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Public Awareness and Attitudes toward Environmental Pollution: A Survey Study in District Lahore, Punjab-Pakistan

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ABSTRACT

In Pakistan' major cities, such as Lahore, where there is a breakneck pace of industrialization, uncontrolled urbanization and inept waste management systems that lead to the the problem of open waste burning. Current study explored the level of social awareness and sentiment about environmental pollution in District Lahore through a representative sample of 385 respondents. The descriptive results showed that a vast awareness were aware of air pollution (90.9 %) and water pollution (85.7 %), as well as soil pollution (67.5 %) and solid waste (76.6 %). The attitudinal analysis showed that the most significant source of pollution was perceived to be the industrial activities ($M = 4.27$, $SD = 0.91$) and vehicle emissions ($M = 4.19$, $SD = 0.97$). While, the most relevant impact of the pollution was perceived to be on human health ($M = 4.16$, $SD = 0.98$). The regression analysis revealed that awareness and attitudes were good predictors of education ($\beta = 0.65$, $p < 0.001$), income ($\beta = 0.35$, $p < 0.001$) and media exposure ($\beta = 0.02$, p under 0.001). The readiness to take pro-environmental behaviours (reduction of single-use plastics: $M = 4.30$, $SD = 0.72$), water conservation ($M = 4.15$, $SD = 0.78$), and community waste clean-up were the highest. The results indicate that education, socioeconomic status, and media consumption play a vital role in defining environmental awareness and conservation practices. These results can be applied to develop effective policy interventions and governance of the environment by the citizens in Lahore.

***Keywords*:** Environmental pollution, social environmental awareness, attitudes, socioeconomic factors, and pro-environmental practices

INTRODUCTION

The problem of environmental pollution has turned into one of the burning issues of the twenty-first century because it endangers the ecosystems, public health, and the economic prosperity. Industry, population growth, and urbanization are increasing at an accelerated pace around the world and have harmful impacts on the environment and health of individuals by increasing the number of pollutants released into the atmosphere, water, and soil (World Health Organization, 2021). It is especially a threat to the developing world because of the lack of legislation enforcement, insufficient waste disposal systems, and the lack of awareness about the seriousness of the problem (Grzywa-Celińska et al., 2020). Pakistan is the fifth most populous country in the world with deplorable environmental problems. Air pollution, poor drinking water, and the lack of enough solid waste disposal are some of the most significant threats (Saleem et al.,2024). The environmental crisis has reached the alarming stage due to industrial deposits, transportation and unplanned urbanization. As a report by IQAir (2022), Pakistan ranks among the worst air pollutant countries with Lahore being frequently featured on the list of most polluted global cities. The Air Quality Index (AQI) in Lahore is frequently very high, which means that millions of citizens are exposed to the negative effects of the harmful air that predisposes them to respiratory and cardiovascular diseases (Javed et al., 2021).

In Pakistan, Sanitation systems are also of low standards. Municipal and industrial wastes are not well disposed of which affect environmental degradation by contaminating fresh water sources (Chen et al., 2022). Thousands of tons of solid waste are generated every day in the city, and a large part of it is mixed with solid waste and discarded in the open or burned, which contaminates the air and soil (Schraufnagel et al., 2019). All these scenarios strengthen the need to accommodate Research is evident on the inadequate Governance of Urban Ecosystems in Lahore,

indicating ineffective implementation of policies and poor coordination among stakeholders (Khalid et al., 2025). Research on willingness, intention and actual behaviours (waste segregation, household pollution reduction practices) exists but is still limited in Lahore. Further, an integrated assessment covering air, water, soil and waste together so comparisons and priorities can be established at the city level (Azam et al., 2020). There is a dire need to make environmental policies more participatory and influence citizens' personal and perceived norms in order to achieve their success on environmental conservation (Ali et al., 2025).

