

# The Study of the Knowledge, Attitude, and Practice about the Air Pollution among the Residents of Kolar Town of South India

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## Abstract

**Introduction:** Air pollution is a major environmental health problem affecting everyone. Few studies have revealed the specific needs of the residents; hence the thought demand for residents to the knowledge of air pollution information was explored using a questionnaire.

**Aims and objective:** To develop awareness and understanding of pollution hazards and their prevention among the Kolar population on air pollution by using a questionnaire.

**Materials and methods:** A cross-sectional study was conducted among 120 subjects in Kolar town by Purposive sampling technique with a validated, standard questionnaire by interview method and collected was analysed by SPSS version 20.

**Results:** Majority gained knowledge on air pollution from mobile phones and television, While a few said from the public and newspapers. Regarding attitude, 91% agreed that air pollution affected their health and the environment, with 116 (96.7%) 106 (88.3%) saying it from outdoor and indoor activities respectively. Statistically significant association was established between knowledge gained among educators with (P=0.004) and attitude toward outdoor air pollution with (P=0.001) and changes in behavioural patterns with (P=0.042).

**Conclusion:** This work served as a starting point for a more timely and complete survey on air pollution and its relation to health and economic growth.

**Keywords:** Environment, Air pollution, Knowledge, Attitude, Practice

## Introduction

Air pollution is the leading risk factor causing premature death and disease which has prominent environmental health hazard worldwide.<sup>[1-2]</sup>

These occupational health risks have become a concern, especially where there is unplanned urbanization.<sup>[3]</sup> The KAP study has not been performed in Kolar region. The Air pollution index (AQI) had not been calculated as other air pollutants

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have not been assessed in this area, the respirable suspended particulate matter recorded was 149.1 mg/m<sup>3</sup> that is above the 100 mg/m<sup>3</sup> notified as safe by the central pollution board and would come under the category of moderate pollution in AQI. Global Burden of Disease study has confirmed that ambient air pollution is a leading risk factor for adverse health effects.<sup>[4]</sup> India contributes second highest premature deaths caused by outdoor air pollution.<sup>[5]</sup> Primary sources of ambient particulate matter pollution in India are residential and commercial biomass burning, windblown mineral dust, coal burning for energy generation, industrial emissions, construction activities,<sup>[6-7]</sup> Household air pollution is caused mainly by using solid fuels for cooking, such as wood, dung, coal, and charcoal.<sup>[8-9]</sup>

This study was chosen to understand the association of the current knowledge of residents on air pollution. The findings of this study can help healthcare workers to identify and change the behaviour towards it.<sup>[10]</sup>

### Methodology

The study was undertaken in Kolar after the ethical clearance from the Institutional ethical committee Sri Devraj Urs Medical college Kolar No DMC/KLR/IEC/218/2023-24 dated 3-07-2023 Studied during the month of June to August 2021.

**Sampling Technique:** Cross-sectional survey of 120 subjects selected through purposive sampling.

**Sample size:** The formula for estimating the sample size is  $n = [\mu\alpha^2 p (1-p)/\delta^2] \times (1 + 20\%)$ ,  $\alpha = 0.05$ ,  $\mu\alpha = 1.96$ ,  $p = 0.6459$ ,  $\delta = 0.15p$ ,  $n \approx 120$ .

The study was conducted among the residents of Kolar to understand of their knowledge, attitude, and practice on air pollution using questionnaire.

**Inclusion criteria:** The sample included subjects between age group of 18 to 60 yrs regularly outdoors with good health and mentally fit staying in Kolar for more than one year.

**Exclusion criteria:** Subjects with mental illness more than 60 yrs always indoors and staying in Kolar town for less than a year. Brief information about the study in local language was provided and informed consent was obtained.

Questions on demographic profile, Knowledge, attitude and the practice of Air pollution was determined using a validated questionnaire. The data was analysed using SPSS version 20. Descriptive statistics were performed and expressed in terms of proportions, and presented Chi-square tests were applied for demographic factors. Multiple logistic regression was used to assess the associations between knowledge outcome and demographic factors, and 95% confidence intervals (CIs) were presented.  $P < 0.05$  was considered statistically significant.

### Results

Demographic profile of 120 subjects of Kolar is represented (Table 1).

**Table 1: Demographic details of the population of Kolar town**

S. No	Parameters	Sub division	Population n=120 (%)
1.	Gender	Males	52 (43.3)
		Females	68 (56.7)
2.	Religion	Hindu	116 (96.7)
		Muslims	02 (1.7)
		Christians	02 (1.7)
3.	Marital Status	Single	40 (33.3)
		Married	72 (60.0)
		Widow	08 (6.7)
4.	Education	Illiterate	06 (5)
		Primary	18 (15)
		Secondary	42 (35)
		University	54 (45)
5.	Occupation	Retired	03 (2.5)
		House wife	48 (40)
		Agriculturist	07 (5.8)
		Unskilled	02 (1.7)
		Business	32 (26.7)
		Government worker	01 (0.8)
		Others	08 (6.7)

### Knowledge

Of the 120 participants 110 (91.7.1%) agreed that the air around their surroundings was polluted, and about 113 (94.2%) were worried about air pollution. They conveyed that 68 (56.7%) and 44 (36.7%) gained awareness and knowledge from mobile phones and

television respectively. Regarding the contributors of air pollution, 94 (78.3%) felt it was from vehicular pollutants, and only 15 (12.5%) people thought it was due to industrialization. Harmful effects of air pollution was answered by 110 participants who said that it would affect health and ecosystem, table-2 However, very few knew the contribution to air pollution was due to global warming and deforestation.

