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A STUDY TO EVALUATE THE EFFECTIVENESS OF EDUCATIONAL INTERVENTION ON KNOWLEDGE REGARDING AIR QUALITY INDEX (AQI) AND CONSERVATIVE MANAGEMENT PRACTICES AMONG INTERMEDIATE STUDENTS IN SELECTED SCHOOL OF URBAN KANPUR, UTTAR PRADESH

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ARTICLE HISTORY	ABSTRACT
Received on: 14-08-2026 Revised on: 21-09-2026 Accepted on: 07-10-2026	Air pollution is one of the major environmental and public health problems affecting populations across the world. Exposure to polluted air is associated with respiratory and cardiovascular diseases, including respiratory infections, chronic obstructive pulmonary disease, stroke and ischemic heart disease. The Air Quality Index (AQI) is an important tool for communicating the status of air quality in an easily understandable form and helps people recognize the potential health effects of air pollution. The present study was conducted to evaluate the effectiveness of an educational intervention on knowledge regarding Air Quality Index (AQI) and conservative management practices among intermediate students in a selected school of urban Kanpur, Uttar Pradesh. A quantitative evaluative research approach with a quasi-experimental one-group pre-test post-test research design was adopted. A total of 60 intermediate students were selected by non-probability purposive sampling technique. Data were collected using a structured knowledge questionnaire consisting of 30 items related to AQI, causes and health effects of poor air quality, preventive measures and conservative management practices. In the pre-test, 28 (46%) students had poor knowledge and 32 (54%) had average knowledge, while none had good knowledge. In the post-test, none of the students had poor knowledge, 14 (23.3%) had average knowledge and 46 (76.7%) had good knowledge. The pre-test mean knowledge score was 11.03 with a standard deviation of 4.722, whereas the post-test mean knowledge score was 24.60 with a standard deviation of 1.625. The mean difference was 13.57 and the calculated paired t value was 21.20 at 0.05 level of significance. The findings indicate a significant improvement in knowledge following the educational intervention. Therefore, the educational intervention was found to be effective in improving knowledge regarding AQI and conservative management practices among intermediate students.
Keywords: Air Quality Index (AQI); Air Pollution; Educational Intervention; Knowledge; Conservative Management Practices; Intermediate Students.	
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INTRODUCTION

Air pollution is a major environmental health concern affecting people in both urban and rural areas. Ambient air pollution is associated with adverse health effects involving the respiratory and cardiovascular systems. Fine particulate matter can penetrate deeply into the lungs and may enter the bloodstream, contributing to systemic health effects.

The major pollutants of public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulphur dioxide. Exposure to air pollution can contribute to respiratory infections, reduced lung function, aggravated asthma, chronic obstructive pulmonary disease, cardiovascular disease, stroke and lung cancer.

The Air Quality Index is a useful communication tool that converts complex information about different air pollutants into a single index value and understandable categories. The National AQI in India includes six categories: Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe. Adolescents spend considerable time in school and outdoor environments and may be exposed to varying levels of air pollution. Adequate knowledge regarding AQI, sources of pollution, health effects and preventive practices can help students make informed decisions and adopt protective behaviours. Hence, an educational intervention focusing on AQI and conservative management practices may improve students' knowledge and encourage

appropriate measures to reduce exposure to poor air quality.

NEED OF THE STUDY

Air pollution has become an important public health concern because both short-term and long-term exposure can adversely affect health. WHO reports that ambient air pollution is associated with millions of premature deaths globally, particularly through cardiovascular and respiratory diseases.

Students are an important group for health education because knowledge acquired during adolescence can influence future health practices. Awareness regarding AQI can help students understand daily air-quality conditions and take appropriate preventive measures such as reducing unnecessary outdoor exposure during poor air quality, avoiding polluted environments and following appropriate protective practices.

In India, the National AQI provides information about air quality through six categories ranging from Good to Severe, allowing the public to understand potential health implications.

CPCB Air Quality

Therefore, the researcher felt the need to assess the existing knowledge of intermediate students regarding AQI and evaluate whether an educational intervention could improve their knowledge.