Prior studies have demonstrated that awareness, environmental education, and participatory approaches could enhance public awareness and lead the collective action against the pollution (Zhao et al., 2021). Studies have shown that a knowledge and practice gap exists in the environment in Pakistan. Although city residents might know about the issue of pollution, the socioeconomic pressure, the absence of other options, and inadequate governmental support are usually not enough to accommodate environmentally friendly conduct (Saleem et al., 2024). Lahore is an urbanizing district, economic, and educational center with more than 13 million inhabitants that are exposed to various environmental stressors. This interconnection of the industrial regions, the amount of traffic, slums, and inappropriate disposal of wastes has resulted in a complicated situation of contamination. Additionally, the level of population engagement and care is an untapped sector of environmental governance. The majority of the policies and interventions are high-level and pay minimal attention to what the citizens perceive, feel, and are willing to do to help mitigate the pollution (Fatima et al., 2024). Therefore, it is necessary to examine the societal consciousness and perception to understand how the citizens will view pollution. So, the study is based on the objectives of identifying the degree of enlightenment of the population on the various forms of environmental pollution, examining the part of citizen attitude towards causes, effects and duty of environmental pollution, and determining demographic and socioeconomic variables that determine attitudes towards awareness and environmental pollution. Measuring citizens' attitudes and the sociodemographic determinants of those attitudes helps tailor education, behavior-change campaigns and policy instruments (e.g., incentives for household waste segregation or regulations to reduce vehicular/industrial emissions). Studies in Pakistan indicate that awareness is linked to pro-environmental behaviours, so improving knowledge and targeting vulnerable demographic groups can improve environmental outcomes (Kousar et al., 2022). Understanding how citizens view causes, effects and responsibilities will help ensure compliance and community support for both short-term emergency measures and long-term reforms. The other importance of the research is that it would provide recommendations for environmental policy and practice and to make positive changes in the environmental governance in Lahore.

MATERIALS AND METHODS

The study is based on the household survey conducted in District Lahore, Punjab, on public awareness and attitudes toward environmental pollution. analyses explore citizens' attitudes toward the causes and consequences of pollution, as well as their perceptions of responsibility for environmental protection. The quantitative survey with cross-sectional research was adopted in this research Study area was the district Lahore due to the high population and pollution of the air, water, soil, and solid waste. Being the capital of Punjab province, itis a very crucial area to investigate.

The study population included adult residents (aged 18 and above) of both urban and peri-urban areas of Lahore. To ensure representativeness, a multistage stratified random sampling technique was applied. First, union councils were stratified into urban and peri-urban categories; second, households were randomly selected from each stratum; and third, within each household, one respondent was selected using the Kish grid method to avoid bias. The sample size was determined using Cochran's (1977) formula for large populations:

