"Effectiveness of a Structured Teaching Programme on Prevention of Respiratory Tract Infections among Timber Workers in Bangalore".

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A R T I C L E I N F O

A B S T R A C T

Background: Respiratory tract infections (RTIs) are a common occupational health issue among timber workers due to prolonged exposure to wood dust.The goal of the current study was to assess the efficacy of a structured instruction programme on preventing respiratory tract infections among woodworkers in a few Bangalore sawmills.**Methods:** A pre-experimental one-group pre-test and post-test design was used among 75 purposively selected sawmill workers in Bangalore. A structured teaching programme (STP) was implemented to improve knowledge about RTI prevention.**Results:** There was a significant increase in the mean post-test knowledge score (21.92 ± 2.78) compared to the pre-test score (18.01 ± 1.40), indicating the effectiveness of the STP (t = 16.478, $p<$ 0.001).**Conclusion:** The STP was effective in improving knowledge about RTI prevention among timber workers.

Introduction

Respiratory tract infections (RTIs) are a major occupational health concern among workers exposed to wood dust, especially those employed in sawmills. Prolonged inhalation of wood dust can lead to various respiratory problems such as allergic rhinitis, chronic sinusitis, chronic obstructive pulmonary disease (COPD), hypersensitivity pneumonitis, and bronchial asthma. Studies have shown that sawmill workers are at a higher risk of developing respiratory symptoms such as cough, sputum production, and breathing difficulties due to continuous exposure to wood particles during cutting and processing operations

Despite the well-documented risks, many timber workers lack adequate knowledge regarding respiratory tract infections and preventive strategies. Educational interventions, such as structured teaching programmes, play a crucial role in improving awareness and promoting safe practices. By enhancing workers' knowledge, such interventions can encourage the use of protective equipment and adoption of preventive behaviours, ultimately reducing the incidence of respiratory illnesses.

Although previous studies have examined the health effects of wood dust exposure, limited research has focused on educational interventions aimed at improving the knowledge of timber workers regarding RTI prevention. Therefore, this study was undertaken to evaluate the effectiveness of a structured teaching programme in enhancing knowledge among timber workers, thereby addressing a critical gap in occupational health education.

Need For the Study

Exposure to wood dust may result in issues with both internal and exterior health. Dermatitis, allergic respiratory effects, mucosal and non-allergic respiratory effects, cancer, and allergy respiratory issues are some of the negative health impacts connected with exposure to wood dust. The interior portions of the tree's heart wood are typically where you can find the compounds in wood that are linked to allergic reactions. There have been reports of hypersensitive reactions leading to asthma as a result of exposure to frequently used wood[5].

Professionals who shape cut or work with wood have been linked to adverse health consequences; sawmill workers and those who work with wood products make up the majority of the workforce with respiratory issues. The main exposure during the sawing of the wood may be wood dust. Use of the wet cutting procedure is the first line of defense against exposure to wood dust. Respirators are a secondary kind of protection that should only be utilized after other engineering controls or wet cutting techniques have been evaluated[5].

To ascertain the risk variables for high exposure to airborne endotoxin and to pinpoint the causes of high exposures, a study was carried out. In four sawmills, personal endotoxin samples (n = 216) were gathered. 9% of the samples had

levels over 5 ng/m3, and the average personal exposure concentration was 2.09 ng/m3. The type of work, compressed air, the percentage of time spent in a booth or cab during a shift, dust concentration, and long storage practices were all linked to personal endotoxin exposure. Comparing the amounts of exposure recorded in this study to those reported for populations with respiratory issues linked to end toxins, they were minimal[6].

Statementoftheproblem
A study to evaluate the effectiveness of a structured teaching programme on prevention of respiratory tract infection among Timber workers in selected sawmills at Bangalore.

Objectives of the Study
1. Assess the pretest knowledge level of sawmill workers regarding respiratory tract infection.
2. Develop a structured teaching programme.
3. Evaluate the effectiveness of the structured teaching programme regarding prevention of respiratory tract infection.
4. Determine the associations between pretest knowledge score of sawmill workers regarding prevention of respiratory tract infection with selected socio demographic variables.

Hypotheses:
H_1 . The mean posttest knowledge scores of the Timber workers regarding prevention of respiratory tract infection is significantly higher than the mean pretest knowledge scores.
H_2 . There is a significant association between the mean pretest and posttest knowledge scores of sawmill workers regarding prevention of respiratory tract infection and the selected socio demographic variables.