PROBLEM STATEMENT

“A Study to Evaluate the Effectiveness of Educational Intervention on Knowledge Regarding Air Quality Index (AQI) and Conservative Management Practices Among Intermediate Students in Selected School of Urban Kanpur, Uttar Pradesh.”

OBJECTIVES OF THE STUDY

To assess the pre-test level of knowledge regarding Air Quality Index (AQI) and conservative management practices among intermediate students.

To evaluate the effectiveness of educational intervention on knowledge regarding AQI and conservative management practices among intermediate students.

To compare the pre-test and post-test level of knowledge regarding AQI among intermediate students.

To determine the association between the level of knowledge and selected socio-demographic variables of intermediate students.

HYPOTHESIS

H₀₁: There will be no significant difference between the pre-test and post-test knowledge scores regarding AQI among intermediate students.

H₁: There will be a significant difference between the pre-test and post-test knowledge scores regarding AQI among intermediate students.

H₀₂: There will be no significant association between the pre-test level of knowledge regarding AQI and selected socio-demographic variables among intermediate students.

H₂: There will be a significant association between the pre-test level of knowledge regarding AQI and selected socio-demographic variables among intermediate students.

METHODS AND MATERIALS

Research Approach

A quantitative evaluative research approach was used for the present study.

Research Design

A quasi-experimental one-group pre-test post-test research design was adopted.

Design:

$O_1 \rightarrow X \rightarrow O_2$

Where:

O_1 = Pre-test assessment

X = Educational intervention

O_2 = Post-test assessment

Variables

Independent Variable:

Educational intervention regarding AQI and conservative management practices.

Dependent Variable:

Knowledge regarding AQI and conservative management practices among intermediate students.

SOCIO-DEMOGRAPHIC VARIABLES

The selected socio-demographic variables included:

- Age
- Gender
- Class/standard
- Stream of study
- Type of school
- Medium of instruction
- Residential area
- Type of family
- Previous knowledge/source of information regarding AQI

POPULATION

The population of the present study consisted of intermediate students.

Target Population: The target population comprised intermediate students studying in selected schools of urban Kanpur, Uttar Pradesh.

Accessible Population: The accessible population included intermediate students available in the selected school of urban Kanpur who fulfilled the inclusion criteria.

Sample: The sample consisted of intermediate students studying in the selected school of urban Kanpur, Uttar Pradesh.

Sample Size: The sample size of the present study was 60 intermediate students.

Sampling Technique: Non-probability purposive sampling technique was used for selecting the participants.

INCLUSION CRITERIA

The study included:

- Intermediate students studying in the selected school of urban Kanpur.
- Students who were available at the time of data collection.
- Students who were willing to participate in the study.
- Both male and female students.

EXCLUSION CRITERIA

The study excluded:

- Students who were not willing to participate.
- Students who were absent during data collection.

METHODS OF DATA COLLECTION

- Data were collected from intermediate students of the selected school in urban Kanpur, Uttar Pradesh.
- Written permission was obtained from the Principal of the selected school before data collection. Participants fulfilling the inclusion criteria were selected using purposive sampling.
- A pre-test was conducted using the structured knowledge questionnaire. Following the pre-test, the

educational intervention was administered through lecture method, discussion and audio-visual aids.

- After 7 days, a post-test was conducted using the same structured knowledge questionnaire to assess the effectiveness of the educational intervention.

DEVELOPMENT AND DESCRIPTION OF TOOLS USED IN THE STUDY

A structured knowledge questionnaire was developed to assess knowledge regarding AQI and conservative management practices.

The tool consisted of two sections:

Section A: Socio-demographic Variables

This section included items related to:

- Age
- Gender
- Class
- Stream of education
- Type of school
- Medium of instruction
- Residential area
- Type of family

Previous knowledge/source of information regarding AQI

Section B: Knowledge Questionnaire

This section consisted of 30 structured knowledge items related to:

- Meaning of AQI
- Categories of AQI
- Causes of poor air quality
- Major air pollutants
- Health effects of air pollution
- Preventive measures
- Conservative management practices
- Measures to reduce exposure to poor air quality

Each correct response was awarded 1 mark and each incorrect response was awarded 0 marks.