$$n_0 = \frac{Z^2 . p . q}{e^2}$$

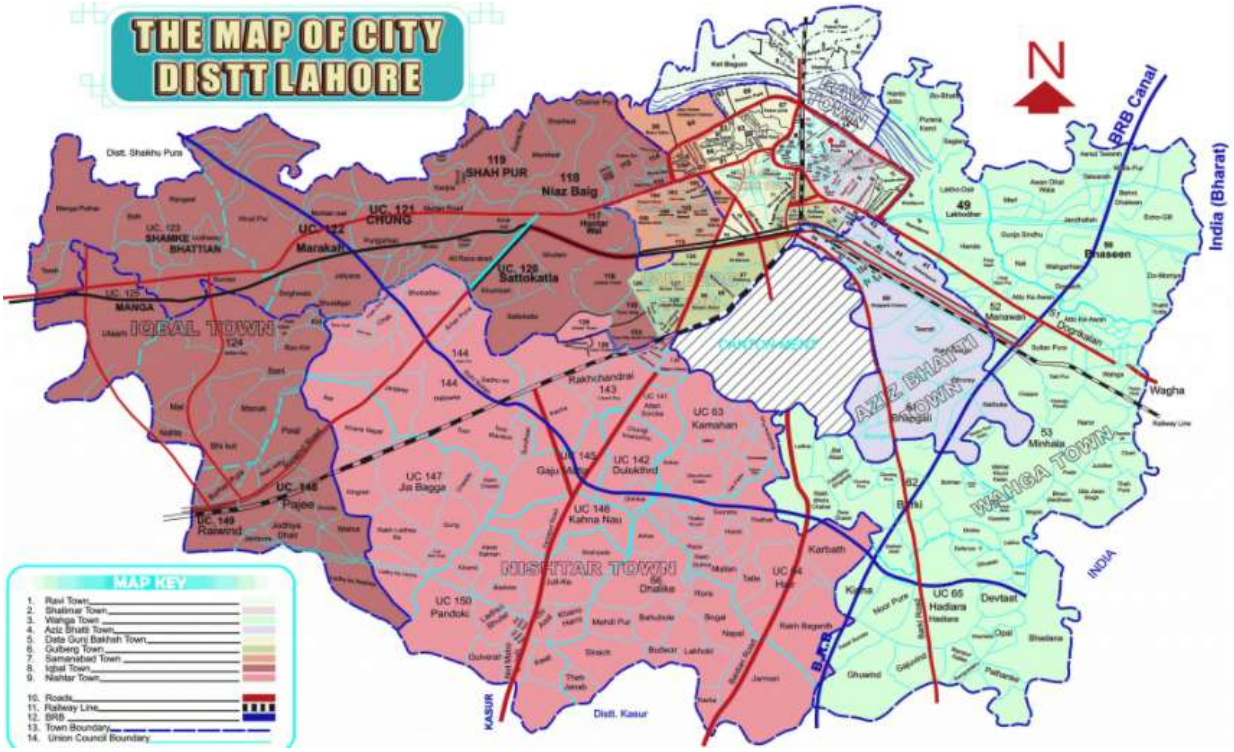
where n_0 = sample size, Z = 1.96 for 95% confidence level, p=0.5 (estimated proportion of attribute in population), q=1−p, and e=0.05 (margin of error). Substituting values,

$$n_0 = \frac{(1.96)^2 . (0.5) . (0.5)}{(0.05)^2} = 385$$

To ensure robustness, a total of 385 households were surveyed, proportionally distributed across urban and peri-urban areas.

Data were collected using a structured questionnaire consisting of five sections: (i) demographic and socioeconomic characteristics, (ii) awareness of different types of environmental pollution (air, water, soil, and waste), (iii) attitudes toward pollution causes, consequences, and responsibilities measured through a five-point Likert scale, (iv) willingness to adopt pro-environmental practices, and (v) sources of environmental information. The questionnaire was initially prepared in English, translated into Urdu for field administration, and pre-tested with 30 respondents for clarity and reliability. Cronbach's alpha was used to test internal consistency of the Likert-scale items, with values above 0.70 considered acceptable (Nunnally, 1978).

Face-to-face surveys were conducted by trained enumerators for data collection, which lasted over six weeks. Informed consent was obtained from all participants, and ethical principles of voluntary participation, confidentiality, and anonymity were strictly observed.



Data were analyzed using SPSS (version 26). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize levels of awareness and attitudes. To test the influence of demographic and socioeconomic factors, inferential statistics were employed. To examine differences in awareness and attitudes across groups (e.g., gender, education, income), independent sample t-tests and one-way ANOVA were conducted. The t-test was calculated as

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where $\bar{x}_1$, $\bar{x}_2$ are sample means, s_1^2, s_2^2 are variances, and n_1, n_2 are sample sizes. ANOVA was computed to determine whether significant differences exist among more than two groups, using:

$$F = \frac{MS_{between}}{MS_{within}} = \frac{SS_{between}/df_{between}}{SS_{within}/df_{within}}$$

Finally, to test the relationship between environmental awareness and willingness to adopt pro-environmental practices, multivariate linear regression analysis was applied. Pearson's correlation was computed as:

$$Y=\beta 0+\beta 1X1+\beta 2X2+\cdots+\beta kXk+\varepsilon$$

where Y = willingness to adopt pro-environmental practices, X1…Xk = awareness scores and demographic variables, β = coefficients, and ε = error term.

