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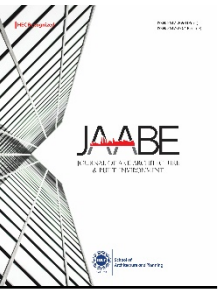

Title:	**Analysing and Enhancing the Level of Awareness about Air Quality among the Teenagers to Achieve Healthier Environment in Lahore**
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Analysing and Enhancing the Level of Awareness about Air Quality among the Teenagers to Achieve Healthier Environment in Lahore

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Abstract

Urban areas have witnessed a rapid increase in population all around the globe during the last few decades. Pakistan has also experienced rapid urbanization which has depleted available resources and created many challenges. These include an unplanned urban sprawl, long travel distances within the city, and the destruction of natural environment. Undoubtedly, among all the issues the city of Lahore is currently facing, poor air quality appears at the top of the list. The deprivation of trees and agricultural land, pollution generated by the construction of housing societies and road networks, and smoke emitted from motor vehicles and factories are some of the major factors contributing to air pollution in Lahore. The study aims to assess the air pollution awareness among the teenagers of Lahore city. Keeping in view the fact that air pollution has increased cardiac and respiratory diseases, it is important to educate the masses to improve air quality for a healthier and liveable environment. The government should introduce more effective legislation to control pollution; however, it needs consistent support from citizens, architects, builders, and all other stakeholders for its successful implementation. Educational institutions and media can play a significant role in creating awareness through education and positive campaigning. At the end, the study discusses how people can positively contribute to the solution when they come to know the intensity of the problem and its harmful effects.

***Keywords*:** air pollution, environmental awareness, environmental education, healthier environment, improved health and lifestyle, sustainable design

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Introduction

Air pollution is a major concern all over the world because of its linkage to a variety of diseases which cause approximately 16% of premature deaths, worldwide (Fuller et al., 2022). According to World Health Organization (WHO), air pollution is an unequivocal carcinogen that may lead to numerous problems, such as acute and chronic bronchitis, pneumonia, asthma attacks, and respiratory symptoms (World Health Organization [WHO], 2000). To curb this issue, effective communication techniques must be utilised to provide education and motivate individuals to take steps which reduce the health problems related to air pollution (Riley et al., 2021). Hence, instead of generalized statements regarding air quality being poor, it would be more beneficial if information is provided regarding the increased risk of breathing problems or respiratory diseases due to increased exposure to bad air quality. Such information must be passed on to all /segments of a population that may differ linguistically and based on income groups or culture. The low-income groups particularly are more in need of such information (Ramírez et al., 2019).

Research shows that poor air quality can be correlated to the high number of emergency and hospitalization cases recorded for cardiovascular and respiratory diseases (Lee et al., 2014). Therefore, exposure to poor air quality must be reduced for a healthier population (Cisneros et al., 2017). This can be achieved only when the public is accurately informed regarding the quality of air in their surroundings regularly.

Another way to improve the understanding of air quality indicators is through their better reporting (Franceschini et al., 2005). For instance, the current reports mention the levels of certain pollutants or simply answer 'air quality is poor'. This can be changed by incorporating more technical and measurable impacts of poor air quality (Wiederkehr & Yoon, 1998). This could be achieved by correlating the impacts of air quality with the diseases most prone to poor air quality (Ramírez et al., 2019). Air quality standards must be established so it can be understood which places are performing better and which are not. These standards can then be used for various industries as benchmarks, for instance, the level of emission cars can produce or the quality of fuel to be used in vehicles to ensure the good air quality in the country.

This research aims to gauge the level of awareness of air quality information in the society and to understand the associated challenges of interpreting such information. For this purpose, this study assesses teenagers' perception of air quality, air pollution level and its measurement techniques, whether the air pollution indexes are easy to understand, and the type of information they require to improve their understanding of air quality (Beaumont et al., 1999; Smallbone, 2012).

Methodology

A quantitative survey was carried out to gather the views of the teenagers of Lahore, Pakistan. The questionnaire was circulated to several experts and professionals and some necessary changes suggested by the respondents of the pilot test were incorporated immediately. The responses obtained through the questionnaire survey were first tested for their reliability. For this purpose, Cronbach's alpha was calculated to determine the internal consistency of responses. The value of Cronbach's alpha was 0.935, which is satisfactory for all the responses gathered. A total of 300 questionnaires were circulated in hard form to the targeted population and the responses were received with an excellent response rate of above 90% within a specified time frame.

This research focuses on teenagers due to the pivotal stage in their lives when they are actively exploring future career options. By assessing the awareness of air quality and pollution within this age group, we can significantly contribute to nurturing a generation of young individuals who are well-equipped to address the pressing issue of air quality. Poor air quality affects the younger or the older population the most (Kim et al., 2017). It is in the hands of the youth to tackle this problem, understand its root causes, and then come up with solutions. Another benefit of targeting this age group is that it would reflect the level and quality of the curriculum as well as the mindset of the faculty involved to teach teenagers in addressing global problems such as air pollution (Güç et al., 2018). The link between youngsters' awareness of air quality knowledge and the education curriculum is evident: a well-designed school curriculum and effective teaching methodology are essential in shaping young minds, and their optimization can significantly enhance the efficient resolution of air quality-related issues.

