



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

Evaluation of Workplace Safety Training Programmes in Reducing Occupational Injuries

Raju Tomar

Student, Faculty of science, SAM Global University, Raisen, M.P., India

Dr. Priyanka Tiwari

Professor, Faculty of science, SAM Global University, Raisen, M.P., India

Abstract

Occupational injuries remain a major preventable public health and workplace management concern. Injuries occur when hazards are not recognised, controls are not applied, unsafe behaviours become routine or workers are not adequately prepared for emergency situations. Workplace safety training programmes are designed to improve hazard awareness, safe operating procedures, correct use of personal protective equipment, incident reporting, emergency response and participation in the safety system. The global burden of work-related disease and injury demonstrates that occupational health requires systematic prevention rather than only treatment after injury. A descriptive cross-sectional evaluative design was used with comparative review of injury records before and after training exposure. The study sample consisted of 120 workers and supervisors. Data were organised through a structured knowledge questionnaire, workplace safety practice observation checklist, training record review checklist, injury record review format and safety training quality assessment tool. The findings indicated that 56.7% of participants had good post-training knowledge, 35.0% had moderate knowledge and 8.3% had poor knowledge regarding workplace safety. Full training coverage was reported among 70.0% of participants, partial training among 18.3% and no training among 11.7%. The overall observed safe practice score was satisfactory to good, but relatively weaker domains included lockout/tagout awareness, hazard reporting and refresher training.

Keywords: Workplace safety; occupational injury; safety training; hazard identification

I. INTRODUCTION

Workplace safety is a core component of occupational health and public health because the workplace is a setting where adults spend a major part of their productive life. Occupational injuries affect workers, families, employers and the wider economy through pain, disability, loss of income, compensation expenses, production interruption and loss of skilled manpower. The International Labour Organization has reported a very high global burden of work-related deaths and non-fatal injuries, showing that unsafe work remains a continuing public health challenge despite technological progress and regulation. Workplace safety training is one of the most commonly used prevention strategies. It aims to make workers aware of hazards, teach



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

safe methods, develop correct use of PPE, improve emergency response and promote timely reporting of incidents and near misses. However, training must be evaluated because attendance alone does not prove effectiveness. A training programme may be conducted, but if it is too theoretical, not repeated, poorly supervised or not linked with hazard control, its effect on injury reduction may remain weak. The present thesis evaluates workplace safety training programmes in relation to knowledge, observed practice, hazard reporting and occupational injury occurrence. The focus is not only on whether training sessions were delivered, but also on whether workers understood the content, applied safe behaviours and experienced reduction in injury events. This approach supports the public health principle that prevention requires a measurable system of risk reduction, not merely a record of meetings or lectures.

Overview of Occupational Injuries

Occupational injury refers to any physical harm, wound, trauma, burn, strain, fall-related injury, chemical injury, electrical injury, machinery-related injury or other work-related damage arising during the course of employment. Injuries may be minor and treated with first aid, or they may be serious enough to cause restricted work, lost workdays, permanent disability or death. In many workplaces, minor injuries and near misses occur more frequently than reportable injuries and serve as early warning signals. Common causes of occupational injuries include slips, trips and falls, manual handling, sharp objects, moving machinery, struck-by objects, caught-in-between events, unsafe electrical work, chemical exposure, heat exposure and poor housekeeping. The occurrence of injury is rarely due to a single cause. It usually reflects interaction between hazards, worker behaviour, supervision, equipment condition, production pressure, work environment and safety culture.

II. REVIEW OF LITERATURE

Concept of Occupational Safety and Health

Occupational safety and health refers to the prevention of injury, disease and death arising from work activities and work environments. It includes hazard identification, risk assessment, control measures, training, medical response, worker participation and continuous improvement. Modern OSH approaches emphasise prevention at source through elimination, substitution, engineering controls, administrative controls and PPE. For the present study, this evidence means that safety training must be assessed through multiple indicators. The programme is considered stronger when it produces understandable learning, visible safe practice, timely reporting, supportive supervision and documented reduction in injury or near-miss risk. This multidomain perspective is consistent with an MPH evaluation framework that measures both process and outcome.

Occupational Injuries and Their Classification

Occupational injuries can be classified by cause, body part affected, severity, lost workdays, treatment required and mechanism of injury. Common categories include cuts, abrasions,



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

puncture wounds, fractures, sprains, strains, burns, chemical exposure, electrical injury, eye injury, fall injury and machinery-related trauma. Classification supports injury trend analysis and helps management identify priority hazards for training and control.

