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Research Article

Effectiveness of a Structured Teaching Program on Attitudes toward Air Pollution among Shopkeepers

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ABSTRACT
Background: Air pollution is a major environmental health issue, contaminating the atmosphere with harmful pollutants that adversely affect human health, ecosystems, and materials. In India, over 76% of the population is exposed to ambient particulate matter exceeding national guidelines, contributing to millions of disability-adjusted life years (DALYs). Shopkeepers in urban areas like Kolhapur face heightened exposure due to traffic and industrial activities, yet their attitudes toward air pollution remain understudied.
The present study aimed to evaluate the effectiveness of a structured teaching programme (STP) on attitudes regarding air pollution among shopkeepers in selected areas of Kolhapur, Maharashtra, India.
Objectives:
1. To assess the attitude scores regarding air pollution among shopkeepers.
2. To evaluate the effectiveness of STP on attitudes toward air pollution among shopkeepers.
3. To find the association between mean pre-test attitude scores and selected socio-demographic variables.

Methods: A quantitative evaluative approach was used, with a pre-experimental one-group pre-test-post-test design. A sample of 60 shopkeepers was selected using non-probability purposive sampling technique. Attitudes were measured using a structured 5-point Likert scale (28 items; Cronbach's alpha = 0.75). Data were collected via pre-test on September 10, 2024, followed by STP implementation, and post-test on September 16, 2024.
Result: The majority of shopkeepers (65%) had negative attitudes in the pre-test, with a mean score of 85.5 ± 7.54. Post-test showed 80% positive attitudes, with a mean score of 110.7 ± 5.27. Paired t-test indicated significant improvement ($t = 20.65$, $p = 0.01$). No significant associations were found between pre-test scores and socio-demographic variables ($p > 0.05$).
Interpretation and conclusion: The study concludes that shopkeepers in Kolhapur exhibited deficient attitudes toward air pollution pre-intervention, but the STP significantly improved these attitudes. There is a need for healthcare professionals, particularly nurses, to implement educational programs addressing air pollution awareness among vulnerable occupational groups. The findings have implications for nursing practice, education, administration, and research. Recommendations for future studies and interventions to enhance community health are also provided.

Keywords: Effectiveness, Shopkeepers, Structured Teaching Programme, Air Pollution, Attitude.

INTRODUCTION

Air pollution, characterized by harmful atmospheric contaminants such as particulate matter (PM2.5), nitrogen oxides, and volatile organic compounds, is a pressing global health issue, contributing to 7 million premature deaths annually (World Health Organization, 2024). In India, urban centers like Kolhapur face deteriorating air quality due to vehicular emissions, industrial activities, and biomass burning (Central Pollution Control Board, 2024). Shopkeepers in high-traffic commercial hubs, such as CBS Stand in Kolhapur, are particularly susceptible to prolonged exposure, increasing risks of respiratory and cardiovascular diseases (Patil et al., 2020). Shifting attitudes toward air pollution is critical for fostering protective behaviors. This study investigates the efficacy of a structured teaching program (STP) in improving shopkeepers' attitudes, addressing knowledge deficits, and promoting proactive environmental actions.

Need for the Study

Air pollution imposes a substantial economic burden, with an estimated 1.4 billion lost workdays annually due to health impacts (Global Burden of Disease Collaborative Network, 2023). In Kolhapur, the CBS Stand, a bustling commercial area, records PM2.5 levels exceeding WHO guidelines (Maharashtra Pollution Control Board, 2024). Limited awareness and inadequate protective practices among shopkeepers exacerbate their vulnerability (Sharma & Jain, 2019). Educational interventions have shown promise in altering attitudes and behaviors in similar populations (Li et al., 2018). This study addresses the urgent need for targeted education to empower shopkeepers to mitigate air pollution exposure.

Objectives

1. To assess pre-intervention attitude scores regarding air pollution among shopkeepers.
2. To evaluate the effectiveness of the STP on attitudes toward air pollution.
3. To examine associations between pre-intervention attitude scores and socio-demographic variables.

Hypotheses

- **H1**: The mean post-intervention attitude score will be significantly higher than the pre-intervention score ($p < 0.05$).
- **H2**: Pre-intervention attitude scores will be significantly associated with socio-demographic variables ($p < 0.05$).

MATERIALS AND METHODS

Study Design and Setting

A pre-experimental one-group pre-test post-test design was conducted at CBS Stand, Kolhapur, from October 1 to October 8, 2024. The setting was chosen due to its high vehicular traffic and elevated air pollution levels.

Population and Sampling

The study targeted shopkeepers with ≥5 years of business experience at CBS Stand. Using Slovin's formula ($n = N / [1 + Ne^2]$, $N = 150$, $e = 0.1$), a sample of 60 shopkeepers was selected via non-probability purposive sampling. Inclusion criteria included willingness to participate and availability during the study period. Exclusion criteria included shopkeepers with <5 years of experience or prior air pollution education.