Figure 1

The Air Quality Levels of Lahore, Pakistan

Note. Source: www.iqair.com, taken on November 11, 2021

The survey questionnaire was concise and to the point with few open-ended questions. The queries were focused on judging the level of information about air quality that the teenagers possess, the impact of legislation affecting air quality, and the different air quality indexes with which air quality is measured (Hayes & Chatterton, 2009). Questionnaires were disseminated among teenagers residing in Lahore to gain insights into their perceptions of air quality. This information will shed light on the effectiveness of air quality communication channels for this age group and facilitate the identification of key factors responsible for raising awareness among them.

The existing research postulates that air quality has improved in those countries where effective legislation has been passed and imposed to ensure it.

However, the research carried out with questionnaires has its limitations and its vital that these are discussed with clarity (Kader, 1994). As per the

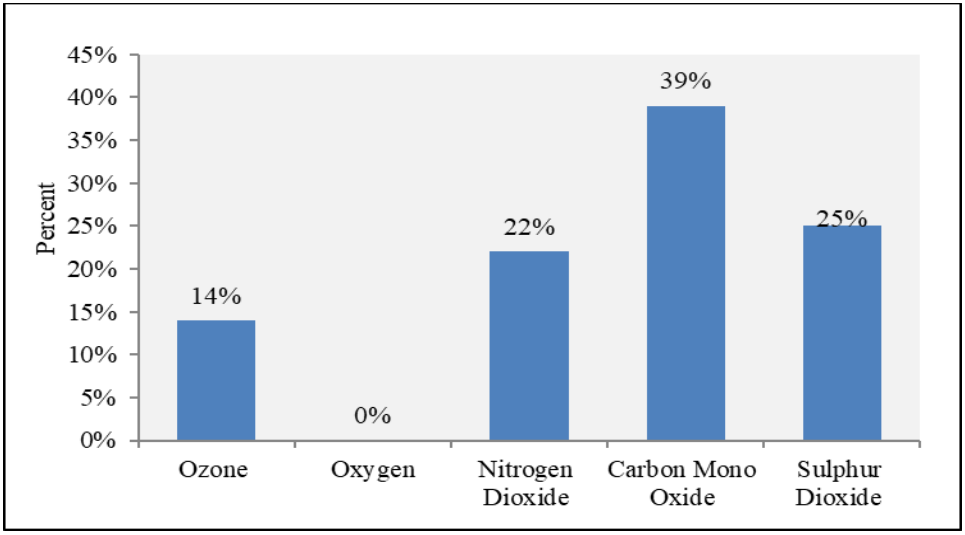
results received from the respondents, their knowledge regarding air quality are qualitative factors and should be dealt with care since one respondent's perception of poor air quality or lack of its understanding can significantly differ from the other. This indicates a need for the responses to be more objective. Although, when asking for people's opinions, subjectivity is inevitable. This can be tackled by choosing a large sample randomly so that more accurate information can be received about people's perceptions and knowledge about air quality. Moreover, it is also important to understand whether the sample chosen for the survey is truly representative of the entire population. This was dealt with in this research by choosing a large enough sample (Oltra & Sala, 2018).

Results and Discussion

A pilot test was conducted to comprehend the reliability and validity of the questionnaire. After confirming the consistency of data through reliability test, it was further analyzed and the following graphs were prepared to elaborate the responses of the audience.

Figure 2

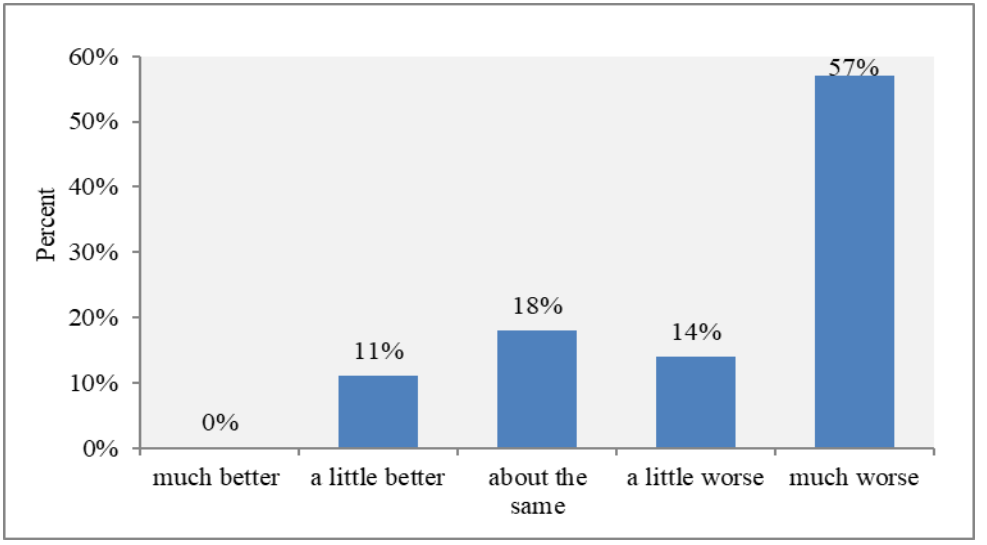
Most Common Air Pollutants



Carbon monoxide was rated as the most common air pollutant as per the responses received and evaluated. Hence, becoming a major hazard for the health and environment.