For the present study, this evidence means that safety training must be assessed through multiple indicators. The programme is considered stronger when it produces understandable learning, visible safe practice, timely reporting, supportive supervision and documented reduction in injury or near-miss risk. This multidomain perspective is consistent with an MPH evaluation framework that measures both process and outcome.

Epidemiology of Workplace Injuries

The epidemiology of workplace injury examines who gets injured, where injuries occur, when they occur and what task or exposure is involved. Injury surveillance helps identify high-risk departments, shifts, job categories and tasks. Such analysis also indicates whether safety training needs to be redesigned for specific groups such as new workers, contract workers, maintenance staff or night-shift personnel. For the present study, this evidence means that safety training must be assessed through multiple indicators. The programme is considered stronger when it produces understandable learning, visible safe practice, timely reporting, supportive supervision and documented reduction in injury or near-miss risk. This multidomain perspective is consistent with an MPH evaluation framework that measures both process and outcome.

Safety Training as a Preventive Intervention

Safety training is a preventive intervention that aims to change knowledge, attitude, skill and behaviour. It is commonly delivered through classroom lectures, demonstrations, videos, toolbox talks, e-learning, simulations, peer learning and on-the-job coaching. Evidence suggests that highly engaging methods with behavioural modelling, practice and dialogue are generally more effective than passive lectures. For the present study, this evidence means that safety training must be assessed through multiple indicators. The programme is considered stronger when it produces understandable learning, visible safe practice, timely reporting, supportive supervision and documented reduction in injury or near-miss risk. This multidomain perspective is consistent with an MPH evaluation framework that measures both process and outcome.

Adult Learning Principles in Safety Training

Adult workers learn best when training is relevant to their job, problem-based, practical and respectful of their experience. Safety training should use real workplace examples, local language, demonstrations and opportunities for questions. Workers should be able to connect the training content with the tasks they perform daily. Training that ignores literacy level, shift timing or practical barriers may have limited effect. For the present study, this evidence means that safety training must be assessed through multiple indicators. The programme is considered stronger when it produces understandable learning, visible safe practice, timely reporting,



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

supportive supervision and documented reduction in injury or near-miss risk. This multidomain perspective is consistent with an MPH evaluation framework that measures both process and outcome.

III. RESEARCH METHODOLOGY

Research Approach

A quantitative evaluative approach was used because the study aimed to assess measurable domains such as training coverage, knowledge, observed safe work practice, training quality and injury occurrence. The approach allowed comparison of trained and partially or untrained workers and helped identify associations between training and safety outcomes.

Research Design

A descriptive cross-sectional evaluative research design was adopted with review of injury records for the six months before and six months after training. The design was appropriate because the objective was to evaluate existing training programmes and their relationship with injury indicators.

Study Setting

The study setting was a selected workplace with production, maintenance, warehouse, administrative and support service units. The setting was selected because occupational injury prevention requires coordination across employees, supervisors, safety officers, maintenance teams and management.

Study Population

The study population consisted of workers and supervisors involved in routine work processes where occupational hazards and safety training programmes were relevant.

Target Population

The target population included all workers and supervisors in workplace units who contribute directly or indirectly to occupational safety and injury prevention.

Accessible Population

The accessible population included workers available during the data collection period, willing to participate and eligible according to the study criteria.

Sample Size

The sample size was 120 workers and supervisors. This number was considered feasible for an MPH thesis and adequate for descriptive statistics and chi-square testing of selected associations.

Sampling Technique

A purposive sampling technique was used to include workers from production, maintenance, warehouse/logistics, supervision and administrative/support units. This allowed representation of both higher-risk and lower-risk job categories.



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

Inclusion Criteria

Workers and supervisors who had worked for at least three months, were available during the study period, had exposure to workplace safety training or safety practices, and gave consent were included.

Exclusion Criteria

Workers on long leave, newly appointed workers with less than three months of work experience, visitors, trainees not involved in regular work and unwilling participants were excluded.

