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Examining the Causes and Magnitude of Pollution's Effect on the Human Health

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ABSTRACT:

This study was conducted to know the effect of pollution on human health. The objectives of the study were to investigate the opinion of school teachers concerning to effect of pollution on the environment and health. The population consisted of all the teachers of secondary schools in Dera Ismail Khan. Eighth male secondary schools in Dera Ismail Khan were selected through convenient sampling with a total of 80 respondents through a simple random sampling technique. The study established the opinion that people are aware and there is a growing concern among them regarding the relations and impact of pollution on humans as well as animals. The need of the time is to create more awareness to care for mother earth through responsible social behavior and living by following the 3-R principle to reduce waste, reuse, and recycle the available resources and products to prevent and minimize the harmful effects of pollution.

Keywords: Pollution, Environmental, and Health Effects, Responsible Social Behavior, 3-R Principle.

Introduction

Pollution has been a major problem issue in recent times. It has a serious toxicological impact on human health. Anthropogenic air pollution is 500 years old. The industrial revolution introduced technology and services; and started mass production and emissions of pollutants. SO2 (Parajuli, Lee, & Shrestha, 2016; Fares, Vargas, Detto, Goldstein, Karlik, & Paoletti. *et al*., 2013; Emberson, Pleijel, Ainsworth, den Berg, Ren, & Osborne, *et al*., 2018). The smoke from burning fossil fuels is considered to be the major pollutant and have lasting harmful impact on human health. (Alexopoulos, Plessas, Kourkoutas, Stefanis, Vavias, & Voidarou, *et al*., 2017). Pollutants are causing serious health issue (Castelli & Sulis, 2017; Zhang, Yang, Li, Qian, Xiao, & Wang *et al*., 2019). Different diseases, from respiratory to cardiac ailments, in different degrees of severity from minor irritation to death could be attributed of our exposure to the pollutants (Pathak, Wang, Ho, & Lee, 2011; Gauderman, *et al*., 2002). The objectives of this study were to investigate the opinion of teachers concerning the impact of pollutants on the human health.

Literature Review

The increasing human activities and release of poisonous substances cause environmental pollution, for example, automobiles, power plants, heavy industry, etc. These activities at a mass scale contribute to air, land, and even noise pollution (Castelli & Sulis, 2017). The effects of pollutants on living organism is not affecting only humans but rather equally harmful to animals too (Castelli & Sulis, 2017). Environmental pollution has changed the climate pattern resulting in climate uncertainty, and catastrophic dangers to living beings. Each person is affected by air pollutants in one way or another other thus, every one of us is at risk, especially those who are more vulnerable and are older age (Wilson *et al.* 1996). The best example of varying individual risks was explained in a study that evaluated maximum expiratory flow among healthy children, and children with the minor respiratory disease along with those who were suffering from asthma, without and with pharmacological management. They were exposed to different environmental pollutants. The study found a correlation between exposure and disease among children with asthma under pharmacological cure (Guo, Zeng, Zheng, Li, Pereira, Liu, *et al*., 2017).

Environmental Damages

From an ecological perspective, air pollution is a serious environmental issue. It not only damages the soil but also the air and water, and is considered a big threat to the diversity of life. Samet *et al*. (2003) and Emberson, Pleijel, Ainsworth, den Berg, Ren, & Osborne, *et al*. (2018) reported that air pollution and extinction of the species, eliminating the diversity and have adverse impacts on the environment as contaminants. The acid rain, inversion of temperature, and global warming due to the emissions of greenhouse gasses into the earth's atmosphere also indicate major ecological impacts of air pollution.

Health Effects due to Acute Exposure to Air Pollutants

The toxic impacts attributable to the desperate exposure to air pollutants have been reported by several researchers since the inception of the industrial revolution associated with high levels of pollutants which have doubled the respiratory and heart diseases inter alia deaths (Burroughs Peña & Rollins (2017). Studies have reported the increase in total mortality being associated with exposure to environmental pollution, ozone, and sulfates (Emberson, Pleijel, Ainsworth, den Berg, Ren, & Osborne, *et al*., 2018). It has been found that increasing mortality is attributed to respiratory complications since were exposed to air pollution. Many researchers also claim an increase in death due to cardiovascular diseases associated with environmental issues (Alexopoulos, Plessas, Kourkoutas, Stefanis, Vavias, & Voidarou, *et al*., 2017; Gauderman, *et al*., 2002). Certain population groups, for instance, older and infants are more vulnerable, studies have found an association between increased mortality and exposure to PM and sulfates (Castelli & Sulis, 2017). Several other complications have also been reported attributed to the air pollutants, especially respiratory tract diseases both in the upper and lower inter alia bronchitis, cough, chronic obstructive pulmonary disease, and pneumonia.