Methodology
An evaluative research approach was considered appropriate for this study, using a pre-experimental one-group pre-test and post-test design to assess the effectiveness of the structured teaching programme (STP). The population for the present study comprised timber workers employed in selected sawmills in Bangalore.
Sample and Sampling Technique
The sample size consisted of 75 timber workers selected using a non-probability purposive sampling technique. This method was chosen because it allowed the researcher to specifically target individuals who met the inclusion criteria and were most likely to provide relevant data for the study. However, purposive sampling has limitations, including reduced generalizability of findings and the potential for researcher bias.

Inclusion Criteria

1. Timber workers aged 18–60 years.
2. Currently employed in selected sawmills.
3. Individuals who understood the local language and were willing to participate.
4. Workers present during the data collection period.

Exclusion Criteria

1. Timber workers with pre-existing chronic respiratory diseases such as asthma, COPD, or tuberculosis.
2. Workers who were absent or unavailable during the data collection period.
3. Those unwilling to provide informed consent.

Variables of the Study
- Independent variable: Structured Teaching Programme on knowledge regarding prevention of respiratory tract infections.
- Dependent variable: Knowledge level of timber workers about respiratory problems.

Data Collection Tool
The tool used for the study consisted of a structured questionnaire schedule and the structured teaching programme. The questionnaire had three parts:

- Part I: Socio-demographic variables such as age, education, marital status, duration of work, hours of contact with machinery, monthly income, type of family, and smoking habits.
- Part II: Nineteen multiple-choice questions on general information about respiratory tract infections, including the anatomy and function of the respiratory system, causes, signs and symptoms, types, and diagnostic evaluation.
- Part III: Nineteen multiple-choice questions on preventive and management measures for respiratory tract infections.

The tool was validated by seven experts for content validity, feasibility, and relevance. The reliability coefficient of the knowledge questionnaire was determined using Cronbach's alpha, yielding a value of 0.94, indicating excellent internal consistency.
Procedure
The pre-test was conducted using the structured knowledge questionnaire, followed by the implementation of the structured teaching programme. After seven days, a post-test was conducted using the same questionnaire to evaluate the effectiveness of the intervention.

Ethical Considerations

- Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study.
- Written informed consent was obtained from each participant after explaining the purpose, procedure, and potential benefits of the study.
- Participants were assured of confidentiality and informed that their participation was voluntary, with the option to withdraw at any time without penalty.

Data Analysis

Data were collected, coded, and analyzed using descriptive and inferential statistics. Results were presented in tabular and graphical formats to meet the study objectives and test the hypotheses.

Results

The results of the study were as follows.

Table: Frequency and percentage distribution of demographic Variables

Variable	Demographic Variables	Frequency Number	Percentage
Age	15 – 25 years	16	21
	26- 36 years	36	48
	37- 47 years	23	31
Educational status	Primary	32	43
	Middle	34	45
	Secondary	9	12
Marital status	Unmarried	45	60
	Married	30	40
Duration of working	Below 5 years	41	55
	6-10 years	18	24
	11- 15 years	16	21
No. of hours contact with machine	1-3 Hours	16	21
	4- 6 hours	46	61
	More than 6 Hours	13	18
Monthly Income	Rs. 2000- 3000	28	38
	Rs. 3001- 4000	22	29
	Rs. 4001 & above	25	33
Type of family	Nuclear	40	53
	Joint	21	28
	Extended	14	19
Smoking Habit	Yes	30	40
	No	45	60

Table 2: Percentage Distribution of knowledge of Timber Worker regarding prevention of RTI.

Level of Knowledge	Category	Pretest	
		Number	Percentage
Inadequate	<50% score	65	87%
Moderate	51 - 75% score	10	13%
Adequate	> 75% score	0	0%
		75	100%

Table 3: Percentage Distribution of Posttest knowledge of Timber Worker regarding prevention of RTI.

