

EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMMES ON KNOWLEDGE REGARDING SELECTED CANCERS AND THEIR PREVENTION AMONG CHEMICAL INDUSTRIAL WORKERS: A SYSTEMATIC REVIEW

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Abstract : Cancer continues to be a major cause of morbidity and mortality worldwide and is a major public health challenge. Exposure to toxic chemicals in the workplace is an important risk factor for the development of different malignancies in industrial workers. Limited knowledge of cancer risk factors, warning signals, screening procedures and preventative strategies further exposes workers to occupational cancer. Structured Teaching Programmes (STPs) and educational interventions have been found to be effective strategies in enhancing knowledge and fostering preventative health behaviours. The present systematic review was carried out to assess the effectiveness of Structured Teaching Programmes on knowledge regarding selected cancers and their prevention among chemical industrial workers and other occupational populations. A thorough literature search was performed utilizing the electronic databases PubMed, Google Scholar, Scopus, CINAHL, Cochrane Library, and ScienceDirect. Thirty studies published between 2014 and 2026 were included according to pre-determined inclusion and exclusion criteria. The findings showed that 86.7% of the reviewed studies reported a significant increase in knowledge after educational interventions. Educational interventions have raised awareness of cancer risk factors, warning signals, screening techniques and preventive behaviours, and workplace educational programmes were particularly useful for industrial and occupational workers. In conclusion, the review suggests that Structured Teaching Programmes are effective tools in enhancing cancer-related knowledge and promoting preventive measures among workers. The findings suggest the need for the establishment of regular workplace-based cancer education programmes in chemical industries to decrease occupational cancer risks and improve worker health outcomes.

IndexTerms - Cancer Prevention, Occupational Cancer, Chemical Industry Workers, Structured Teaching Programme, Health Education, Cancer Awareness, Occupational Health.

I. INTRODUCTION

Cancer is one of the leading causes of morbidity and mortality worldwide and remains a major public health challenge. It is characterized by the uncontrolled growth and spread of abnormal cells in the body. According to GLOBOCAN 2022, approximately 20 million new cancer cases and 9.7 million cancer-related deaths occurred globally, highlighting the growing burden of the disease [1].

Occupational exposure to hazardous chemicals is a significant risk factor for the development of cancer. Workers employed in chemical industries may come into contact with carcinogenic substances during manufacturing, processing, and handling activities. Long-term exposure to such chemicals can increase the risk of cancers such as lung cancer, bladder cancer, skin cancer, and leukemia [2].

Industrial workers are often exposed to various workplace hazards and may have limited knowledge regarding cancer risk factors and preventive measures. Lack of awareness can increase their vulnerability to occupational diseases. Adequate knowledge regarding cancer warning signs, risk factors, and prevention can help workers adopt healthy behaviours, use personal protective equipment appropriately, and follow workplace safety practices [3].

Health education is an effective strategy for improving awareness and promoting preventive practices among workers. A Structured Teaching Programme (STP) provides organized and systematic information that can enhance

knowledge and encourage positive health behaviours. Educational interventions have been shown to improve awareness regarding disease prevention and occupational health hazards [4].

RSPL Limited, Panki Industrial Area, Kanpur, is a chemical-based industry where workers may be exposed to various occupational hazards. Therefore, assessing the effectiveness of a Structured Teaching Programme on knowledge regarding selected cancers and their prevention among chemical industrial workers is important for promoting occupational health and reducing cancer-related risks. The findings of this review may help in planning effective health education programmes and improving preventive practices among industrial workers.

II. METHODS

A systematic review technique was performed as per PRISMA criteria to evaluate the effectiveness of Structured Teaching Programmes on knowledge regarding specified malignancies and their prevention. A thorough literature search was performed utilizing electronic databases such as PubMed, Google Scholar, Scopus, CINAHL, Cochrane Library, and ScienceDirect. Keywords used in the search strategy included: Cancer, Occupational Cancer, Cancer Prevention, Industrial Workers, Chemical Workers, Structured Teaching Programme, Educational Intervention, Health Education, and Awareness.

Studies published between 2014 and 2026 were reviewed based on predetermined inclusion and exclusion criteria. After removing duplicate research and assessing eligibility, 30 studies were included in the final review. The data extracted included: author, year of publication, country, study design, sample size, intervention, outcome measures, significant findings and conclusions. Methodological quality of the included studies was examined using standardised critical appraisal techniques such as the Joanna Briggs Institute (JBI) Critical Appraisal Checklist and the Critical Appraisal Skills Programme (CASP) Checklist.

III. FINDINGS

3.1 Knowledge Deficits Regarding Cancer Prevention

The review identified significant gaps in knowledge regarding cancer risk factors, warning signs, screening procedures, and preventive measures among workers and other population groups. Several studies reported inadequate awareness regarding:

1. Occupational cancer risk factors.
2. Early warning signs of cancer.
3. Screening methods and early detection.
4. Protective measures against carcinogenic exposures.
5. Lifestyle modifications for cancer prevention.