Figure 3

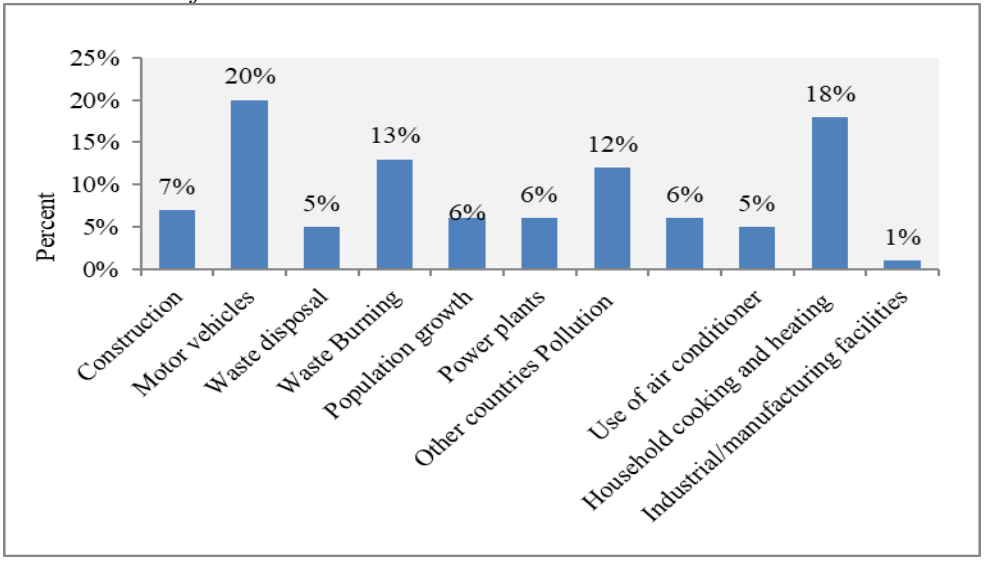
Overall Rating of Air Quality



More than 70% of the respondents believed that the air quality in Lahore overall is below the acceptable standards and is not suitable for the environment. Hence, they rated it as 'little worse' to 'much worse'.

Figure 4

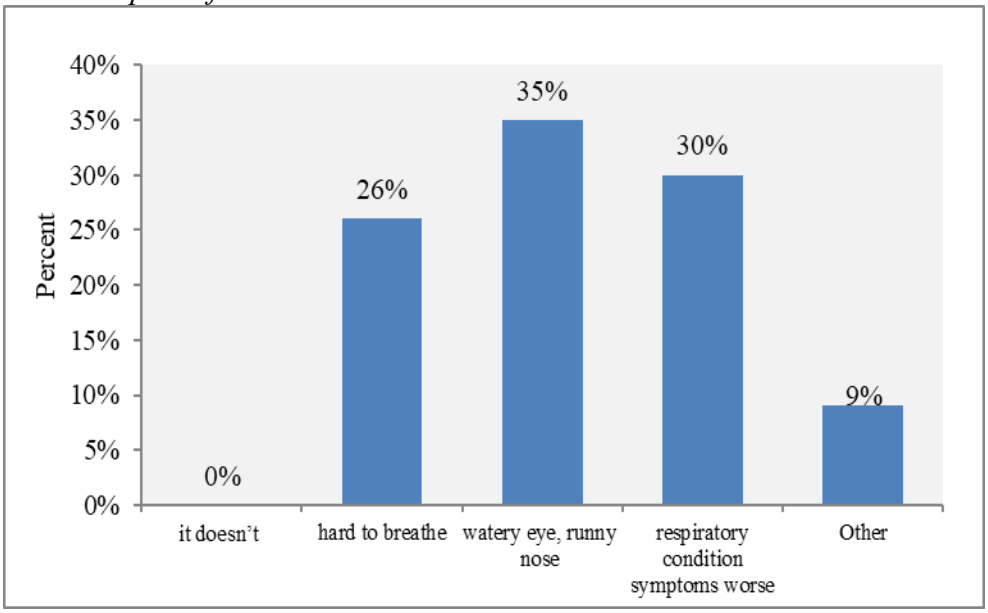
Main Causes of Air Pollution



Pollutants emanating from the smoke of motor vehicles as well as household cooking and heating were considered as the main causes of air pollution by the respondents. This happened because the number of households and automobiles in Lahore have increased exponentially in recent times, due to the enormous increase in the population of the city.

Figure 5

Health Impact of Air Pollution



The citizens of Lahore have been facing multiple health related issues for the last few years and understand from where they originate. As per the analysis, air pollution has affected greatly the human eyes, nasal track, and respiratory system, as compared to its other bad impacts on the human health.

Figure 6 depicts that during the early hours of the day, air pollution is usually at its peak and mostly occurs because of the heavy loads of vehicular traffic and domestic cooking. This has been linked also with the earlier responses shown in Figure 4 (*Main Causes of Air Pollution*). In the morning time, extreme traffic congestion is witnessed on the roads as people rush for schools, colleges, offices, and other personal or professional commitments.