This rigorous methodology ensures that the study not only measures levels of awareness and attitudes but also statistically identifies the demographic determinants of these variables and quantifies their relationship with pro-environmental behavioral intentions.

RESULTS AND DISCUSSION

Awareness

Table 1: Public Awareness of Different Types of Environmental Pollution in District Lahore (N = 385)

Type of Pollution	Aware (f)	Aware (%)	Not Aware (f)	Not Aware (%)	Rank
Air Pollution	350	90.9	35	9.1	1
Water Pollution	330	85.7	55	14.3	2
Solid Waste	295	76.6	90	23.4	3
Soil Pollution	260	67.5	125	32.5	4

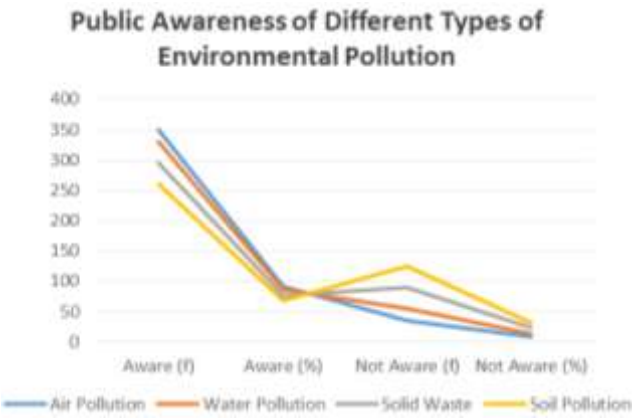


Table 1 illustrates the level of public awareness regarding different types of environmental pollution among respondents in District Lahore. The results reveal that the majority of participants demonstrated awareness of common pollution types, though the degree of awareness varied considerably across categories. Specifically, the greatest percentage of respondents (90.9%) were aware of air pollution, following by the awareness about water pollution (85.7%) andSolid waste pollution76.6%. While lowest percentage of respondents was about soil pollution, showing that only 67.5% of respondents were aware of it. Such a trend suggests that the most noticeable or perceivable forms of pollution are more dominant in the mind of the respondents; smog, drinking water pollution, and garbage accumulation, whereas less visible to the masses are other issues, e.g., soil pollution. These statistics may be connected to prior research that mentioned the rise in interest of urban dwellers in water and air pollution, as it is immediately impacting their well-being and is observable (particularly in highly industrialized and high-density regions such as Lahore) (Ontawong et al., 2020; Fatima et al., 2024). The less tangible nature and relative invisibility of the issue to the population can explain such comparative lack of information regarding soil pollution (Grzywa-Celińska et al. 2020). One reason may be that in city, people have limited exposure to land because of more service, businness and industrial jobs and limited connections with agriculture. Overall, as depicted in the table, there is a need to take certain awareness efforts, particularly with regard to less familiar forms of pollution (solid waste and soil pollution), to enhance a wider understanding of the environmental issues.

Differences in Public Awareness of Environmental Pollution across Demographic Groups

Table 2 presents the results of independent sample t-tests and one-way ANOVA conducted to examine differences in public awareness of environmental pollution across demographic groups in District Lahore. The findings reveal that awareness levels significantly varied by gender, education, and age.