Health Effects due to Chronic Exposure to Air Pollutants

Recently studies are focusing more to investigate the effects of chronic exposure over prolonged periods. There is a consensus among scientists concerning chronic exposure and its extreme effects on human health, yet it will be hard to establish a single agent responsible for cancer because cancer develops over a long time and involves numerous interacting factors too (Eze, Schaffner, Fischer, Schikowski, Adam & Imboden, *et al*., 2014; Emberson, Pleijel, Ainsworth, den Berg, Ren, & Osborne, *et al*., 2018). Increased respiratory diseases have also been found related to chronic exposure. Nearly 80% of all cancer types happen because of our exposure to atmospheric pollutants. For example, the mutagenic properties of various elements like diesel have been found one of the main causes since change is a vital stage in the mutation of a normal cell to a malignant cell. Here is a mutagenic ability of an element responsible to stimulate cell transformation that leads to cellular transformation and cancer (Fares, Vargas, Detto, Goldstein, Karlik, & Paoletti, E., *et al*., 2013). In a study volunteers were exposed to ozone with and without pre-exposure to H2SO4 reported that the pre-exposed group suffered more than the group that was not pre-exposed to the severe toxic effects (Guo, Zeng, Zheng, Li, Pereira, Liu, *et al*., 2017).

Ozone

Although Ozone is an ill- soluble but highly reactive gas that exits in the troposphere produced by a chain of a sunlight-driven reaction through the mechanism of nitric oxides and volatile organic compounds (Eze, Schaffner, Fischer, Schikowski, Adam & Imboden, *et al*., 2014). It might react with uric acid secreted by the human airway's submucosal glands in mmol/l concentrations in nasal surface liquids (Fares, Vargas, Detto, Goldstein, Karlik, & Paoletti, *et al*., 2013). Some of the toxic products of the later reaction (hydroxy hydro peroxides, hydroxy aldehydes) significantly mediate ozone effects on the underlying epithelium, which according to scientific findings implies that ozone per se reaches the epithelial cell apical membrane in conducting airways (Glantz, 2002). The quantity of ozone uptake attributed to surface liquid decreases progressively as the surface liquid thins and/or its reactivity with ozone contracts. Thus, the upper epithelial tissue results in a lethal bronchiole-respiratory bronchiole region (Kaun & Uldam, 2017; Lumley & Sheppard, 2002).

Method

This study followed a descriptive design and a survey method was employed. The population comprised all the teachers at public secondary schools of DIKhan. A convenient sampling technique was used in selecting the schools and simple random sampling was used for sampling. Fifty teachers and fifty parents of secondary schools were a sample of the study. Since the study followed a survey, therefore, a self-administered questionnaire was used based on a five-point Likert scale. The questionnaire was administered to 20 accessible representative samples for the pilot study. Some difficult and ambiguous nature items were removed from the questionnaire and the final 15 items were in the final study.

Findings and Discussion

Table 1

Air pollution effect on human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	12	50	8	10	0	80
Percentage	15%	62.5%	10%	12.5%	0%	100%

The majority of respondents i.e., teachers 77.5% agreed that Air pollution affects human health. However, few of the respondents i.e., teachers 12.5% disagreed. Some of them few of the respondents i.e., teachers 10% could not decide in favor or against.

Table 2

Harmful gases' effect on human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	12	58	6	4	0	80
Percentage	15%	72.5%	7.5%	5%	0%	100%

The majority of respondents i.e., teachers 87.5% agree that harmful gases affect human health. However, few of the respondents i.e., teachers 5% disagreed. As some of the respondents i.e., teachers 7.5% could not decide in favor or against.