Figure 6

Time of the Day with Maximum Air Pollution

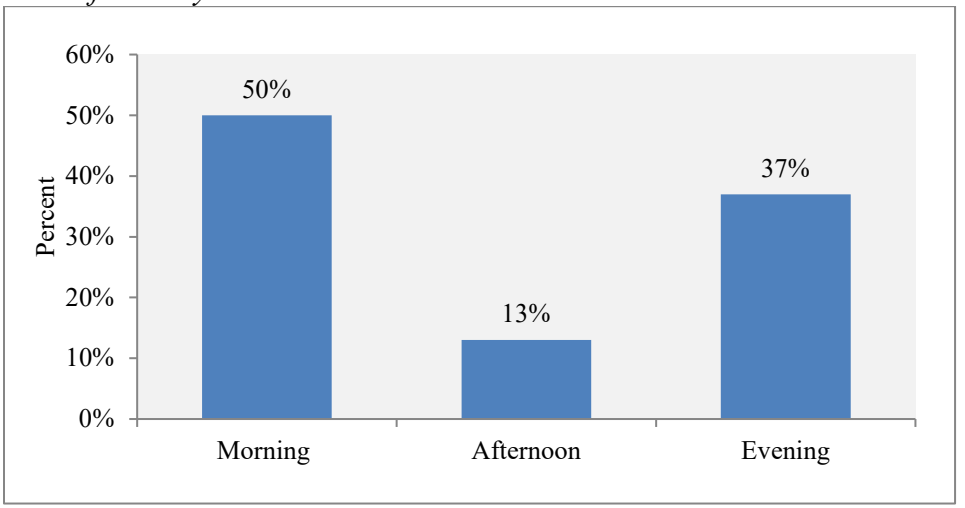
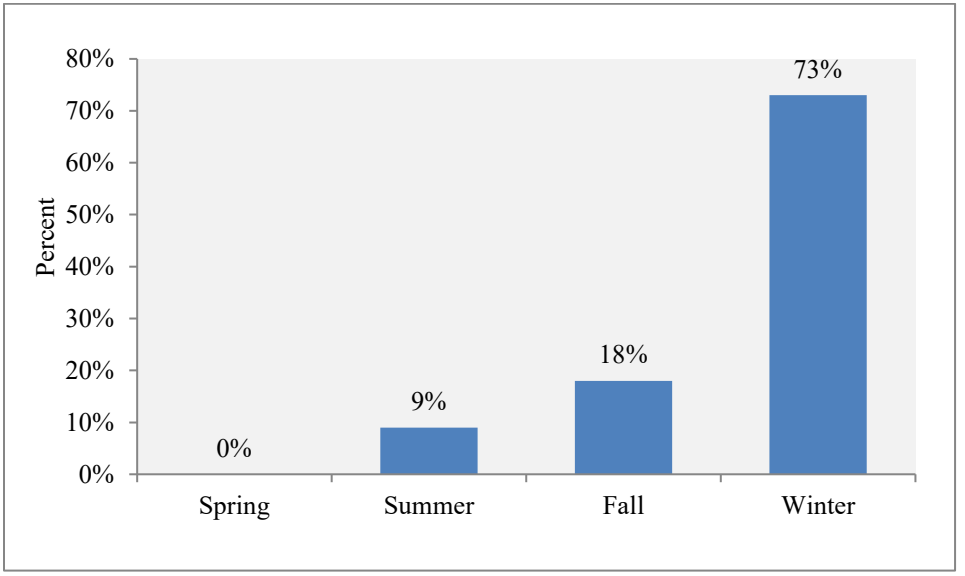


Figure 7

Time of the Year with Maximum Air Pollution



Among all the seasons, winter is considered as the one which brings with it maximum air pollution and that too with quite a high intensity (refer to Figure 7). The respondents believed that the air quality has worsened

during recent years and it ranges from 'normal' to 'very severe' during the winter season, both in the morning and evening (refer to Figure 8 below).

Figure 8

Severity of Air Pollution

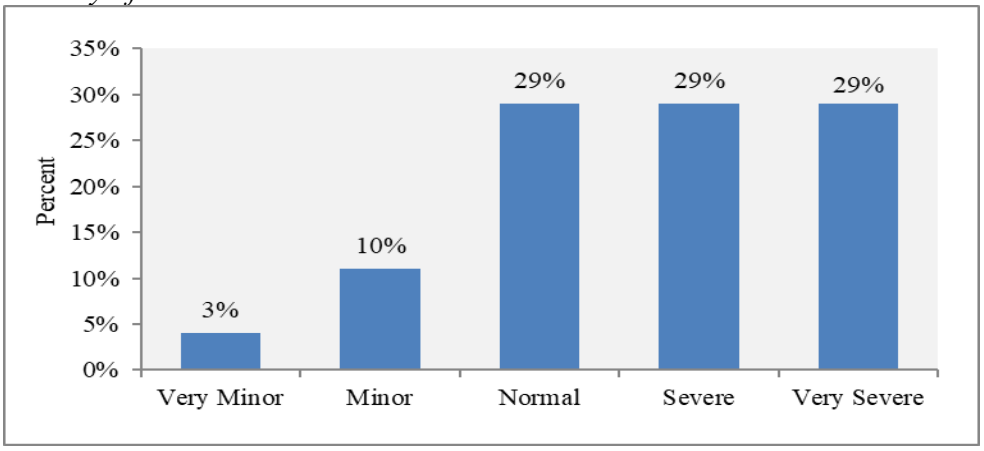
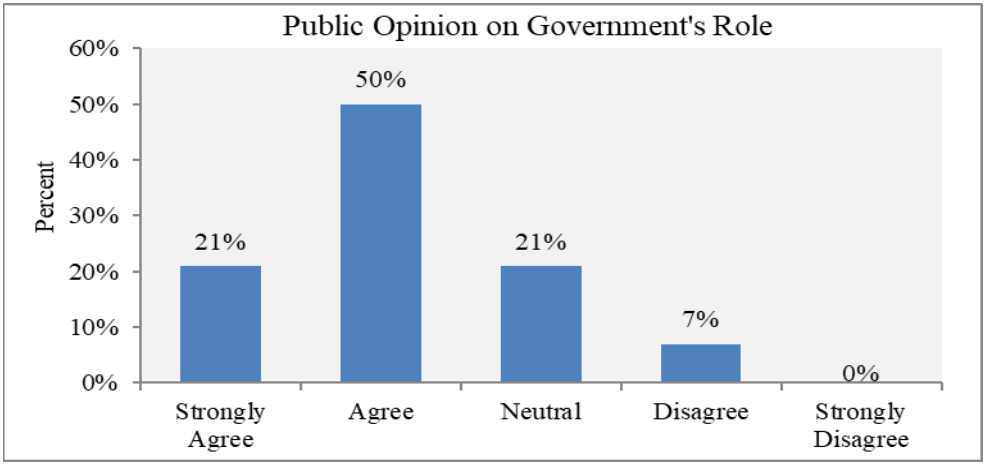