Table 2: Independent Sample t-tests and One-way ANOVA Results Examining Differences in Public Awareness of Environmental Pollution across Demographic Groups (N = 385)

Variable	Grouping Variable	Mean	SD	Test	df	F / t-value	p-value	Interpretation
Awareness	Gender (Male = 210, Female = 175)	M: 3.82 / F: 3.65	0.72 / 0.69	t-test	383	2.18	0.030	Significant difference: males more aware
	Education (Primary = 95, Secondary = 128, Tertiary = 162)	3.28 / 3.70 / 4.05	0.66 / 0.63 / 0.58	ANOVA	2, 382	19.04	0.000	Awareness increases with higher education
	Age (18–30 = 140, 31–45 = 125, 46+ = 120)	3.55 / 3.80 / 3.95	0.64 / 0.61 / 0.60	ANOVA	2, 382	8.72	0.000	Older age groups show higher awareness

Public Awareness of Environmental Pollution across Demographic Groups (N = 385)

The t-test indicated ($t = 2.18$, $p < 0.05$) that the gender difference was significant, the males ($M = 3.82$, $SD = 0.72$) had a little bit higher awareness level than the females ($M = 3.65$, $SD = 0.69$). It might be because men are more liberated in their movements and socialization within their spaces of work or community, so they might be better placed to have access to information about the surroundings. This tendency can be found in the existing literature, with male respondents demonstrated increased levels of awareness of the issue of pollution compared to female respondents in South Asian contexts (Chen et al., 2022; Raza et al., 2021). The most associated variable with awareness was education ($F = 19.04$, $p < 0.001$). The tertiary level educated respondents ($M = 4.05$) were the most conscious followed by secondary level ($M = 3.70$) and primary level ($M = 3.28$) respondents, respectively. This is regarded as concordant with the data collected at the global level that education is a crucial factor in building an awareness of environmental issues and critical thinking (Haque et al., 2024). The institutes of higher learning in Pakistan are also incorporating environmental issues in their curriculum, and this would be considered to enhance the level of education of the educated respondents.

The other significant effect was on age on awareness ($F = 8.72$, $p < 0.001$). Older respondents (46 years and above) ($M = 3.95$) had the highest awareness compared to the younger age groups (1830 years old). It is suggestive that life experience or prolonged exposure to environmental alterations such as smog and water shortages, and garbage disposal issues might be some factor in enlightenment towards the ageing populations. The two Pakistan-based and external studies help to promote the idea that older individuals will be more environmentally and more conscious of it as an implication of the individual experience of the effects of pollution and the generational obligation (Yousaf et al., 2021; Jabeen et al., 2021). The results highlight the point that the mass presence of the overall level of awareness about environmental pollution is not necessarily evenly distributed throughout the whole District of Lahore, but rather

demographic and socioeconomic. The above observations reiterate the need to conduct certain awareness campaigns that would balance the gender, education level, and age group disparity. This can help provide a more balanced ratio of the information and mobilization of the collective action against the environmental attack, organizing the educational programs on the environmental issues in such a way that it would make it accessible to women and the younger generation.

Attitudes toward Causes, Consequences, and Responsibilities of Environmental Pollution

Table 3 shows the perceptions citizens have about the causes of environmental pollution and its effects and their contributions in District Lahore. The findings indicate that the respondents considered the industrial activities (Mean = 4.27, SD = 0.91) and vehicle emissions (Mean = 4.19, SD = 0.97) as the most prevalent sources of pollution, respectively succeeded by improper waste disposal and use of agricultural chemicals. Further, respondents cited urbanization and rapid industrialization as one of the primary causes of environmental degradation and that it is also in accordance with other research studies in Pakistan and South Asia, where the impact of industrial emissions and transport were significantly observed as the primary source of air and water pollution (Ali and Rana, 2024; Arif et al., 2023). In terms of consequences, the worst consequence with the highest rating was the environmental pollution adversely affected human health (Mean = 4.16, SD = 0.98), and there were also such consequences as resource degradation and respiratory illnesses. Climate change was surprisingly the least perceived (Mean = 3.94, SD = 1.11). This implies that the citizens are more aware of the visible and short-term effects of pollution, yet the indirect effects like climate change are not as highlighted. This does not qualify as an exemption to Ali and Rana (2024), who have shown that anxiety experienced within the society of urban Pakistan is usually informed by direct health experience and not the global danger to the environment.