**Table 2: Survey regarding Knowledge on air pollution in Kolar town**

	Survey question	Response N=120n(%)
1.	Do you think the air your surrounding is polluted	
	Yes	110 (91.7)
	NO	10 (8.3)
2.	Are you worried of the Air pollution in your place	
	Yes	113 (94.2)
	No	07 ((5.8)
3.	From where did you gain knowledge about air pollution?	
	Television	44 (36.7)
	Mobile Phone	68 (56.7)
	News Paper	04 (3.3)
	Radio	00 (00)
	Public	04 (3.3)
4.	What do you think contributes to air pollution?	
	Deforestation	08 (6.7)
	Vehicular Pollution	94 (78.3)
	House hold pollution	02 (1.7)
	Industrialization	15 (12.5)
	Global warming	01 (0.8)
	Others	00 (00)
5.	What knowledge you have about air pollution?	
	I think it will harm the health of the individual	06 (5.0)
	I think it will harm the eco system	03 (2.5)
	I think both the above are true	110 (91.7)
	None of the above are true	01 (0.8)

## Attitude

Out of 120, 119 (99.2%) of subjects felt that air pollution causes problems, 116 (96.7%) and 106 (88.3%) felt it affects their outdoor and indoor activities. However, only 87 (72.5%) felt they need to change their habits to prevent air pollution. Regarding bringing changes to the public on air pollution, 75 (62.5%) felt the need to bring awareness through talking to the public, and 31 (25.8%) felt growing plants in the surrounding. The rest answered that its possible by speaking to their children. (Table 3)

**Table 3: Survey of Air pollution regarding attitude in Kolar town**

	Survey question	Response N=120 n(%)
1.	Does Air pollution cause any trouble or problem to your life	
	Yes	119 (99.2)
	NO	1 (0.8)
2.	Does air pollution effect your outdoor activity?	
	Yes	116 (96.7)
	No	04(3.3)
3.	Does air pollution effect your indoor activity?	
	Yes	106 (88.3)
	No	14 (11.7)
4.	Do you change your habits due to Air Pollution?	
	Not applicable	2 (1.7)
	Not at all	6 (5.0)
	Neutral	24 (20.0)
	Yes	87 (72.5)
	Always	1 (0.8)
5.	How would you like to bring a change to public about air pollution?	
	Talk to my friends about it always	6 (5.0)
	Tell my children about it and spread it around	8 (6.7)
	Grow plants around the surrounding	31 (25.8)
	Bring awareness to the public	75 (62.5)
	None of the above	00

**Practice**

Regarding behaviour, 114(95%) said they practiced protecting themselves from air pollution, with 72 (60%) and 32 (26.7%) by wearing masks, and covering face with handkerchief and the rest by using air purifiers, and staying indoor. 115 (95.5) of them agreed that lungs is the organ which gets affected due to air pollution Around 69(57.5%) of the participants felt that minimal effort is taken by government towards handling air pollution, and 118 (98.3%)felt economic growth would get impaired.

**Discussion**

In this study most of the respondents were literate with basic primary education and felt that the surrounding was polluted. This observation has been accurate based on the place they lived and their exposure to air pollution. This was an important point to note because educational background increased awareness of the problem, which showed a significance in the P value of 0.004, which is <0.05 in similar lines to study by Onunkor Etal from Knowledge, attitude, and perception of air pollution in Accra, Ghana. Education which was the main factor that was significant in knowledge compared with other demographic profiles. The study also pointed that the awareness was low among the elderly and less educated respondents and most of the residents admitted improving air quality is the responsibility of every citizen [10]

Our study showed that most subjects were worried about air pollution in their town. Majority of them said they gained knowledge from the mobile phone, television which was abundantly utilized by the current generation for their daily activities of their life. In contrast, a few gained knowledge from the public and newspapers. Similar findings were consistent with Qian X et. al.. [11]

To prevent air pollution, it is essential to create awareness among the public and educate them. [12] Individual and collective perception regarding the quality of the environment around them is imperative to bring about behavioral changes and accept interventional strategies.[13] Education status, and culture can further influence risk perception.[14] Hence, we studied their knowledge of air pollution.

In this regard, 91% of respondents felt that their residential areas and surrounding areas were polluted, and 94% believed that it affected their health. These findings were coincident with those of previous studies.[15] showing a significant P value of 0.004 association with knowledge and education (Table 4).

