can be used as drinking water.

2. Effects of environmental pollution (air, water and solid waste) on mental health

The mental health of the statistical samples of research was measured by Goldberg Mental Health questionnaire. This questionnaire provides 4 levels of mental health as follow:

- Mental and physical health
- Presence of Symptoms
- Boundary of mental disorder
- Chronic and severe mental disorders.

2.1. Description of Mental Health Data

Of the total 2,205 participants in the research, 12% have reported that environment pollution had no effect on their mental health. And they their life actively despite pollution in their environment. 62% of samples have reported that pollution in their environment provided mental illness including physical symptoms; anxiety & sleep disorder; depression and their social function has also been effected by environmental pollution and led them to aggressive behaviors in social relationship. 25% of total samples have reported that pollution in their environment strongly affects them while they felt themselves sick mentally. Finally, only 1% reported having chronic and severe mental disorder as a result of environmental pollution.

Figure 1: Frequency Chart
Mental Health Level of Participants

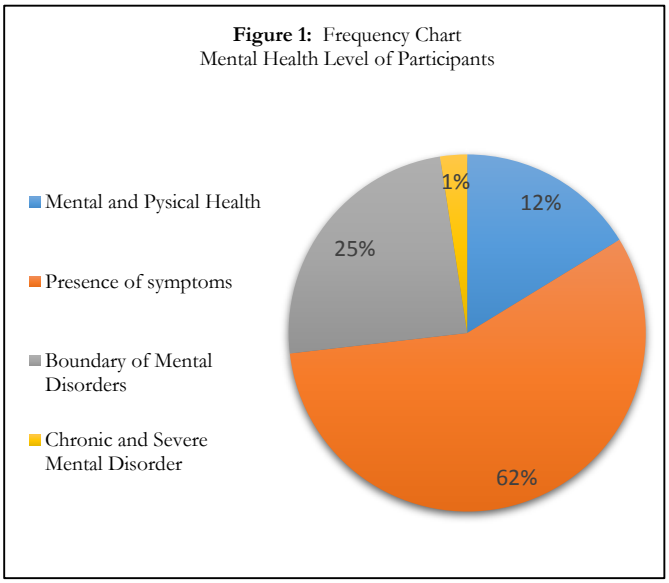
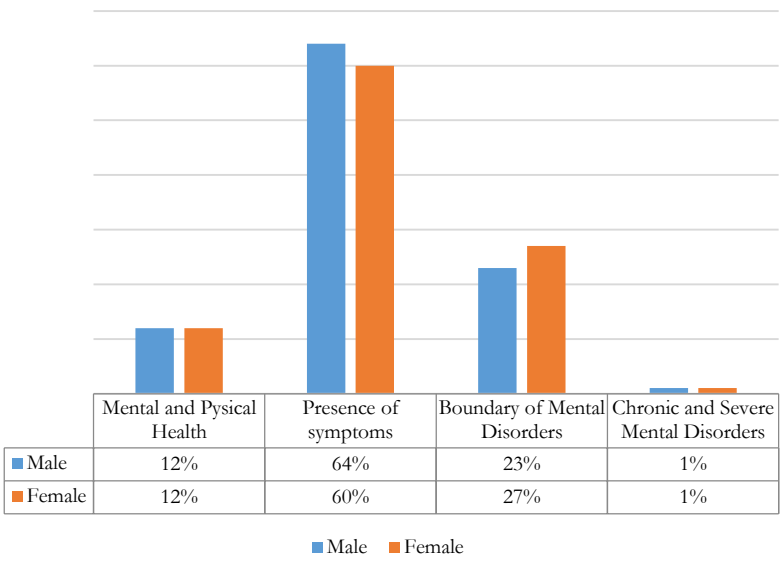


Figure 2: Comparative Chart
Metal Health Levels according to sex



	Mental and Pysical Health	Presence of symptoms	Boundary of Mental Disorders	Chronic and Severe Mental Disorders
Male	12%	64%	23%	1%
Female	12%	60%	27%	1%

