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A Study to Assess the Effectiveness of Video Assisted Teaching Programme on Knowledge and Attitude Regarding Ill Effects of Frostbite Among Workers in Selected Ice Factories of Kanpur

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Abstract:

Frostbite is a serious cold-induced injury prevalent among workers in ice factories due to prolonged exposure to low temperatures. Lack of awareness can lead to severe complications including tissue necrosis and amputation. Despite being preventable, frostbite continues to affect numerous individuals due to poor awareness and delayed treatment-seeking behavior. Aims of Study **is** to assess the effectiveness of a video-assisted teaching programme on knowledge and attitude regarding the ill effects of frostbite among workers in selected ice factories of Kanpur. A quasi-experimental one-group pre-test post-test design was used among 40 workers from New Crystal Ice Factory, Kanpur. Participants were selected using simple random sampling. A self-structured knowledge and attitude questionnaire was employed for data collection. The video-assisted teaching included visual demonstrations on causes, symptoms, preventive methods, and first-aid measures for frostbite. Statistical analysis was carried out using descriptive statistics, paired t-test, and chi-square test. The study revealed a statistically significant improvement in post-test scores ($p<0.005$), with workers exhibiting enhanced understanding of frostbite, improved preventive practices, and more positive attitudes. Associations were observed between knowledge levels and selected demographic factors such as age and religion. The video-assisted teaching programme proved to be a successful strategy to improve both knowledge and attitude related to frostbite among ice factory workers. It serves as an effective, practical, and scalable approach for occupational health education.

Keywords: Frostbite, Ice factory workers, Video-assisted teaching, Knowledge, Attitude, Occupational health, Preventive education.

Background of the Study:

Frostbite is a critical health concern arising from prolonged exposure to freezing temperatures, leading to freezing of body tissues, especially in extremities. Workers in ice factories are regularly subjected to cold environments, making them highly susceptible to frostbite and its severe consequences. Despite being preventable, the lack of proper knowledge, protective measures, and early intervention among industrial workers often results in complications such as infection, gangrene, and even amputation.

In India, particularly in the northern regions during peak winter or within cold storage industries, workers experience frequent cold-related injuries, yet there remains a gap in occupational health education addressing this hazard. The burden of frostbite is further intensified by low literacy levels, minimal health awareness programs, and limited access to occupational health services.

Preventive strategies such as proper clothing, periodic monitoring, and educational interventions have shown potential in mitigating these risks. Among various educational strategies, video-assisted teaching programmes stand out due to their visual appeal, clarity of demonstration, and ability to engage adult learners effectively. Thus, implementing such interventions within the industrial workforce can bridge the knowledge gap, promote preventive behaviours, and reduce frostbite-related morbidity and disability.

Need for the Study:

Frostbite is a critical but often neglected occupational health hazard, particularly in environments like ice factories where workers are continuously exposed to sub-zero temperatures. Despite its preventable nature, frostbite still leads to

substantial morbidity including tissue damage, necrosis, and even amputations, primarily due to lack of awareness and early intervention strategies.

In Uttar Pradesh, a descriptive study conducted in 2019–2020 identified 29 confirmed frostbite cases among young male laborers working under freezing conditions in cold-chain facilities. Most of these cases exhibited first- and second-degree injuries due to insufficient protective clothing and lack of timely medical attention. Another local study from Barabanki district in 2022 revealed that 35% of cold-exposed workers were unaware of basic preventive measures against frostbite, emphasizing the urgent need for educational interventions.

India as a whole report a high incidence of cold-related mortality, with over 655,000 deaths attributed to low temperatures annually.[10] Uttar Pradesh alone accounts for nearly 31% of these cold-wave-related fatalities, making it one of the most affected states after Bihar. In an extreme case during the 2012 Indian cold wave, Uttar Pradesh recorded at least 92 deaths within a single winter season. These alarming statistics underline the vulnerability of unprotected laborers, including ice factory workers.

Globally, studies from Finland and the United States further confirm the occupational risks of frostbite. A Finnish population-based study indicated that 12.9% of workers experienced mild frostbite annually, while the United States has reported frostbite incidence rates of 0.83 per 100,000 with higher severity in homeless populations and those with outdoor professions.

Considering the lack of structured awareness and training, especially among the labor class, this study was deemed essential to bridge the educational gap.[13] A video-assisted teaching programme is a feasible, engaging, and evidence-based approach to equip workers with the necessary knowledge and attitude to recognize, prevent, and respond to frostbite effectively. Implementing such initiatives in industrial settings can potentially reduce the burden of cold injuries and enhance occupational safety standards.

Statement of the Problem:

"**An evaluation of the impact of a video-assisted instructional program on the knowledge and attitudes of workers in selected ice factories of Kanpur concerning the adverse effects of frostbite".**

Objectives:

1. To determine the extent of knowledge workers, have about the negative consequences of frostbite.
2. To assess the level of attitude regarding the ill effects of frostbite among workers.
3. To analyze the role of video-supported education in increasing understanding and influencing attitudes toward frostbite hazards in workers.
4. To determine if there is a correlation between post-test knowledge outcomes and specific sociodemographic attributes.