**Table 4: Association between demographic characteristics and Knowledge of air pollution**

Parameters	Population N(%) N=120		χ 2	df	P value
	Yes	No			
<b>1. Do you think in your surrounding is polluted?</b>					
Education	110 (91.7)	10 (8.3)	13.333	3	0.004*
<b>2. Are you worried about the air pollution in your place</b>					
Education	110 (91.7)	10 (8.3)	13.333	3	0.004*

Chi square test for association with P<0.05

Regarding their knowledge of pollutants in the surroundings, 78.3% of the respondents in our study believed that vehicles were the leading cause of air pollution, similar to several studies that have linked exhaust from vehicles, which is one of the leading causes of air pollution.[16] This was followed by industrial waste and household pollution. Regarding vehicular pollutants, the Government of India has already taken several measures, including a ban or special permission to use vehicles that are 15years old and higher, standards for exhaust emission pollutants standardized, and engine requirements in manufacturing. Electrostatic precipitators have also been added to industries’ chimneys to prevent particulate matter’s emission into the environment. We should seriously consider alternative energy and renewable energy use to reduce pollution.[17]

Knowing the attitude and behavioural aspects of the respondents to the health and ecosystem, 91% agreed that air pollution had effected their health as well as the environment, with 116 (96.7%) saying it has severe effects on one’s health and in their outdoor and 106 (88.3%) the indoor activities. 85 (72.5%) said they would change their behavioural habits due to air pollution in the study conducted by Qiu et al., 2018.[18]

Age showed a significant value towards health issues as older people were worried about their health and wanted a clean and green environment (Table 5).

**Table 5: Association between demographic characteristics and Attitude of air pollution**

Parameters	Population N(%) N=120		χ <sup>2</sup>	Df	P value
	Yes	No			
1. Does air pollution cause any trouble or problem to your life?					
Age	119 (99.2)	1 (0.8)	9.076	4	0.050*
2. Does air pollution effect you're outdoor activity?					
Religion	116 (96.7)	4(3.3)	13.787	2	0.001**
3. Does air pollution effect you're indoor activity?					
Gender	106 (88.3)	14 (11.7)	5.446	1	0.017*

Chisquare test for association with Pvalue of 0.001\*\*

Concerning the outdoor activities in the religion showed a highly significant P value of 0.001. This may be due to the cause that the people were worried about dust allergy and that outdoor activities would worsen the situation. It may be the cause as this survey was done in June and July, which are the windy and dusty seasons, and the respondents were much bothered of their health. Our study showed a significant P value with 0.017 for the indoor activities as in with gender response which was clear that the female were more concerned about the indoor air pollution, due to wind and the construction work near their locality. Indoor pollution may be due to the use of the open fire's unsafe fuels and combustion of biomass fuels inadequate ventilation as Kolar town is a semiurban area where most use kerosene stove for cooking, which was cause for household air pollution.<sup>[19]</sup>

The response to the question on the changing their habits for air pollution was responded positively by many showing that they would stop their vehicles and start utilize public transport, which would in

protecting their health, similar to the study by Qui F et. al<sup>[20]</sup>

When the respondents were enquired about their behaviour in protecting against air pollution, wearing of mask and using hankey to cover the face proved these practices have indicated that certain self-protection consciousness seems to be developing about the safe threshold among the people around, which was similar to Qian X etal.<sup>[11]</sup>

Our study showed that the respondents' behaviour to air pollution was affirmative, among the married and educated, with the significant P value of 0.028 and 0.042, showing that they were responsible for their duties.<sup>[21]</sup> Protective measures were used by them throug face masks and handkerchiefs. as shown in (Table 6) Hence these policies should be encouraged for awareness for the future generation that suggest environmental education can be transferred between generations and indirectly induce targeted behavioural changes.<sup>[22]</sup>

**Table 6: Association between demographic characteristics and Practice of air pollution**

Parameters	Population N (%) N=120		χ <sup>2</sup>	Df	P value
	Yes	No			
1.Do you use any protection against air pollution					
Marital Status	114 (95)	06 (05)	7.135	2	0.028*
Education	114 (95)	06 (05)	7.719	3	0.042*
2. Do you think the air pollution will impair economic growth					
No significance observed with any of the demographic profile					

Chi square test for association with P < 0.05

Their opinion towards the contribution of the government towards air pollution, 69 (57%) reported that the government did little to control air pollution and further the impairment regarding economic growth, 118 (98.3%) said that there was a fall in the economic growth which would affect the public. Hence, the government should bring awareness among youngsters by bringing a healthy environment concerning economic growth, and educating them. This may help policymakers in guidance to make residents aware of sources of air pollution and related health risks.<sup>[20]</sup>

### Conclusion

This study has highlighted that primary education increased awareness of air pollution and knowledge regarding its presence, effects, and prevention. This work will be a starting point for getting more timely and complete survey of opinions on air pollution and its relation to health and economic growth.

**Ethical clearance:** The study was undertaken in Kolar after the ethical clearance from the Institutional ethical committee Sri Devraj Urs Medical college Kolar No DMC/KLR/IEC/218/2023-24 dated 3-07-2023 Studied during the month of June to August 2021.

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**Conflict of Interest:** Nil

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