Table 1: Study variables and operational measures

Variable type	Variables	Operational measure
Independent	Age, gender, department, job category, experience, training attendance	Questionnaire profile section
Independent	Training quality, refresher training, supervisor support	Training quality assessment tool
Dependent	Knowledge regarding workplace safety	Score from knowledge items
Dependent	Safe work practice level	Observation checklist percentage score
Dependent	Occupational injury status	Injury record review and self-report confirmation
Outcome indicator	Injury reduction and safety behaviour score	Comparison of injury events and domain-wise practice scores

IV. DATA ANALYSIS AND INTERPRETATION

Interpretation: The participants represented a working-age group with a larger proportion in the 31-40 year category. Male participants formed 60.0% of the sample, while female participants formed 40.0%. This distribution is useful for safety training evaluation because injury risk and training needs may vary across age group, experience and job role.



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

Table 2: Socio-demographic profile of workers

Variable	Category	Frequency (n=120)	Percentage
Age	21-30 years	32	26.7
Age	31-40 years	44	36.7
Age	41-50 years	28	23.3
Age	>50 years	16	13.3
Gender	Male	72	60.0
Gender	Female	48	40.0

Table 3: Occupational profile of study participants

Variable	Category	Frequency	Percentage
Job category	Production/operators	52	43.3
Job category	Maintenance	20	16.7
Job category	Warehouse/logistics	18	15.0
Job category	Supervisors	16	13.3
Job category	Administrative/support	14	11.7
Experience	<2 years	22	18.3
Experience	2-5 years	38	31.7
Experience	6-10 years	36	30.0
Experience	>10 years	24	20.0

Interpretation: Production and maintenance workers formed a substantial part of the sample, which is appropriate because these groups commonly face machinery, manual handling,



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

movement and equipment-related hazards. Inclusion of supervisors helped evaluate whether training messages were reinforced at the worksite.

Interpretation: Baseline knowledge was mostly moderate, while one-third of participants had poor knowledge. This indicates that safety training was needed not only as an administrative requirement but also as a knowledge-building intervention.

Table 4: Baseline knowledge level regarding workplace safety

Knowledge level	Score range	Frequency	Percentage
Poor	<50%	40	33.3
Moderate	50-74%	58	48.4
Good	>=75%	22	18.3

Table 5: Post-training knowledge level regarding workplace safety

Knowledge level	Score range	Frequency	Percentage
Poor	<50%	10	8.3
Moderate	50-74%	42	35.0
Good	>=75%	68	56.7

Interpretation: After training exposure, good knowledge was observed among 56.7% of workers and poor knowledge reduced to 8.3%. This suggests that training improved understanding of workplace hazards, PPE and safe procedures. Workers with moderate knowledge still require refresher sessions and practical reinforcement.

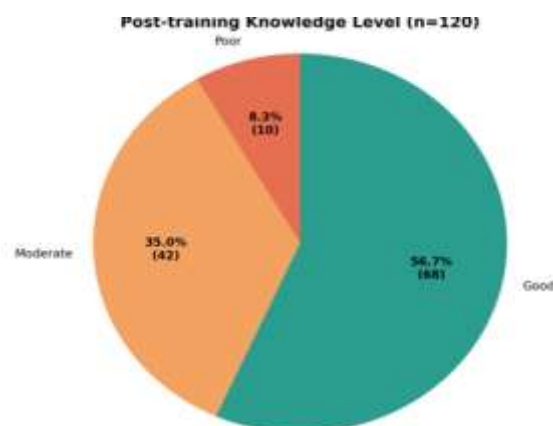


Figure 1: Post-training knowledge level



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

V. RESULTS AND DISCUSSION

Summary of Key Findings

The findings showed that safety training coverage was substantial but incomplete. Good post-training knowledge was observed among more than half of the participants, and the number of recorded injuries reduced after the training period. However, gaps persisted in refresher training, lockout/tagout awareness, hazard reporting and feedback after reporting. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation, feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

Discussion on Socio-demographic and Occupational Characteristics

The study included workers from production, maintenance, warehouse, supervisory and administrative roles. This occupational diversity is important because workplace injury prevention depends on both high-risk task groups and supervisors who influence daily practice. Production and maintenance workers contributed a larger share of injuries, reflecting greater exposure to machinery, movement, tools and manual handling. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation, feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

Discussion on Knowledge Regarding Workplace Safety

The improvement in post-training knowledge suggests that safety training helped workers understand hazards, PPE, reporting and emergency response. However, the presence of moderate and poor knowledge among some participants indicates that onetime training cannot ensure complete learning. Workers who miss sessions or receive only partial training may remain vulnerable, especially when they perform high-risk tasks. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation, feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