Hypothesis

H1 – A considerable enhancement in workers' knowledge scores was noted after the video-assisted instruction program on the detrimental effects of freezing to the skin, demonstrating a marked difference between pre-test and post-test outcomes.

H2 – A notable alteration in workers' ratings of attitude was evident after the video-assisted instruction program on the detrimental effects of frostbite, reflecting a substantial enhancement from pre-test to post-test.

H3 – The analysis revealed a statistically significant relationship between workers' knowledge after the intervention and their demographic profiles.

Research Approach:

A quantitative evaluative research approach was adopted for the study to evaluate the effectiveness of a video-assisted instructional program on workers' knowledge and attitudes regarding frostbite.

Research Design:
A pre-experimental one-group pre-test post-test design was used to assess the impact of the intervention.

Setting of the Study:
The study was conducted among industrial workers in a New Crystal Ice Factory Kanpur cold-environment occupational setting.

Population:
The target population consisted of workers employed in cold exposure environments.

Sample and Sampling Technique:

A sample of 60 workers was selected using Simple random technique sampling technique based on inclusion and exclusion criteria.

Inclusive criteria

Participants who meet all the following criteria will be included in the study:

1. Workers employed in selected ice factories of Kanpur**.**
2. Workers aged between 18 to 60 years**.**
3. Workers who are willing to participate and give written informed consent**.**

Exclusive criteria

Participants who meet any of the following criteria will be excluded from the study:

1. Workers who have already received formal training or education about frostbite or cold-related injuries in the past 6 months.
2. Workers who are on leave or absent during the data collection period.

Tool for Data Collection:

1. **Structured Knowledge Questionnaire** – To assess knowledge regarding frostbite before and after the intervention.
2. **Attitude Scale (Likert-type)** – To assess the change in attitude regarding frostbite effects and prevention.
3. **Sociodemographic Profile Sheet** – To collect data on age, gender, faith, where they live, how much money they make each month, and whether they have been to any teaching programs on how to avoid frostbite.

Intervention:
A video-assisted instructional program focusing on the causes, signs, effects, prevention, and first aid of frostbite was developed and administered to participants.

Data Collection Procedure:

- **Pre-test** was conducted using the structured tools.
- **Intervention** was administered on the same day.
- **Post-test** was conducted after a specified period (e.g., one week) using the same tools.

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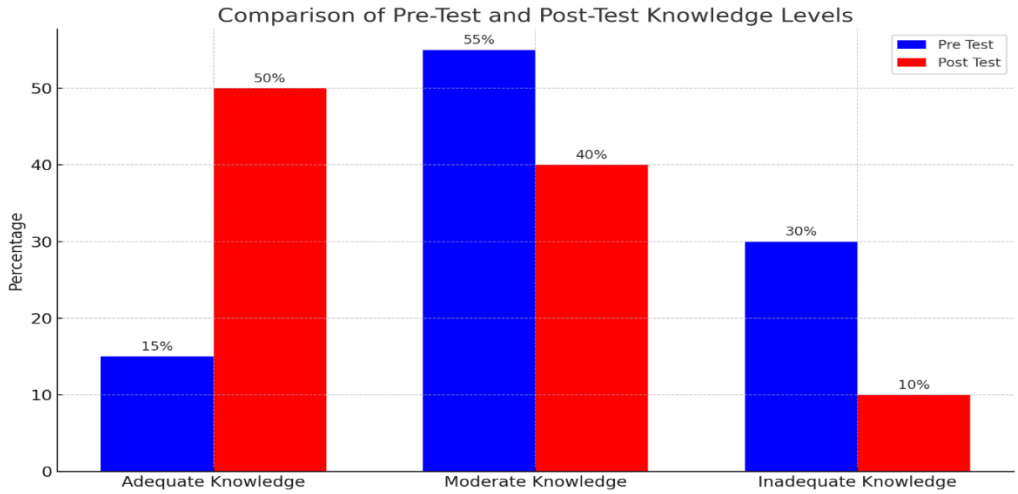
Data Analysis:

Descriptive statistics (mean, frequency, percentage) were used to summarize the data. Inferential statistics (paired t-test, chi-square test) were used to evaluate the effectiveness of the intervention and its association with sociodemographic variables.