Table 3: Citizens' Attitudes toward Causes, Consequences, and Responsibilities of Environmental Pollution in District Lahore (N = 385)

Dimension	Statement	Mean	SD	Rank
Causes	Industrial activities are the main source of environmental pollution	4.27	0.91	1
	Vehicle emissions significantly contribute to air pollution	4.19	0.97	2
	Improper waste management is a major cause of pollution	4.12	1.00	3
	Use of pesticides and fertilizers pollutes soil and water	3.95	1.09	4
Consequences	Environmental pollution negatively affects human health	4.16	0.98	1
	Pollution leads to degradation of water and soil resources	4.02	1.03	2
	Air pollution contributes to respiratory diseases	4.01	1.06	3
	Environmental degradation contributes to climate change	3.94	1.11	4
Responsibilities	Citizens are equally responsible for environmental protection	3.93	1.09	1
	Government should strictly regulate industries to control pollution	3.98	1.08	2
	Media and educational institutions should raise public awareness	3.95	1.10	3
	NGOs and community groups should play a role in reducing pollution	3.91	1.12	4

The respondents showed similarity in government, civil society and individuals, regarding their roles to combat polution. The identification of the two duties is demonstrated with the awareness of the joint responsibility of the people on environmental protection (Mean = 3.93, SD = 1.09) and the need to manage the industries of the government (Mean = 3.98, SD = 1.08). Media, school and NGO roles were also found to have a significant role in creating awareness and action. This is in line with the previous study, which recommended that the environmental governance of the developing countries needed a collaborative model in which the role of the masses should be incorporated during the implementation of the policy (Ahsan et al., 2020; Hussain et al., 2023). Those findings indicate that the District Lahore population is rather aware of the local impact of the pollution and of the immediate outcomes of the same however, there is still a necessity to increase the awareness of the risks of the pollution on the long-term basis and of how to share the responsibility on the issue.

Demographic & Socioeconomic Predictors of Awareness and Attitudes

Table 4 presents the results of multivariate linear regression analyses used to identify demographic and socioeconomic predictors of awareness and attitudes toward environmental pollution in District Lahore. The results reveal that education, income, media exposure, age, and gender significantly influenced awareness and attitudes, whereas residential location (urban vs. peri-urban) showed no significant impact after controlling for other factors.

Education was found to be the most significant determinant of awareness and in attitudes. Secondary education was much more aware ($\beta = 0.30$, $p < 0.001$) and tertiary education ($\beta = 0.65$, $p < 0.001$) compared to respondents with only primary education. Similarly, education was the predictor of more positive attitude towards the environment but tertiary-educated individuals were most positively oriented ($\beta = 0.48$, $p < 0.001$). This is consistent with the findings on the international research that have shown that higher education does contribute to environmental literacy, critical thinking, and civic engagement in the ecological issues (Hussain and Adil, 2022; Fang and Mushtaque, 2024). Khan et al. (2023) also identified education in the Pakistani context as one of the key factors that contributed to the development of environmental concern and in urban settings in particular, where sustainability curricula are now

starting to incorporate more sustainability-related content. The other significant predictor is the household income. The middle-income ($\beta = 0.22$, $p < 0.01$) and higher-income respondents ($\beta = 0.35$, $p < 0.001$), respectively, had greater awareness, and so did the attitudes ($\beta = 0.28$, $p < 0.001$). This means that economic security would allow individuals to access more information and the capability to practice some pro-environmental practices. The past study within South Asia confirms that the level of awareness and willingness to spend towards environmental protection goes up with income (Hussain, 2022).