Figure 9

Government's Role towards a Better Environment

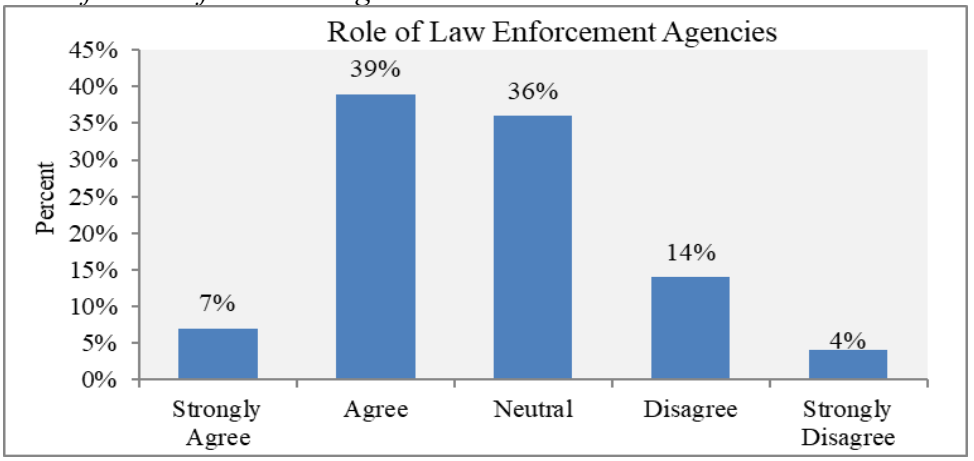


The respondents were asked about their opinion regarding the role of government and how eager they are about making improvements in the system, laws, policies, and the society. The people expressed their concern in this regard. The majority of the respondents said that government agencies carry a great responsibility. Hence, they should take measures to promote and encourage a healthier environment (refer to Figure 9).

The respondents expounded that they were willing to pay slightly higher taxes if the government could ensure better air quality.

Figure 10

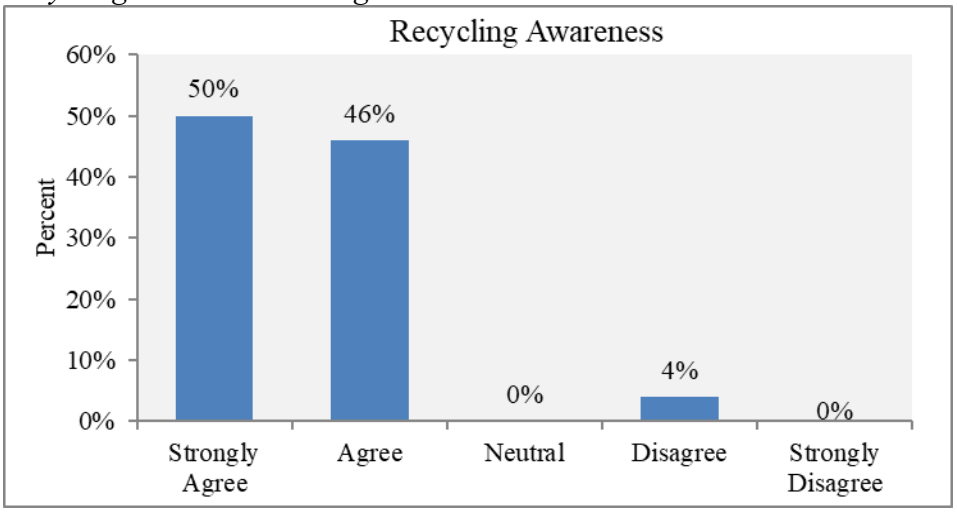
Role of Law Enforcement Agencies



The respondents expressed that law enforcement agencies in Pakistan, such as the police and traffic wardens, should stop and check vehicle emissions more frequently, even if it causes minor traffic delays. Further, they should promote awareness among the public through billboards, signage, seminars, and social media campaigns (refer to Figure 10).