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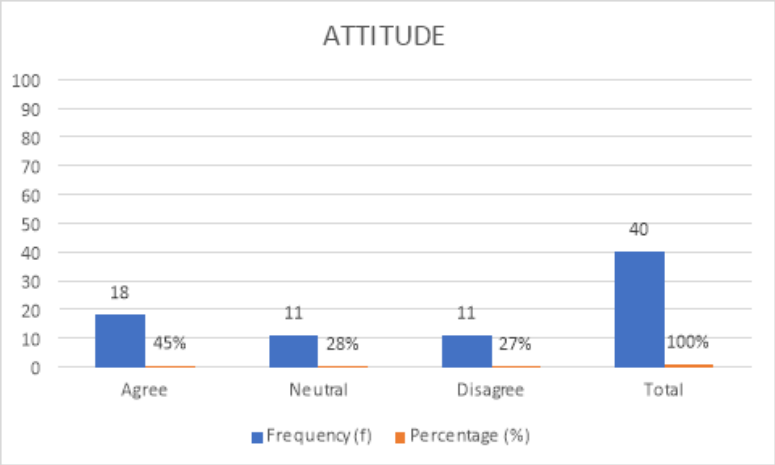

Table 1: Mean and Standard Deviation of pre-test knowledge and attitude regarding ill effects of frostbite among workers.

(n=40)

Knowledge	Mean	Standard deviation	Paired t-value	Df	t-value<0.005
Knowledge	12.7	6.03	5.52	3	2.00
Attitude	0.83	2.18			
Knowledge	Mean	Standard deviation	Paired t-value	Df	t-value<0.005

The paired t-test showed a statistically significant improvement in knowledge scores after the intervention (Mean = 12.7, SD = 6.03, t = 5.52, df = 3, $p < 0.005$), indicating the video-assisted instruction was effective. No significant change was observed in attitude scores (Mean = 0.83, SD = 2.18).

Table 2: Comparison of Knowledge Levels – Pre-Test vs Post-Test

Knowledge Level	Pre-Test (%)	Post-Test (%)	Difference (%)	Interpretation
Adequate Knowledge	15%	50%	**+35%**	Marked improvement after intervention
Inadequate Knowledge	30%	10%	**–20%**	Significant reduction in poor knowledge

There was a substantial increase in adequate knowledge and a notable decrease in inadequate knowledge among workers after the video-assisted instruction, indicating the intervention was effective.

Table 3: Association between the level of post-test attitude score of ice factory workers and their selected Socio-demographic variables.

Demographic Variables	Chi-square Value	df	p-value	Significance
Age	13.59	6	0.05	Significant
Experience in years	17.33	6	0.05	Significant

Age and Experience in years showed a statistically significant association with post-test attitude scores, indicating that both age and work experience influence the attitude levels of ice factory workers after the intervention.

DISCUSSION

This study aimed to evaluate the effectiveness of a video-assisted educational program in improving knowledge and attitude among ice factory workers in Kanpur regarding the harmful effects of frostbite. The findings confirmed that prior

to the intervention, workers had limited knowledge and neutral or unfavorable attitudes toward frostbite, likely due to low educational levels and lack of workplace training. After the intervention, there was a significant improvement in both knowledge and attitude scores, supporting the efficacy of video-assisted teaching. This aligns with similar studies from other industrial settings, such as in Bangalore and Tamil Nadu, which highlighted the success of audiovisual methods in enhancing worker awareness, particularly in low-literacy groups. Furthermore, a significant association was found between post-test knowledge scores and variables like education and prior health education exposure, while no such association existed with age, gender, or income. This implies that while video teaching benefits all, those with better educational backgrounds may absorb and retain more. Overall, the findings support the utility of structured video-assisted education as a practical tool for occupational health promotion in informal industrial sectors.

CONCLUSION

The investigation determined that the video-assisted training program substantially improved the knowledge and attitudes of ice manufacturing workers concerning the detrimental effects of frostbite, thereby affirming its efficacy as an educational tool. It emphasizes the need for regular, structured, and interactive health education interventions in occupational settings to prevent cold-related injuries like frostbite.

Implications of the Study

- **Nursing Practice:**
  Occupational health nurses can utilize video-based modules to educate factory workers about cold-related hazards.
- **Nursing Education:**
  This study highlights the effectiveness of innovative teaching methods such as video-assisted learning in adult education.
- **Nursing Administration:**
  Factory management and health departments should implement periodic training sessions for all workers in cold-exposure environments.
- **Nursing Research:**
  Further studies are needed to explore other occupational hazards and to assess the effectiveness of various innovative educational strategies for workplace safety.

Recommendations

- Conduct regular refresher training sessions.
- Include family members in awareness campaigns to extend knowledge beyond the workplace.
- Translate educational materials into regional languages to enhance understanding.

SUMMARY

Frostbite is a serious cold-related injury commonly affecting workers in low-temperature environments such as ice factories. Many such workers lack adequate knowledge and a positive attitude towards its prevention and management. This study aimed to assess and improve their knowledge and attitude through a structured video-assisted teaching program. The pre-test revealed poor awareness, while post-test results showed significant improvement in knowledge and a more favorable attitude towards preventive practices. Statistical analysis using the paired t-test confirmed the effectiveness of the intervention ($p < 0.05$). Additionally, a significant association was found between post-test knowledge scores and factors like educational level and previous exposure to health education, while no significant association was observed with age, gender, income, or experience.

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