Maximum score = 30

Minimum score = 0

Scoring Interpretation

Level of Knowledge Scoring Criteria

S. No.	Level of Knowledge	Score	Percentage
1	Poor knowledge	0–10	0–33%
2	Average knowledge	11–20	34–66%
3	Good knowledge	21–30	67–100%

RESULTS

SECTION A: Frequency and Percentage-wise Distribution of Socio-demographic Variables

Table 01: Distribution of Students According to Age

S. No.	Age	Frequency (f)	Percentage (%)
1	15–16 years	27	45%
2	17–18 years	33	55%
Total		60	100%

The findings show that the majority of students, 33 (55%), were in the age group of 17–18 years, while 27 (45%) were in the age group of 15–16 years.

Table 02: Distribution of Students According to Gender

S. No.	Gender	Frequency (f)	Percentage (%)
1	Male	24	40%
2	Female	36	60%
Total		60	100%

The findings show that the majority of students, 36 (60%), were female, while 24 (40%) were male.

Table 03: Distribution of Students According to Class/Standard

S. No.	Class/Standard	Frequency (f)	Percentage (%)
1	11th	20	33.3%
2	12th	40	66.7%
Total		60	100%

The majority of students, 40 (66.7%), were studying in class 12th, whereas 20 (33.3%) were studying in class 11th.

Note: The original percentages of 32% and 68% do not exactly correspond to frequencies of 20 and 40 out of 60. The mathematically correct percentages are 33.3% and 66.7%.

Table 04: Distribution of Students According to Stream of Study

S. No.	Stream of Study	Frequency (f)	Percentage (%)
1	Science	43	71.7%
2	Arts	1	1.7%
3	Commerce	16	26.6%
Total		60	100%

The majority of students, 43 (71.7%), belonged to the Science stream, followed by 16 (26.6%) from Commerce and 1 (1.7%) from Arts.

Table 05: Distribution of Students According to Type of School

S. No.	Type of School	Frequency (f)	Percentage (%)
1	Government	0	0%
2	Private	60	100%
3	Aided	0	0%
Total		60	100%

All 60 (100%) students belonged to a private school.

Table 06: Distribution of Students According to Medium of Instruction

S. No.	Medium of Instruction	Frequency (f)	Percentage (%)
1	English	60	100%
2	Hindi	0	0%
Total		60	100%

All 60 (100%) students had English as their medium of instruction.

Table 07: Distribution of Students According to Residential Area

S. No.	Residential Area	Frequency (f)	Percentage (%)
1	Urban	18	30%
2	Rural	36	60%
3	Semi-urban	6	10%
Total		60	100%

The majority of students, 36 (60%), belonged to rural areas, followed by 18 (30%) from urban areas and 6 (10%) from semi-urban areas.

Table 08: Distribution of Students According to Type of Family

S. No.	Type of Family	Frequency (f)	Percentage (%)
1	Nuclear	29	48%
2	Joint	31	52%
3	Extended	0	0%
Total		60	100%

The majority of students, 31 (52%), belonged to joint families, whereas 29 (48%) belonged to nuclear families. None of the students belonged to an extended family.

SECTION B: Distribution of Intermediate Students According to Their Level of Knowledge Regarding AQI

Table 09: Pre-test and Post-test Level of Knowledge Regarding AQI

S. No.	Level of Knowledge	Pre-test n (%)	Post-test n (%)
1	Poor knowledge	28 (46.7%)	0 (0%)
2	Average knowledge	32 (53.3%)	14 (23.3%)
3	Good knowledge	0 (0%)	46 (76.7%)
Total		60 (100%)	60 (100%)

The findings show that in the pre-test, 28 (46.7%) students had poor knowledge and 32 (53.3%) had average knowledge, while none had good knowledge. After the educational intervention, none of the students had poor knowledge, 14 (23.3%) had average knowledge and 46 (76.7%) had good knowledge. Thus, a marked improvement in the level of knowledge was observed after the educational intervention.