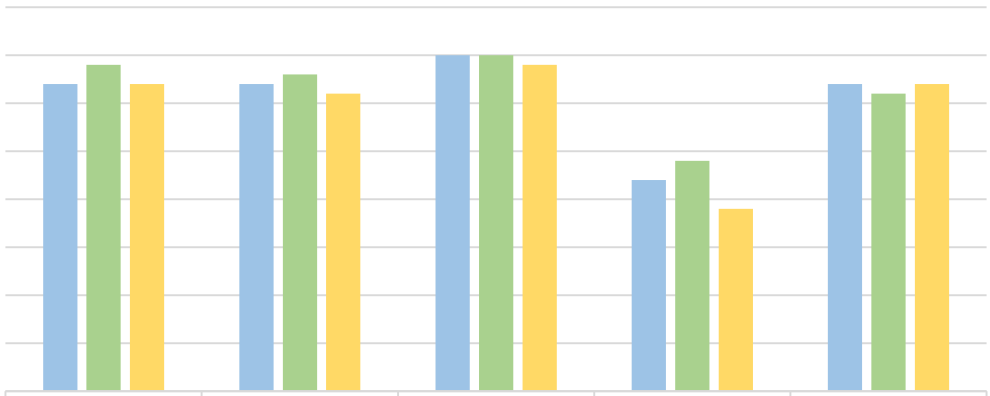
Male Female

Furthermore, no significant difference has been observed between the male and female and the environmental pollution had the same effects on the both of them. Totally, 12% of the male and female have reported that despite environmental pollution they still have good physical and mental health. 60% of female and 64% of male have reported that environmental pollution has caused them mental disorder symptoms. 27% of female and 23% of male have stated that environmental pollution has had a significant impact on them, while they felt themselves sick as a result of pollution in their environment. Finally, just 1% of the males and females have reported that the contaminations have chronically affected them, while they have lost their normal activities and need supportive services such as counseling or medical services.

2.2. Analysis of Sub-Scales of GHQ

The GHQ was developed as a screening tool to detect those who are likely to have or are at the risk of developing psychiatric disorders, the GHQ measure of emotional distress in medical setting. Trough factor analysis, the GHQ has been divided into four sub-scales; Somatic symptoms, Anxiety/Insomnia, social

Figure 3: Score distribution of particpants in each sub-scales



	Somatic Symptoms	Anxiety/Insomnia	Social Dysfunction	Severe Depression	Aggression
Total	32%	32%	35%	22%	32%
Female	34%	33%	35%	24%	31%
Male	32%	31%	34%	19%	32%

Total **Female** **Male**

dysfunction, severe depression (Goldberg 1978). The researchers of this study added the sub-scale of aggression to this test to measure the effects of environmental pollution on the intensity of aggressive behaviors.

The finding of research shows that social impairment is the most important psychological response to environmental pollution reported by the participants, because they spend more time in fulfilling their social responsibilities than the past and due to the pollution of their surroundings, they are not satisfied with their functions and performance, and do not enjoy like past.

In addition, table of frequency shows: social dysfunction is the first psychological symptom as the direct result of environmental pollution. Almost 35% of total samples have reported that environmental pollution disrupts their social function and make them more sensitive in social images—hence, they cannot enjoy doing their social tasks like they did in the past. 32% of total samples have reported that the environmental pollution found some somatic symptoms including feeling low energy, chronic headache, feeling of weakness or dizziness and hot or cold spells.

Anxiety and insomnia is the third psychological symptom of environmental pollution reported by affected people. 32% of total samples has reported which environmental pollution makes them anxious and causes sleep disorders in them including insomnia, waking up in the midst of sleep, and feeling sleepy during day.

32% of total samples have reported that they become more sensitive when they are watching environmental pollution and show aggressive behavior like physical and passive aggression. Even in the same case, they called environmental pollution as the main cause of their aggression. Finally, depression is the last psychological symptoms which is reported by participants as a result of environmental pollution. 22% of total samples reported which contamination in their environment depress them and is the cause of depressive feeling including feeling blue, lonely, dark, and loss of energy.