Figure 11

Recycling Awareness among Citizens

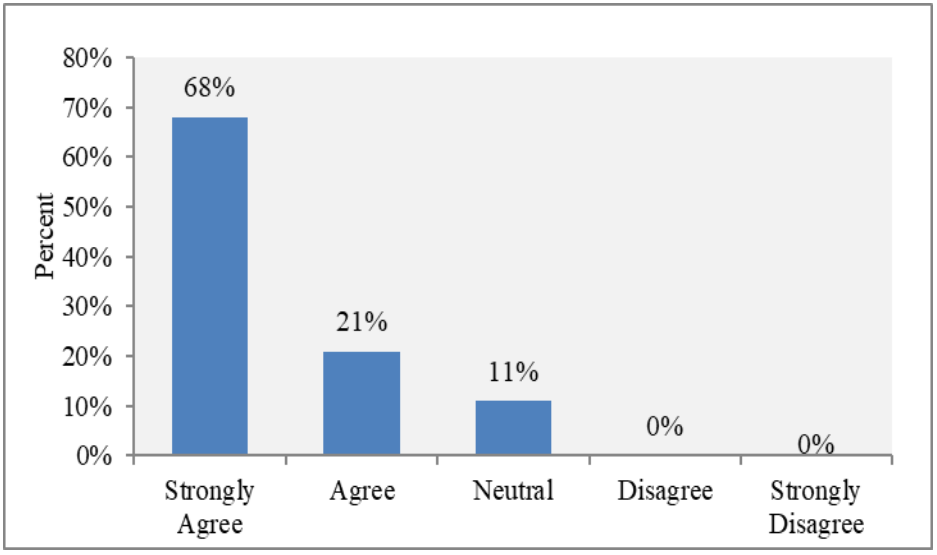


The respondents strongly agreed with the suggestion that recycling programs should be put in place and promoted across the whole city (refer to Figure 11).

The respondents strongly agreed that improving the quality of environment is the responsibility of every citizen (refer to Figure 12). By accepting their responsibility, the youth can play their part and actively participate in the implementation of the relevant regulations for the betterment of air quality.

Figure 12

Role and Responsibility of Citizens

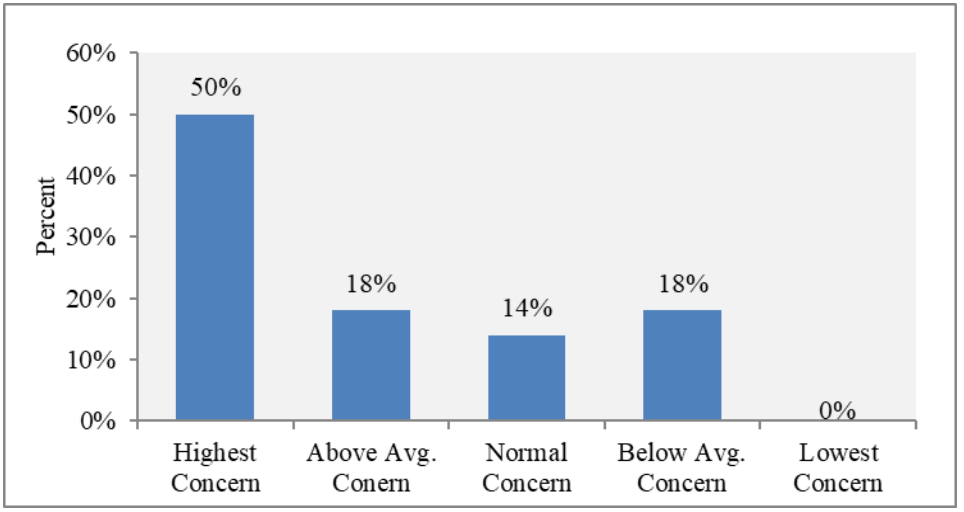


The respondents were asked about the effects of some environmental issues, such as air/drinking water pollution, garbage and solid waste, and loss of green areas in the city on their health and well-being. The aim was to know the level of awareness and concern they show about their social and environmental impact.

These environmental issues are discussed in detail with the help of a graphical representation of the responses.

Figure 13

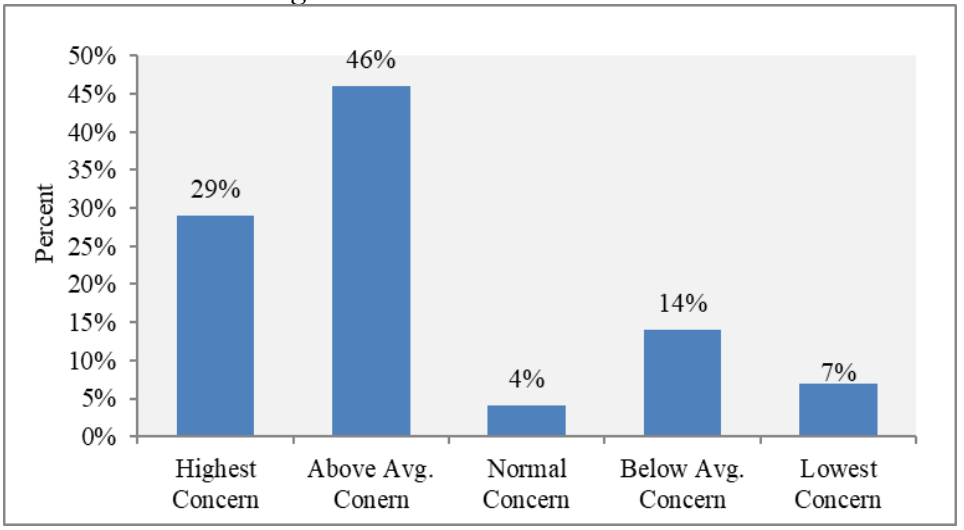
Concern Over Air Pollution



The majority of the respondents showed their highest concern towards air pollution, which reflected that they were well aware of its negative impact on the society and upon their health and well-being. Around 80% of them expressed that they feel bothered by it and are interested to actively play their part towards the betterment of the environment (refer to Figure 13).