Discussion on Training Coverage and Quality

Training coverage was good but not universal. Partial or absent training may occur due to shift work, leave, contract work, turnover or lack of follow-up. The quality scores showed that trainer clarity and demonstrations were stronger than refresher schedules and feedback mechanisms. This indicates that the training system should include not only delivery but also follow-up, observation and corrective action. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation,



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

Discussion on Safe Work Practices

Observed safe work practice compliance was highest for PPE use and emergency readiness. This may be because PPE and emergency equipment are visible and commonly emphasised in safety messages. Lower scores for lockout/tagout and hazard reporting show that more technical and procedural topics require repeated practical training. Workers must be able to stop unsafe work and report hazards without fear. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation, feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

Discussion on PPE Use and Hazard Reporting

PPE use was comparatively high, but checking PPE condition and receiving feedback after hazard reporting were weaker. This distinction is important because safety systems should not end with individual PPE use. Reporting systems help identify hazards that cannot be solved by the worker alone. Management response to reports is essential for maintaining worker trust. This finding indicates that workplace safety training should be designed as a continuous process. Training must be followed by observation, feedback, supervisor reinforcement and documented corrective action. Without these links, learning may remain limited to the classroom and may not translate into lower injury risk.

VI. CONCLUSION

The study concluded that workplace safety training programmes were associated with improved knowledge, better safe work practices and reduction in recorded occupational injuries. Full training attendance was significantly associated with higher knowledge levels, better practice and lower injury occurrence. The findings show that training is most useful when it is practical, repeated and supported by supervision and corrective action.

REFERENCES

- [1] International Labour Organization. Safety and health at work. Geneva: ILO; 2026.
- [2] International Labour Organization. Nearly 3 million people die of work-related accidents and diseases. Geneva: ILO; 2023.
- [3] World Health Organization, International Labour Organization. WHO/ILO joint estimates of the work-related burden of disease and injury, 2000-2016. Geneva: WHO/ILO; 2021.
- [4] International Organization for Standardization. ISO 45001:2018 occupational health and safety management systems - requirements with guidance for use. Geneva: ISO; 2018.



Kavya Setu

A Multidisciplinary Open Access, Peer-Reviewed Refereed Journal

Impact Factor: 7.2

ISSN No: 3049-4176

- [5] Occupational Safety and Health Administration. Recommended practices for safety and health programs. Washington, DC: OSHA; 2016.
- [6] Occupational Safety and Health Administration. Education and training: recommended practices for safety and health programs. Washington, DC: OSHA; 2024.
- [7] National Institute for Occupational Safety and Health. Hierarchy of controls. Atlanta: Centers for Disease Control and Prevention; 2024.
- [8] Robson LS, Stephenson CM, Schulte PA, Amick BC, Irvin EL, Eggerth DE, et al. A systematic review of the effectiveness of occupational health and safety training. *Scand J Work Environ Health*. 2012;38(3):193-208.
- [9] Burke MJ, Sarpy SA, Smith-Crowe K, Chan-Serafin S, Salvador RO, Islam G. Relative effectiveness of worker safety and health training methods. *Am J Public Health*. 2006;96(2):315-324.
- [10] National Institute for Occupational Safety and Health. The effectiveness of workplace training. Atlanta: CDC/NIOSH; 2010. Marx, Karl, and Friedrich Engels. *The Communist Manifesto*. Translated by Samuel Moore, Penguin Books, 2002.
- [11] Jozan MMB, Khanmohammadi S, Shamsi M, Sadeghi M. Impact assessment of e-trainings in occupational safety and health: a literature review. *BMC Public Health*. 2023;23:1187.
- [12] Ministry of Law and Justice, Government of India. *The Occupational Safety, Health and Working Conditions Code, 2020*. New Delhi: Government of India; 2020.
- [13] Dyreborg J, Lipscomb HJ, Nielsen K, Törner M, Rasmussen K, Frydendall KB, et al. Safety interventions for the prevention of accidents at work: a systematic review. *Campbell Syst Rev*. 2022;18(2):e1234.
- [14] Verbeek J, Ivanov I. Essential occupational safety and health interventions for low- and middle-income countries: an overview of the evidence. *Saf Health Work*. 2013;4(2):77-83.
- [15] Ricci F, Chiesi A, Bisio C, Panari C, Pelosi A. Effectiveness of occupational health and safety training: a systematic review with meta-analysis. *J Workplace Learn*. 2016;28(6):355-377.