Level of Knowledge	Category	Posttest	
		Number	Percentage
Inadequate	<50% score	0	0%
Moderate	51 - 75% score	17	23%
Adequate	> 75% score	58	77 %
		75	100%

Table 4: Evaluation of the effectiveness of STP on knowledge regarding RTI among timber workers.   n= 75

Sl. No	Knowledge Variables	Pretest		Posttest		Mean Difference	Paired 't' value	P value
		Mean	SD	Mean	SD			
1.	Meaning, Cause, Signs &symptoms and Diagnostic evaluation.	8.49	1.27	10.41	1.09	1.92	10.82*	0.005
2.	Preventive and management measures.	11	1.02	12.03	1.1	1.03	6.13*	0.005

*Highly significant at 0.005 level

Table 5: Improvement Mean score of the overall level of knowledge between Pretest and Posttest

n = 75

Sl. No.	Groups	Mean	Standard deviation	Mean difference	Paired 't' value	P value
1.	Pretest	18.0133	1.403234	3.889	t =16.478**	0.005
2.	Posttest	21.92	2.789261			

Table 6: Association of posttest knowledge with Demographic variables

Sl. No.	Demographic Variables	Frequency Number	Mean	SD	Chi Square	P Value
1	**Age**				12.583*	11.34
	15 – 25 years	16	40.33	2.08		
	26- 36 years	36	39.27	3.14		
	37- 47 years	23	40.40	2.29		
2	**Educational status**				14.958*	11.5
	Primary School	32	39.74	3.29		
	Middle School	34	40.15	2.97		
	Secondary School	9	40.08	2.9		
3	**Marital status**				1.325	6.33
	Unmarried	45	40.02	3.13		
	Married	30	39.14	3		
4	**Duration of working**				13.537*	11.34
	Below 5 years	41	41.56	1.58		
	6-10 years	18	39.25	3.93		

	11- 15 years	16	39.96	3.01		
5	**Hrs. of contact with machine work.**				9.291*	9.21
	1-3 Hours	16	39.50	2.92		
	4- 6 hours	46	39.36	2.93		
	More than 6 Hours	13	40.24	3.33		
6	**Monthly Income**				5.456Ns	8.21
	Rs. 2000- 3000	28	39.44	3.35		
	Rs. 3001- 4000	22	42.00	1.41		
	Rs. 4001 & above	25	40.00	3.33		
7	**Type of family**				3.095Ns	7.21
	Nuclear	40	41.00	0		
	Joint	21	38.83	3.06		
	Extended	14	41.00	2.74		
8	**Smoking habit**				6.11Ns	6.63
	Yes	30	42.60	1.67		
	No	45	41.75	4.5		

Ns – Not significant at 0.005level   ** Significant at 0.005 level

Discussion

The study evaluated the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding respiratory tract infection (RTI) prevention among timber workers.

Before the intervention, **87%** of participants had inadequate knowledge and **13%** had moderate knowledge, with a mean pre-test score of **18.01**, indicating a lack of awareness. After the STP, there was a significant improvement, with **77%** achieving adequate knowledge and a mean post-test score of **21.92** (t = 16.478, p< 0.001), confirming the effectiveness of the intervention.

A significant association was found between post-test knowledge and demographic factors such as age, educational status, duration of work, **and** hours of contact with machinery**,** while no significant association was observed with marital status, income, type of family, or smoking habits. These findings align with previous research indicating that educational interventions improve awareness and promote preventive behaviours among high-risk occupational groups.

Implications

- **Nursing Education:** Findings can be incorporated into nursing curricula to emphasize occupational health and prevention of RTIs.
- **Nursing Practice:** Nurses can play a pivotal role in educating workers and promoting preventive measures.
- **Nursing Administration:** Administrators can organize regular health education programs and in-service training for nurses and timber workers.

- **Nursing Research:** Future studies can focus on larger populations, other variables such as attitudes and practices, and long-term outcomes.

Recommendations

3. Conduct similar studies on other domains such as **attitudes and practices**.
4. Replicate the study on a **larger sample size** for broader applicability.
5. Carry out **comparative studies** in different industries like flour mills.
6. Undertake **descriptive studies** to evaluate long-term benefits of preventive strategies.

Conclusion

The study demonstrated that a Structured Teaching Programmesignificantly improved the knowledge of timber workers regarding RTI prevention. The mean post-test score was notably higher than the pre-test score, confirming the effectiveness of the intervention.

Educational programs are essential for promoting safe practices and reducing the incidence of RTIs among occupational groups. Future research with larger, randomized samples is recommended to strengthen evidence and guide workplace health policies.

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