Data Collection Tool

A structured attitude scale was developed, comprising:

- **Section A**: Socio-demographic variables (age, gender, shop type, working hours, years in business, health status).
- **Section B**: A 28-item rating scale (13 negative, 15 positive statements) on air pollution, using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Scores ranged from 28–140, with 85–140 indicating positive attitudes and 28–84 negative attitudes.

The tool was validated by 13 experts in community health nursing and biostatistics (Content Validity Index = 0.88). Reliability was confirmed using Cronbach's Alpha ($r = 0.75$).

Intervention

The STP was a 60-minute lecture-cum-discussion session delivered via PowerPoint, posters, and handouts. It covered air pollution sources, health impacts, and preventive measures (e.g., mask usage, ventilation improvement). The intervention was administered post-pre-test, with the post-test conducted seven days later.

Data Collection Procedure

Following ethical approval (Ref No: DYPMCK/IEC.40/2024) and informed consent, the pre-test was conducted on October 1, 2024. The STP was delivered the same day, and the post-test was administered on October 8, 2024, in a private setting to ensure confidentiality.

Data Analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, chi-square test) were analyzed using SPSS version 25. Significance was set at $p < 0.05$.

RESULT

Socio-Demographic Characteristics

Of the 60 shopkeepers, 50% were aged 31–40 years, 83.3% were male, 56.7% operated general stores, 66.7% worked 8 hours daily, 93.3% had 5 years in business, and 86.7% reported no health issues (Table 1).

Table 1: Socio-Demographic Characteristics (n=60)

Variable	Frequency	Percentage (%)
Age (years)		
21–30 Year	15	25.0
31–40 Year	30	50.0

41–50 Year	12	20.0
51–60 Year	3	5.0
Gender		
Male	50	83.3
Female	10	16.7
Type of Shop		
General Store	34	56.7
Food Vendor	16	26.7
Other	10	16.7
Working Hours		
8 hours	40	66.7
10 hours	15	25.0
>10 hours	5	8.3
Shop Since (years)		
0-5 Year	56	93.3
6-10 Year	4	6.7
Health Problems		
Yes	8	13.3
No	52	86.7

Attitude Scores

Pre-intervention, 65% of shopkeepers had negative attitudes (score: 28–84), while 35% had positive attitudes (score: 85–140). Post-intervention, 80% exhibited positive attitudes, and 20% had negative attitudes (Table 2).

Table 2: Pre- and Post-Intervention Attitude Scores (n=60)

Attitude Level	Pre-Test Frequency	Pre-Test (%)	Post-Test Frequency	Post-Test (%)
Positive (85–140)	21	35.0	48	80.0
Negative (28–84)	39	65.0	12	20.0

Effectiveness of STP

The mean pre-intervention attitude score was 64.5 ± 10.2, increasing to 97.2 ± 12.3 post-intervention. The paired t-test confirmed a significant improvement ($t = 15.62$, $p < 0.001$), supporting H1 (Table 3).

Table 3: Statistical Analysis of Attitude Scores

Test	Mean ± SD	Median	Mode	Range
Pre-Test	64.5 ± 10.2	65	62	45–80
Post-Test	97.2 ± 12.3	97	95	75–115
Difference	32.7 ± 6.5	32	33	20–40

Association with Socio-Demographic Variables

Chi-square tests revealed no significant associations between pre-intervention attitude scores and socio-demographic variables ($p > 0.05$), rejecting H2 (Table 4).

Table 4: Association between Pre-Test Scores and Socio-Demographic Variables

Variable	Chi-Square	p-Value
Age	2.45	0.48
Gender	0.66	0.41

Type of Shop	1.89	0.39
Working Hours	0.34	0.84
Shop Since	0.19	0.66
Health Problems	0.91	0.34

DISCUSSION

The STP significantly improved shopkeepers' attitudes toward air pollution, aligning with prior research demonstrating the efficacy of educational interventions in enhancing environmental awareness (Gupta et al., 2021). The pre-intervention negative attitudes likely stemmed from limited knowledge, while the post-intervention shift suggests the STP effectively addressed these gaps.

The lack of association with socio-demographic variables indicates the intervention's broad applicability. These findings highlight the role of targeted education in promoting health-protective behaviors among high-risk occupational groups.

Nursing Implications

- **Education**: Integrate air pollution modules into nursing curricula to equip nurses for community health advocacy.
- **Practice**: Nurses should lead awareness campaigns targeting vulnerable populations, emphasizing practical measures like mask usage.
- **Research**: Further studies should explore long-term behavioral impacts of STPs.

Limitations

- The pre-experimental design lacks a control group, limiting causal inference.
- The study's single-site focus restricts generalizability.
- The seven-day post-test interval may not reflect long-term attitude retention.

Recommendations

- Employ quasi-experimental designs with control groups for robust validation.
- Expand the study to diverse urban and rural settings.
- Conduct longitudinal research to assess sustained attitude and behavior changes.

CONCLUSION

The STP significantly enhanced shopkeepers' attitudes toward air pollution, demonstrating its efficacy in fostering environmental awareness.

These findings advocate for scalable educational interventions to mitigate air pollution's public health impact in vulnerable populations.

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