Studies conducted among industrial workers demonstrated that baseline knowledge regarding occupational cancers was generally poor to moderate prior to educational interventions.

3.2 Effectiveness of Educational Interventions

The majority of reviewed studies demonstrated positive outcomes following educational interventions. Major findings included:

1. Improved knowledge regarding cancer risk factors.
2. Increased awareness of cancer warning signs.
3. Enhanced understanding of screening procedures.
4. Improved adoption of preventive practices.
5. Better utilization of personal protective measures.

Among the 30 studies reviewed, 26 studies (86.7%) reported significant improvement in knowledge, 3 studies (10%) reported moderate improvement, and 1 study (3.3%) reported no statistically significant improvement.

Table 1: Summary of Knowledge Improvement Outcomes Across Reviewed Studies (N = 30)

Outcome	Number of Studies	Percentage
Significant improvement in knowledge	26	86.7%
Moderate improvement in knowledge	3	10.0%
No statistically significant improvement	1	3.3%

3.3 Workplace-Based Cancer Education

Several studies emphasized the importance of workplace settings as effective platforms for cancer prevention and health promotion. Research conducted among industrial workers and occupational groups demonstrated that:

- Workplace-based teaching programmes significantly improved cancer awareness.

- Workers showed improved understanding of occupational carcinogens.
- Preventive practices increased following educational interventions.
- Occupational health services played a key role in promoting cancer prevention.

Studies by Roth et al. (2026), Kostrzewa et al. (2025), Collatuzzo et al. (2025), Chandraleka and Nagar (2025), and Symanzik and John (2024) strongly supported workplace-based cancer prevention initiatives.

3.4 Cancer-Specific Educational Outcomes

The review identified educational interventions focusing on different types of cancers, summarised below.

3.4.1 Oral Cancer

Oral cancer constituted the largest category of intervention studies. Most studies reported significant improvements in knowledge regarding risk factors, tobacco-related hazards, early signs, and preventive practices.

3.4.2 Breast Cancer

Educational interventions significantly improved breast cancer awareness, breast self-examination practices, and screening participation among women.

3.4.3 Cervical Cancer

Studies highlighted the importance of HPV vaccination, cervical screening, and awareness programmes in preventing cervical cancer.

3.4.4 Lung Cancer

Awareness programmes improved knowledge regarding smoking-related risks, occupational exposures, and preventive strategies.

3.4.5 Skin Cancer

Occupational educational interventions enhanced awareness regarding ultraviolet radiation exposure and protective measures among outdoor workers.

IV. DISCUSSION

The findings of the present review provide strong evidence supporting the effectiveness of Structured Teaching Programmes and educational interventions in improving knowledge regarding selected cancers and their prevention.

Most studies demonstrated significant improvements in awareness, attitudes, and preventive practices following educational interventions. The review highlighted the importance of educational programmes in addressing existing knowledge gaps and promoting healthy behaviours.

Workplace settings emerged as particularly effective environments for implementing cancer prevention programmes. Industrial workers frequently encounter occupational exposures that increase cancer risk, making workplace-based interventions essential components of occupational health services.

The review further demonstrated that educational interventions can facilitate early detection, encourage participation in screening programmes, and improve adoption of preventive measures. These outcomes have the potential to reduce cancer-related morbidity and mortality while enhancing overall worker health and safety.

The evidence synthesized in this review strongly supports the implementation of Structured Teaching Programmes among chemical industrial workers, particularly those working in industries where exposure to carcinogenic substances is common.

V. RECOMMENDED STRATEGIES FOR CANCER PREVENTION EDUCATION

1. Regular workplace-based Structured Teaching Programmes should be conducted for industrial workers.
2. Educational sessions should focus on occupational cancer risk factors, warning signs, screening methods, and preventive measures.
3. Information booklets, posters, audiovisual aids, and digital educational resources should be made available.
4. Periodic health screening and cancer awareness campaigns should be integrated into occupational health services.
5. Training regarding appropriate use of personal protective equipment should be provided regularly.
6. Collaboration between industries, healthcare professionals, occupational health departments, and policymakers should be strengthened.
7. Continuous monitoring and evaluation of workplace health education programmes should be undertaken.

VI. CONCLUSION

Cancer prevention remains an important public health priority, particularly among industrial workers who may be exposed to occupational carcinogens. The present systematic review demonstrated that Structured Teaching Programmes and educational interventions are effective in improving knowledge regarding selected cancers and their prevention.

The majority of reviewed studies reported significant improvements in awareness, knowledge, attitudes, and preventive practices following educational interventions. Workplace-based cancer education programmes were especially effective in enhancing worker awareness and promoting preventive behaviours.

The findings support the implementation of regular Structured Teaching Programmes among chemical industrial workers, including workers employed at RSPL Limited, Panki Industrial Area, Kanpur. Strengthening cancer education initiatives can contribute to increased awareness, early detection, adoption of preventive practices, and reduction of occupational cancer risks.

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