2.3. Inferential analysis of mental health data

A) Significant differences between the two independent groups (Districts with potable water and District with non-potable water)

Pollution		N	Mean	Std. Deviation	Std. Error Mean
Mental Health	Polluted	800	46.99	13.295	470
	Not - Polluted	700	37.31	10.663	403

Independent samples test

Mental Health	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	42.799	.000	15.412	1498	.000	9.682	.628	8.450	10.915
Equal variances not assumed			15.637	1486	.000	9.682	.619	8.468	10.897

An independent-sample test comparing the mean scores of the experimental and control groups found a significant difference between the means of the two groups ((5) = 15.412 p <.05). The mean of the experimental group was significantly lower (m = 37.31, sd = 10.633) than the mean of the control group (m = 46.92, sd = 13.295).

Therefore, water pollution can be considered as a serious threat to mental health. According to the achieved results, the mental health of residents of the districts 1, 2, 7, 8, 11, 16, 17, 18 due to biological pollution of

drinking water is lower than the mental health of residents of the districts 3, 6, 9, 13, 14, 21 and 22 that have clean and potable water. So it should be noted that people of those districts where their drinking water is not healthier have more psychological problems than the people who use healthy and potable water. As a result, water pollution is identified as a risk factor for mental health by this research.

B) Significant Difference between means according to sex

Pollution		N	Mean	Std. Deviation	Std. Error Mean
Mental Health	Male	750	43.28	13.068	.477
	Female	750	41.87	13.034	.476

Independent sample tests (men and women)

Mental Health	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.109	.742	1.802	1498	.072	1.215	.0674	-.107	2.537
Equal variances not assumed			1.802	1486	.072	1.215	.0674	-.107	2.537

An independent-samples t test was calculated comparing the mean score of females to the mean score of males. No significant difference was found ((5) = 1.802 p<.05). The mean of the female participants (m: 43.28, sd = 13.068) was not significantly different from the mean of male participants (m = 41.87, sd = 13.034). It means the water pollution has the same effect on the mental health of males and females, and there is no significant difference in their mental health scores. Consequently, both sexes are suffering the same kind of mental disorder.

3. Effects of Environmental Pollution (air, water and solid waste) on Physical Health

The following physical diseases were observed as a result of environmental pollution by this study:

A) General examination was intended for the presence of asthma, Bronchitis, allergy, Leis mania Cutaneous Food Poisoning and Visceral leis mania.
B) Blood examinations were intended for diseases of H. pylori and Typhoid.
C) Faecal examination was intended for diseases of H. Pylori, Worms (parasites), bacterial infection, undigested food, Giardia and Protozoa.

All of the above inform us of the effects of environmental pollution on physical well-being, and this fact is vibrant and clear that environmental contaminants create a wide range of physical problems. In this study, a total of 880 laboratory examinations of 131 cases of asthma, 199 cases of allergies and various exposures, 123 cases of bronchitis have been detected by general examination of participants. These diseases are the result of air pollution and are intensified by session change. Also, 158 cases of food poisoning, 47 cases of cutaneous leis mania (seizure) and 7 cases of visceral leis mania were detected. This category of diseases is caused by solid waste pollution, which provides a suitable environment for the living of various types of worms and other insects.

In addition, blood examinations of participants have identified 188 cases of H. pylori, while 139 cases of typhoid disease have been detected in participants. These diseases are caused by the pollution of water and solid waste produced gradual pain in the affected person. Above mentioned diseases can lead to multiple psychological problems by reducing the person's physical capacity as well.

In the faecal examination of participants, 188 cases of H. pylori, 149 cases of 149 kinds of worms and parasites, 15 cases of Giardia disease, 92 cases of bacterial infection, 149 cases of digestive problems and 120 cases of protozoa were identified.