Table 3

Through air pollution, skin diseases increased.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	8	50	12	10	0	80
Percentage	10%	62.5%	15%	12.5%	0%	100%

The majority of respondents i.e., teachers 72.5% agree that through air pollution skin diseases increased. However, few of the respondent's i.e., teachers12.5% disagreed. As some of few of the respondents i.e., teachers 15% could not decide favor or against.

Table 4

Dust effect on human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	10	50	12	8	0	80
Percentage	12.5%	62.5%	15%	10%	0%	100%

The majority of respondents i.e., teachers 75% agreed that dust affects human health. However, few of the respondents i.e., teachers 10% disagreed. As some of few of the respondents i.e., teachers 15% could not decide favor or against.

Table 5

Not proper cleanliness of the road effect on human health

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	9	60	6	5	0	80
Percentage	11.25%	75%	7.5%	6.25%	0%	100%

The majority of respondents i.e., teachers 86.25% agree that not proper cleanliness of the road effect human health. However, few of the respondents i.e., teachers 6.25% disagreed. Some of them few of the respondents i.e., teachers 7.5% could not decide in favor or against.

Table 6

Industrial waste materials' effect on human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	10	50	10	10	0	80
Percentage	12.5%	62.5%	12.5%	12.5%	0%	100%

The majority of respondents i.e., teachers 75% agreed that Industrial waste materials affect human health. However, few of the respondents i.e.,teachers 12.5% disagreed. Some of them few of the respondents i.e., teachers 12.5% could not decide in favor or against.

Table 7

Mining activities affect human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	8	54	8	10	0	80
Percentage	10%	67.5%	10%	12.5%	0%	100%

The majority of respondents i.e., teachers 77.5% agree that Mining activities affect human health. However, few of the respondents i.e., teachers 12.5% disagreed. Some of them few of the respondents i.e., teachers 10% could not decide in favor or against.

Table 8

Transportation noises from vehicles affect human health.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	8	56	10	6	0	80
Percentage	10%	70%	12.5%	7.5%	0%	100%

The majority of respondents i.e., teachers 80% agreed that Transportation noises from vehicles affect human health. However, few of the respondents i.e.,teachers 7.5% disagreed. Some of the respondents i.e., teachers 12.5% could not decide in favor or against.

Table 9

Transportation noises from vehicles affect human listening ability.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	12	50	8	10	0	80
Percentage	15%	62.5%	10%	12.5%	0%	100%

The majority of respondents i.e., teachers 77.5% agree that Transportationnoises from vehicles affect human listening ability. However, few of the respondents i.e., teachers 12.5% disagreed. Some of them few of the respondents i.e.,teachers 10% could not decide in favor or against.

Table 10
Sleeping disorder developed through noise pollution.

Options	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Teachers	10	52	8	10	0	80
Percentage	12.5%	65%	10%	12.5%	0%	100%

The majority of respondent's i.e., teachers 77.5% agreed that sleepingdisorders are developed from noise pollution, while 12.5% disagreed. Likewise, 72.5% opined that air pollution has increased skin diseases and 12.5% disagreed. 75% considered dust detrimental to human health. Similarly, 86.25% thought that irresponsible trash behavior and untidiness also affect human health, and around 75% accounted for industrial waste as more detrimental; likewise, 77.5% also considered mining activities being the cause of pollution. Around 77.5% of respondents believed that the noise of vehicles causes listening disability and the same numbers also consider is it for sleepingdisorders inter alia 73.75% considered noise as a barrier to effective communication. As for as land pollution is concerned, 80% were of the view land pollution is also damaging human health since we are dependent on the produce from the soil. Light waves affect human health according to 77.5% of respondents. 77.5% showed concerns for climate change and 80% helped responsible pollutants for respiratory, skin, and cancerous diseases.

Conclusion and Recommendations

Based on the findings it is concluded that the majority of respondents agree that air pollution has serious effects on human health. Diseases out of air pollutants are increasing with every spell of the moment. Industrial waste, emission of poisonous smoke from vehicles, burning of fossil fuel, and soil erosion are responsible for climate change and increasing rate of diseases and death inter alia noise pollutants. Noise pollution affects human listening ability, resulting in sleeping disorders and leading to psychological and physical health issues besides respiratory system damage. The need of the hour is to create awareness among the masses to preserve our mother earth through responsible living by observing the three 3-RRR principles reduce waste, reuse, and recycle the products and resources.