Figure 14

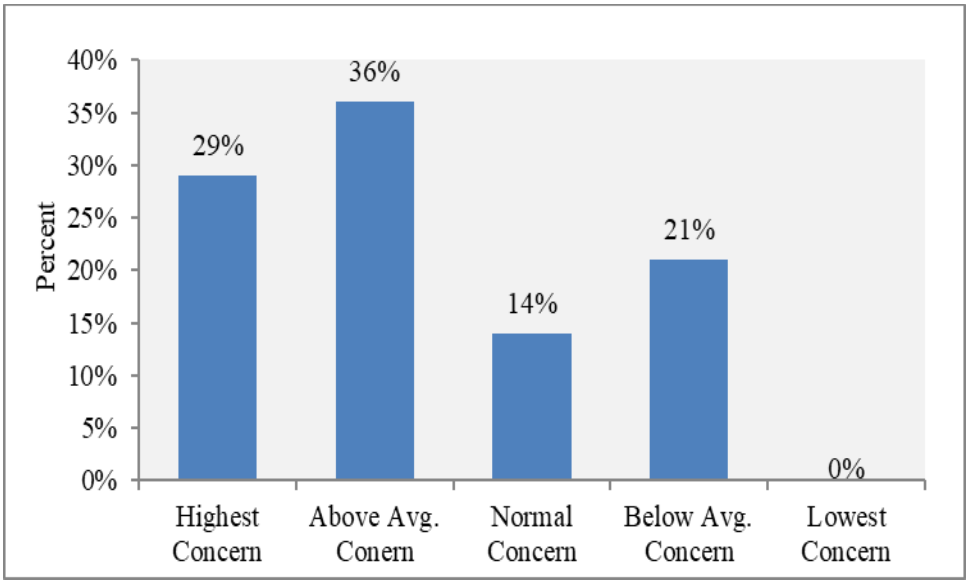
Concern Over Drinking Water Pollution



Around 75% of the respondents expressed 'above average' to 'highest concern' about the quality of drinking water and the rapid increase of water pollution (refer to Figure 14). This shows that they are very well aware of the importance of clean drinking water and understand that it's imperative to reduce water pollution by highlighting the problem at the concerned levels.

Figure 15

Concern Over Garbage and Solid Waste Pollution

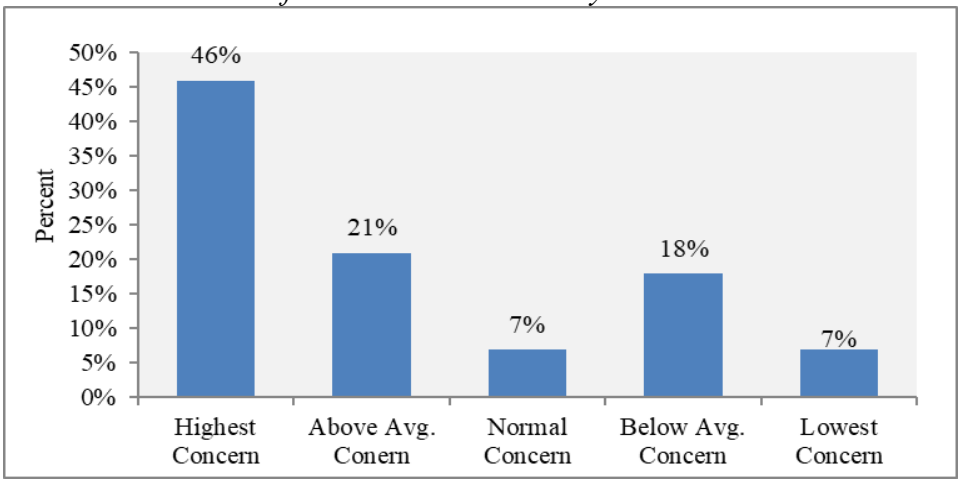


Around 65% of the respondents showed 'above average' to 'highest concern' about garbage and solid waste pollution. This percentage is individually on the higher side. However, the awareness and concern levels are slightly towards the lower side as compared to the previous environmental effects (refer to Figure 15).

Similarly, almost 66% of the respondents expressed that they need more green spaces for a healthier environment by showing 'above average' to 'highest concern' regarding the loss of parks and green areas in the city (refer to Figure 16). The massive increase in urban population and rapid urbanization have been the major causes leading to a huge loss of trees, forests, green areas, and parks.

Figure 16

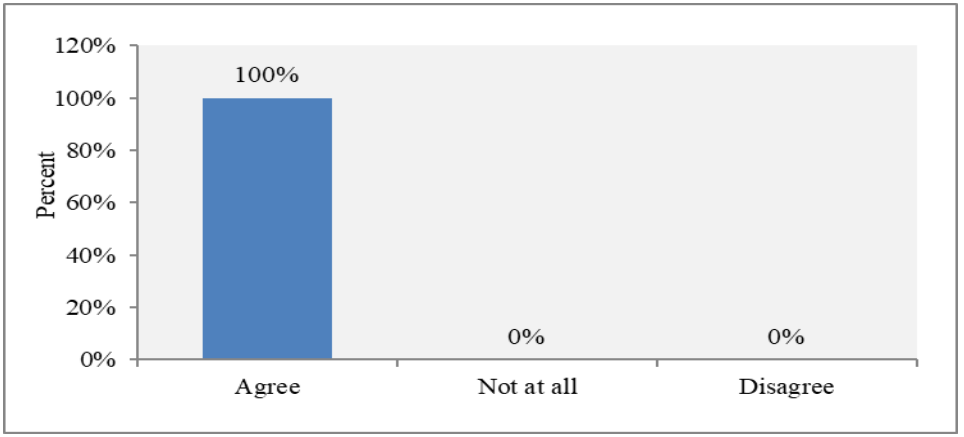
Concern about Loss of Green Areas in the City



Moving towards the fact, virtually all of the respondents believed that air pollution has become a very serious problem in Lahore for the last few years and needs urgent attention. Otherwise, this problem would become more critical in the near future (refer to Figure 17). They showed their high-level concern regarding the matter and its hazardous effects on human life and well-being.