Table of Frequency: Distribution of physical diseases due to environmental pollution

Sickness	Total frequency	Frequency Percentage	frequency of males	Frequency percentage of male	Female frequency	Frequency percentage of Female
General examinations						
Asthma	131	15%	73	17%	58	13%
Bronchitis	123	14%	69	16%	54	125
Allergy	199	23%	96	22%	103	23%
food poisoning	158	18%	86	20%	72	16%
Cutaneous leishmaniosis	47	6%	29	75	19	4%
Visceral leishmaniosis	7	79%	4	90%	3	./68
Blood examinations						
H. pylori	188	22%	104	24%	84	19%
Typhoid	139	16%	75	17%	65	15%
Stool examinations						
H. pylori	188	22%	104	24%	84	19%
Worms and parasites	149	17%	79	18%	70	16%
Bacterial infections	92	11%	55	13%	37	8%
Digestive problems	194	22%	106	24%	88	20%
Giardia	15	25	11	3%	4	./90
Protozoa	120	14%	72	16%	48	11%

Allergy is the most commonly diagnosed disease that is identified by general examinations in the statistical sample of the study. Allergy and bronchitis are from those diseases that can be caused by air pollution, especially due to seasonal changes in environmental pollution, and these changes also affect the mentioned diseases. Allergy with the frequency of 23% and asthma with the frequency of 15% are the most important respiratory problems that are detected due to air pollution. But the comparison data shows that males are more infected than female to respiratory illnesses as a result of air pollution.

Totally, environmental pollution affects males more than females, but this difference is not significant. Therefore, the environmental pollution aeffects both male and female equally.

Discussion and conclusion:

A) Laboratory water culture from 22 districts of Kabul city shows that 10% of the water in the studied areas are chemically polluted with Nitrate and Nitrite and all samples are physically categorized as hard water. But, totally and an average of one-third of all total samples was biologically polluted with Total Coliform, which needs filtering before being used as drinking water, and hardness of water need to be reduced as well. Long-term use of hard water can cause Kidney illnesses.

For detail, laboratory examination shows that all water samples taken from districts of 1, 2, 7, 16 are completely polluted with Total Coliform and need filtering before being used as drinking water. Also, no contamination had been observed in water of district of 3, 6, 9, 13, 14, 21, 22 of Kabul city. The drinking water of these districts are completely potable. In addition, two thirds of samples taken from district of 8, 11 and 17 are biologically

contaminated and need filtering before being used as drinking water. Meanwhile, total coliform has been observed in one sample of three cultivated water samples from district of 4, 5, 10, 12, 15, 19 and 20.

Solid waste pollution has also been observed alternately in all districts due to the lack of a waste disposal system. Researchers were not able to measure the air pollution because of the lack of measurement facilities in Afghanistan.

B) Description data shows; environment pollution can cause mental disorders like physical symptoms of mental disorders, anxiety/insomnia, severe depression and aggression. It has negative effects on social function of affected people as well. But no significant difference has been observed between male and female, and environmental pollution have the same psychological effects on both male and female.

Totally, all districts are equally affected by environment pollution but the mental disorder has been observed more in districts where citizens use unhealthy water.

Based on descriptive data, environmental pollution intensifies the following psychological disorders; social dysfunction, somatic symptoms, anxiety/insomnia, aggression and depression.

The role of statistical description is to collect, summarize and describe the achieved quantitative data from statistical samples. But the researchers do not limit their work to describe data, rather they try to expand their finding to the larger similar group of society. Therefore, inferential statistics is usually used for generalizing data from statistical samples to society samples and based on the nature of this study we use from (t test) as tool to find the significant difference between variables of research.

Inferential statistic shows: an independent-sample t test comparing the mean scores of the experimental and control groups found a significant difference between the means of the two groups ((5) = 15.412 p <.05). The mean of the experimental group was significantly lower (m = 37.31, sd = 10.633) than the mean of the control group (m = 46.92, sd = 13.295). Therefore, water pollution can be considered as a serious threat to mental health. According to the achieved results, the mental health of residents of the districts 1, 2, 7, 8, 11, 16, 17, 18 due to biological pollution of drinking water in these districts is lower than the mental health of inhabitants of districts 3, 6, 9, 13, 14, 21 and 22 that have good and drinkable water. So, it should be noted that people of those districts whose drinking water is not healthier have more psychological problems than the people who use healthy and potable water. As a result, water pollution identified as risk factor for mental health by this research.