Table 4: Multivariate Linear Regression — Demographic & Socioeconomic Predictors of Awareness and Attitudes (N = 385)

Predictor	Model 1: Awareness (β)	SE	t	p	Model 2: Attitude (β)	SE	t	p
Gender (Male = 1)	0.12*	0.05	2.18	0.030	0.05	0.04	1.25	0.212
Age (years)	0.005*	0.002	2.36	0.019	0.003*	0.001	2.05	0.041
Education — Secondary (vs Primary)	0.30***	0.07	4.29	0.000	0.22***	0.06	3.67	0.000
Education — Tertiary (vs Primary)	0.65***	0.06	10.83	0.000	0.48***	0.05	9.60	0.000
Income — 30–60k (vs <30k)	0.22**	0.06	3.67	0.000	0.18**	0.06	3.00	0.003
Income — >60k (vs <30k)	0.35***	0.07	5.00	0.000	0.28***	0.07	4.00	0.000
MediaExp (hours/week)	0.02***	0.005	4.00	0.000	0.015***	0.004	3.75	0.000
Urban (Urban = 1)	0.08	0.05	1.60	0.110	0.06	0.04	1.40	0.162
Constant	2.20***	0.15	14.67	0.000	2.00***	0.13	15.38	0.000
Model fit								
Observations (N)	385				385			
R^2	0.42				0.36			
Adjusted R^2	0.40				0.34			
F-statistic	33.5 (df = 8,376)			p < 0.001	24.8 (df = 8,376)			p < 0.001

Note: * p < 0.05; ** p < 0.01; *** p < 0.001

Media exposure to awareness also had a significant positive effect ($\beta = 0.02$, $p = 0.001$) and media exposure to attitudes ($\beta = 0.015$, $p = 0.001$). Those respondents who were more likely to be informed and possess positive attitudes towards taking action against pollution were those with a longer time of watching television, listening to the radio, and watching social media. This tells the significance of mass communication in raising the significance of environmental literacy, and it is worth mentioning that studies have shown that media campaigns are one of the most efficient methods of educating people on air quality and waste management issues (Liu et al., 2020; Mushtaque et al., 2021). The age had a small yet significant positive impact on both the awareness ($\beta = 0.005$, $p < 0.05$) and attitudes ($\beta = 0.003$, $p < 0.05$). The seniors were somewhat more well-informed and were worried about pollution. Our finding is not new, as older adults, according to the literature, are more conscious and open to expressing more positive attitudes towards the environment when they have life experience and are long-term exposed to the changing environment (Niazi et al., 2020; Smedley and Tan, 2020). Gender differences were also observed (males were more aware (0.12 $p < 0.05$) compared to females, but no longer considered gender when the other variables were held constant. This tendency can be viewed as the reflection of the gendered disparity in access to information and educational opportunities in Pakistan (Raza et al., 2020). Analogous outcomes have been reported by Khan et al. (2023), who found that the score of male respondents on the scale of environmental awareness is higher, yet the gender difference regarding attitudes decreases when the education is held constant. Overall, the regression models explained 42 percent of the change in awareness and 36 percent of the change in attitudes. This implies that institutional trust, community participation and direct exposure to pollution are other factors that determine the rate of change of demographic and socioeconomic factors. These results also highlight the importance of targeting awareness efforts, especially to women, youth, the poor and the less educated individuals.