References

Alexopoulos, A., Plessas, S., Kourkoutas, Y., Stefanis, C., Vavias, S., & Voidarou, C., *et al*. (2017). Experimental effect of ozone upon the microbial flora of commercially produced dairy fermented products. *Intl J Food Microbiol*, 246: 5-11.

Burroughs Peña, M.S., & Rollins, A. (2017). Environmental exposures and cardiovascular disease: A challenge for health and development in low- and middle-income countries. *Cardiol Clin*. 35: 71-86.

Castelli, F., & Sulis, G. (2017). Migration and infectious diseases. *Clin Microbiol Infect*. 23: 283-9.

Emberson, L.D., Pleijel, H., Ainsworth, E.A., den Berg, M., Ren, W., & Osborne, S., *et al*. (2018). Ozone effects on crops and consideration in crop models. *Eur J Agron*., 100: 19-34.

Eze, I.C., Schaffner, E., Fischer, E., Schikowski, T., Adam, M., Imboden, M., *et al*. (2014). Long- term air pollution exposure and diabetes in a population-based Swiss cohort. *Environ Int*., 70: 95-105.

Fares, S., Vargas, R., Detto, M., Goldstein, A.H., Karlik, J., & Paoletti, E., *et al*. (2013). Tropospheric ozone reduces carbon assimilation in trees: estimates from analysis of continuous flux measurements. *Glob Change Biol*., 19: 2427-43.

Gauderman, W. J., *et al*. (2002). Association between air pollution and lung function growth in southern California children. Results from a second cohort. *American Journal of Respiratory and Critical Care Medicine*, 166: 76-84.

Glantz, S. A. (2002). Air pollution as a cause of heart disease: Time for action. *Journal of the American College of Cardiology*, 39: 943-945.

Guo, Y., Zeng, H., Zheng, R., Li, S., Pereira, G., & Liu, Q. *et al*. (2017). The burden of lung cancer mortality attributable to fine particles in China. *Total Environ Sci*., 579: 1460-6.

Kaun, A., & Uldam, J. (2017). Digital activism: after the hype. *New Media Soc*., 20: 2099-106.

Lindh, E., Argentini, C., Remoli, M.E., Fortuna, C., Faggioni, G., & Benedetti, E., et al. (2019). The Italian 2017 outbreak Chikungunya virus belongs to an emerging Aedes albopictus-adapted virus cluster introduced from the Indian subcontinent. *Open Forum Infect Dis*, 6: ofy321.

Lumley, T., & Sheppard, L. (20023). Time series analyses of air pollution and health: Straining at gnats and swallowing camels? *Epidemiology*, 14: 13-14.

Manucci, P.M., & Franchini, M. (2017). Health effects of ambient air pollution in developing countries. *Int J Environ Res Public Health*, 14: 1048.

Marlon, J.R., Bloodhart, B., Ballew, M.T., Rolfe-Redding, J., Roser-Renouf, C., & Leiserowitz, A. *et al*. (2019). How hope and doubt affect climate change mobilization. *Front. Commun*. 4: 20.

Parajuli, I., Lee, H., & Shrestha, K.R. (2016). Indoor air quality and ventilation assessment of rural mountainous households of Nepal. *Int J Sust Built Env*. 5; 301-11.

Pathak, R.K., Wang, T., Ho, K.F., & Lee, S.C. (2011). Characteristics of summertime PM2.5 organic and elemental carbon in four major Chinese cities: Implications of high acidity for water- soluble organic carbon (WSOC). *Atmos Environ*., 45: 318-25.

Samet, J. M. *et al*. (2003). New problems for an old design: Time series analyses of air pollution and health. *Epidemiology*, 14: 11-12.

Stansfeld, S.A. (2015). Noise effects on health in the context of air pollution exposure. *Int J Environ Res Public Health*, 12: 12735-60.

Zhang, L., Yang, Y., Li, Y., Qian, Z.M., Xiao, W., & Wang, X. *et al*. (2019). Short-term and long-term effects of PM2.5 on acute nasopharyngitis in 10 communities of Guangdong, China. *Sci Total Env*, 688: 136-42.