In addition, an independent-sample t test was calculated comparing the mean score of females to the mean score of males. No significant difference was found ((5) = 1.802 p<.05). The mean of the female participants (m: 43.28, sd = 13.068) was not significantly different from the mean of male participants (m = 41.87, sd = 13.034). It means, the water pollution has the same effect on the mental health of males and females, and there is no significant difference in their mental health scores. Consequently, both sexes are suffering the same kind of mental disorder.

Overall, the result of descriptive and inferential analysis of the mental health data shows that environmental pollution has reduced the mental health of affected people, and based on achieved results this study identified air, water and solid waste pollution as risk factors for mental health, which could embroil people with psychological problems.

C). General physical health examinations show that environmental pollution is causing numerous physical problems and has negative effects on mental health. Asthma, bronchitis and allergies are the most important diseases that happen or are intensified by air pollution and disrupt the function of breathing system. The interesting point is that air pollution has more effect on male than female because male spend more time out of home and are exposed to pollution more than female.

Water and solid waste pollution are causing several diseases including food poisoning, H. pylori, typhoid, cutaneous and visceral leishmaniosis, infection, bacteria, Giardia, digestive problems, protozoa, worms and

parasites identified by faecal and blood examination of participants. The mentioned diseases are associated with severe physical pain and are observed in one third of the participants.

Based on the achieved data, we concluded that environmental pollution can affect physical health especially they cause breathing and digestive problems, physical infection, worms and parasites. Finally, polluted air, solid waste and water pollution are the risk factors for physical health which can afflict exposed people with widespread physical illnesses.

RECOMMENDATIONS

The research on environmental pollution and its effect on health has provided recommendations for changing environment and making it clean and more suitable for living as follows:

- This research combined three ideas together. Actually, the necessity of single research idea is clear to prevent result dispersal and keep internal constancy; therefore, the researchers suggest all ideas of this research to be redefined and conducting more research with specific budget and time for instance: "Research on Psychosocial effect of environmental pollution" or "Research on water pollution and its effects on physical health."
- This research was just implemented in Kabul province, so the finding of research cannot be generalized to the national level. In addition, due to research limitations, even we must take care of the result generalization to all villages of 22 districts of Kabul province; therefore, it is necessary to carry out this research at the national level for providing generalization possibility of results,
- Designing and running advocacy programs based on research findings with the goal of providing clean environment without any contamination,
- Building the capacity of community on negative impacts of environmental pollution on health with the goal of mobilizing all members of community to provide clean and green environment,
- Designing and running awareness raising campaign to inform community on risks and disadvantage of environmental pollution and involve them in process of cleaning city,
- Making short video clips/documentary and invest on media awareness raising programs to encourage community to keep their environment clean, such programs help community to provide green environment free of any contamination,
- Attempts to bring positive changes in life style of community by expanding research programs and raising awareness of community based on finding of this research and future findings.
- The green and clean family can provide clean community free of pollution. The necessity of investigation on families is clear. Such programs build families' capacity on cleanliness of life environment and help them to provide clean and green families.
- Restoration of and sanitary attempts to clean up dump sites and sanitation of the disposal system
- Control and limit the production process of pollution, such as modifying the existing technology of industrial units, providing the standard dumping sites for industrial and urban wastes, more attention to the educational aspects of expulsion system, codifying reliable standards for industrial and agricultural units.
- Long-term solutions including designing and implementing system for collecting dumps, providing urban and industrial sewage, purifying drinking water through using different methods of eliminating pollution.
- Providing training programs based on proper usage of resources and prevention of environmental pollution
- Developing comprehensive management system for polluted resources including removing contaminated sources from consumption cycle or reducing resources utilization which are at the risk of contamination.

LIMITATION

- This study consists of complicated subject (physical & mental health) and pollution.
- Time & budget limitation
- The researchers of this study had to use different methodology and tools for data collection and analysis.
- Accessibility hardship to statistical sample especially women
- Expensive study with limit budget
- Lack of similar research and access to recourses

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