Willingness to Adopt Pro-Environmental Practices

The results in Table 5, indicates the willingness of the respondents to practice pro-environmental behavior in District Lahore. The findings demonstrate that respondents showed the most willingness to reduce single-use plastic products ($M = 4.30$, $SD = 0.72$), followed by conserving water ($M = 4.15$, $SD = 0.78$). These kinds of outcomes imply that human beings will be more predisposed to the practices, which are convenient, cost-effective, and can be conducted at the domestic level. Attitude towards tree plantations ($M = 4.12$, $SD = 0.81$) and waste segregation and recycling ($M = 3.95$, $SD = 0.87$) are also rated high, which illustrates the increased awareness of the environmental sustainability practices. It is a continuation of the earlier research carried out in Pakistan and South Asia that began to focus on the rise in the level of awareness of tree planting and recycling as a worthy environmental lifestyle (Sansakorn et al., 2024; Ali and Rana, 2024). The intent to use the energy-saving appliances ($M = 3.82$, $SD = 0.89$) and the community waste reduction programs ($M = 3.78$, $SD = 0.91$) was, however, lower, might be been due to the economic limitations and the hindrances of collective actions to do so (Arif et al., 2023).

The most resisted by all was the desire to participate in environmental campaigns ($M = 3.72$, $SD = 0.93$) and taking part in the clean-ups of the neighborhoods ($M = 3.60$, $SD = 0.95$). The latter tendency can also be associated with the global data, according to which the individuals will be less inclined to engage in time-consuming group

activities than the domestic-based ones (Sarfraz et al., 2022; Sawangchai et al., 2022). These results reveal that the residents are positively oriented towards environmental protection, but they are more willing to take part in individual and household level processes. It implies the need to have policy interventions and awareness campaigns that not only encourage individual action but also encourage collective action in environmental management at the communal level.

Table 5: Willingness to Adopt Pro-Environmental Practices (N = 385)

Pro-Environmental Practices	Mean	SD	Rank
Reducing single-use plastic (bags, bottles, packaging)	4.30	0.72	1
Conserving water (fixing leaks, mindful daily use)	4.15	0.78	2
Participation in tree plantation drives	4.12	0.81	3
Waste segregation and recycling (plastic, paper, organic)	3.95	0.87	4
Using energy-efficient appliances (LED bulbs, efficient fans)	3.82	0.89	5
Supporting community waste management initiatives	3.78	0.91	6
Joining local environmental awareness campaigns	3.72	0.93	7
Volunteering in neighborhood clean-up activities	3.60	0.95	8

CONCLUSION

The results concluded that awareness of air and water pollution was quite satisfactory because it was observable and had direct health effects but awareness of soil and solid waste and soil pollution was less. Attitudinal analysis revealed the highest awareness about industrial activities, motor emissions, and poor management of waste. Interestingly, the respondents highlighted the shared responsibility of the citizenry, the government and the civil society to cooperate to ensure eradicate pollution and conserve environment. The demographic and socioeconomic characteristics were identified to be strong predictors of awareness and attitudes including education, income, media exposures, and age; these factors are indicative of more structural differences in information and access to resources. Further, the willingness to implement pro-environmental practices was lower in terms of household-level behaviour, such as plastic reduction or water conservation, that belongs to household activity… but the behaviour that is more of a group behaviour and that which involves spending money was not as prevalent among participants. These results indicate that the policy actions should be focused on intentional sensitization, especially ensuring the inclusion of focusing women, youth, and low-income citizens., determine the mechanism to assist the group behavior. Enhancing environmental education, media involvement and community engagement would be chief in supporting the sustainable environmental practices in Lahore.

DECLARATIONS

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Conflicts of Interest

Authors have no conflicts of interest.

Data Availability

Data will be available from the corresponding author upon request.

Ethics Statement

The Institute of Agricultural Extension, Education, and Rural Development at the University of Agriculture, Faisalabad, gave its approval to the human subjects' study. The studies were carried out in compliance with institutional norms and local laws. To take part in this study, the subjects gave their written informed consent.

Authors' Contribution

Fahim Ali**;** Conceptualization, Data Curation, Data analysis, writing, Syed Imran Ahmad Shah; Formal Data Analysis, Writing, Review and Editing, Mian Azmat Farooq; Writing, Review and Editing, Muhammad Yahya; Writing, Review and Editing, Data Collection

Generative AI Statements

The authors declare that no Gen AI/DeepSeek was used in the writing/creation of this manuscript.

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