SECTION C: Comparison of Pre-test and Post-test Knowledge Regarding AQI

Table 10: Comparison of Pre-test and Post-test Knowledge Scores

S. No.	Test	Mean	Mean %	Mean Difference	Standard Deviation (SD)
1	Pre-test	11.03	36.76 %	—	4.722
2	Post-test	24.60	82.00 %	13.57	1.625

The findings show that the pre-test mean knowledge score was 11.03 (36.76%), whereas the post-test mean knowledge score increased to 24.60 (82.00%). The mean difference between the pre-test and post-test knowledge scores was 13.57, indicating a substantial improvement in knowledge following the educational intervention.

SECTION D: Effectiveness of Educational Intervention Regarding AQI among Intermediate Students

Table 11: Effectiveness of Educational Intervention on Knowledge Regarding AQI

S. No.	Test	Mean	Mean Difference	SD	Paired t Value	Level of Significance
1	Pre-test	11.03	13.57	4.722	21.20	0.05, HS

2	Post-test	24.60	—	1.625	—	—
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The calculated paired t value was 21.20, which was statistically significant at the 0.05 level of significance. The findings indicate that there was a significant difference between the pre-test and post-test knowledge scores.

Therefore, the null hypothesis (H_{01}) was rejected and the research hypothesis (H_{11}) was accepted. This indicates that the educational intervention was effective in improving knowledge regarding Air Quality Index (AQI) and conservative management practices among intermediate students.

SECTION E: Association between Level of Knowledge and Selected Socio-demographic Variables

The association between the level of knowledge and selected socio-demographic variables was assessed using the Chi-square (χ^2) test.

Table 12: Association between Level of Knowledge and Selected Socio-demographic Variables

S. No.	Socio-demographic Variable	Calculated χ^2 Value	Table Value	Level of Significance	Finding
1	Age	1.95	3.84	0.05	Not significant
2	Gender	3.21	3.84	0.05	Not significant
3	Class/Standard	0.01	3.84	0.05	Not significant
4	Stream of Study	1.77	5.99	0.05	Not significant
5	Type of School	N/A	N/A	0.05	Not applicable
6	Medium of Instruction	N/A	N/A	0.05	Not applicable
7	Residential Area	13.72	5.99	0.05	Significant
8	Type of Family	3.51	3.84	0.05	Not significant

The findings indicate that there was no significant association between the level of knowledge regarding AQI and the socio-demographic variables of age, gender, class/standard, stream of study, and type of family, as the calculated χ^2 values were less than the respective table values.

However, a significant association was found between the level of knowledge and residential area, as the calculated χ^2 value (13.72) was greater than the table value (5.99) at the 0.05 level of significance.

The variables type of school and medium of instruction could not be tested meaningfully because all 60 students belonged to the same category for these variables.

The study findings demonstrate that the educational intervention produced a significant improvement in students' knowledge regarding Air Quality Index (AQI) and conservative management practices. The mean knowledge score increased from 11.03 in the pre-test to 24.60 in the post-test, with a mean difference of 13.57 and a paired t value of 21.20, which was significant at the 0.05 level. Therefore, the educational intervention was found to be effective among intermediate students.

CONCLUSION

The present study was conducted to evaluate the effectiveness of an educational intervention on knowledge regarding Air Quality Index (AQI) and conservative management practices among intermediate students.

The findings demonstrated a considerable improvement in knowledge after the educational intervention. The pre-test mean knowledge score was 11.03, which increased to 24.60 in the post-test. The mean difference was 13.57 and the calculated paired t value was 21.20, which was significant at the 0.05 level. In the pre-test, 46% of students had poor knowledge and 54% had average knowledge. Following the intervention, 76.7% of students achieved good knowledge and only 23.3% remained in the average knowledge category. Therefore, the study concluded that the educational intervention was effective in improving knowledge regarding AQI and conservative management practices among intermediate students.

The study highlights the importance of providing structured health education to students regarding air pollution, AQI, associated health effects and preventive practices. Awareness of AQI can help individuals understand air-quality conditions and make appropriate decisions to reduce exposure to polluted air.

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AUTHOR CONTRIBUTION

All authors are contributed equally.

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