Figure 17

Air Pollution - A Serious Problem in the Future

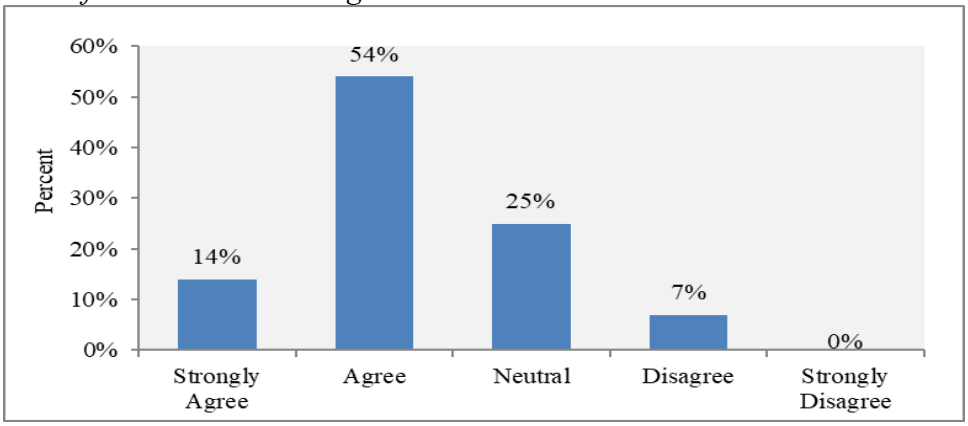


It is evident from this research that the teenage population of the society believes that air pollution would become a serious threat in the near future for everyone. Further, they also shared that they are actively taking steps for

cleaning the environment by themselves and not just depending upon the authorities. Also, they are playing their part by bringing this into the notice of the concerned authorities and by asking them to perceive it as a serious threat, so that they may prepare an effective plan to tackle it now and, in the future, as well (refer Figure 18).

Figure 18

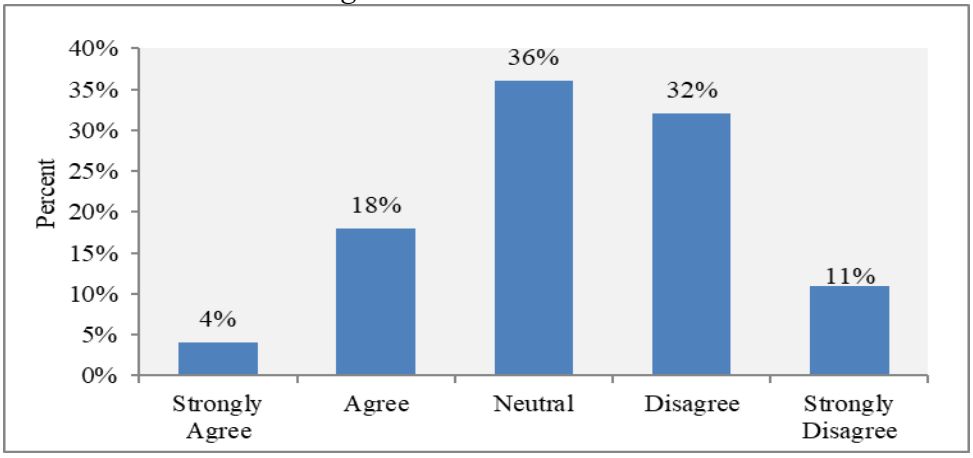
Role of Citizens in Cleaning the Environment



The respondents strongly disagreed with the fact that pollution is out of control and they cannot do anything to change the situation. Rather, they showed their keen interest, concern, and high level of awareness about this issue. They also showed their willingness and contribution towards controlling air pollution at the city and country levels (refer to Figure 19).

Figure 19

Contribution in Controlling Air Pollution



Conclusion

This research is an attempt to assess awareness about one of the most serious issues affecting almost the entire population of Lahore. As each day, we are inundated with reports of the harmful consequences of escalating pollution and the detrimental effects of human negligence, which have led to the degradation of the quality of life for all living organisms.

The results of the survey indicate the level of air quality which can be improved by adopting effective legislation. This can be done through several economic instruments, such as road taxes for using personal vehicles, taxes on air tickets, taxes on industry emissions above a certain level or subsidizing green technology. A combination of economic incentives and more taxation on stakeholders creating more pollution will not be successful unless all these measures are effectively monitored and inspected regularly.

Further research is essential to comprehensively define the concept of air quality and establish clear correlations between air quality, human health, and activity levels. This will pave the way for a more informed and proactive approach in addressing air quality-related issues in the future. This is also one of the recommendations that has been proposed as a result of this research. This is inevitable because government legislations go a long way in changing consumer and industrial behaviours. When the producers are held responsible for the deterioration of air quality as a result of their activities, only then air quality is likely to improve. On the flip side, consumers also have the responsibility to create demand for only those products which have been manufactured in a green environment i.e., zero or minimum impact on air quality due to operational activities.

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