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Systematic review of risk factors for work injury among youth

Summary

About this summary:

This summary is based on the report *Systematic Review of Risk Factors for Work Injury among Youth*

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Foreword

In recent years, the Institute for Work & Health has been actively engaged in building relationships with Prevention System agencies and organizations in Ontario.

In these encounters, we often hear that potential research users want more evidence about the effectiveness of interventions aimed at protecting workers' health. We are also told that even when research evidence exists, it is often hard to access, difficult to understand and is not always presented in language and formats suitable to non-scientific audiences.

In response to these needs, the Institute for Work & Health has established a dedicated group to conduct systematic reviews of relevant research studies in the area of workplace injury and illness prevention. In instances where there are too few studies to conduct a full Systematic Review we may provide our audiences with a narrative review.

- Our systematic review team monitors developments in the international research literature on workplace health protection and selects timely, relevant topics for evidence review.
- Our scientists then synthesize both established and emerging evidence on each topic through the application of rigorous methods.
- We then present summaries of the research evidence and recommendations following from this evidence in formats which are accessible to non-scientific audiences.

The Institute consults regularly with workplace parties to identify areas of workplace health protection that might lend themselves to a systematic review of the evidence.

We appreciate the support of the Ontario Workplace Safety & Insurance Board (WSIB) in funding this four-year Prevention Systematic Reviews initiative. As the major funder, the WSIB demonstrates its own commitment to protecting workers' health by supporting consensus-based policy development which incorporates the best available research evidence.

Many members of the Institute's staff participated in conducting this Systematic Review. A number of external reviewers in academic and workplace leadership positions provided valuable comments on earlier versions of the report. On behalf of the Institute, I would like to express gratitude for these contributions.

Dr. Cameron Mustard
President, Institute for Work & Health
February, 2006

1.0 Introduction

Working is a normal part of growing up for the majority of North American teenagers and young adults. However, this "rite of passage" comes with an increased risk of injury and some young workers will be hurt on the job.

Studies have found that teenagers and young adult workers are more likely to sustain work injuries than older workers. When these injuries are serious, they can have long-term implications, both for the individual's health and subsequent work, and the health of society as a whole.

A lot of money has been spent on young worker safety programs in the past five to ten years to try to prevent some of these injuries. In Canada alone there are about 75 work safety education programs currently directed at teenage and young adult workers. However, these programs were developed without a comprehensive look at what the research says about the factors that led teens and young adults to get injured at work.

This summary is based on the Institute for Work & Health report, *Systematic review of risk factors for work injury among youth.* This review gathered published research evidence on both the risk and protective factors for work injuries among youth to answer the question: "What individual, job, and workplace factors are associated with work injuries and illness among young people 12 to 24 years of age? "

1.1 Who are young workers?

There are a variety of definitions of "young worker." In some jurisdictions, such as the United States, young workers are defined as those under 18 years old because child labour laws only apply to this age group. The Institute's review chose a broader definition that includes young adults up to 24 years old. This definition recognizes that many young adults are just entering the labour market and are, like adolescents, more likely than older adults to sustain a work injury.

1.2 What is a "risk factor"

For this review, a risk factor was defined as an individual characteristic or event associated with the increased likelihood of a work injury. For example, are young workers who work evening shifts more likely to be hurt on the job than those who do not work evening shifts?

A protective factor is a characteristic or event that appears to reduce the likelihood of a work injury. For example, are young workers who receive safety training less likely to be hurt on the job than those who did not undergo such training?

It's important to note that a risk factor does not necessarily imply it is a direct cause of injury. For example, young males (gender risk factor) have higher injury rates than young women. However, other factors such as increased work hazard exposure or different ways of carrying out jobs, rather than gender, may underlie their elevated risk for injury.

2.0 What is a systematic review?

In a systematic review, researchers develop a clearly formatted question, use systematic and explicit methods to identify, select and critically appraise relevant research, and then analyze data from studies selected in the review process. The review normally includes the following steps:

• determining the question • developing a search strategy and searching the literature • selecting studies that meet the inclusion/exclusion criteria •assessing the methodological quality of selected studies and eliminated those in which the quality is insufficient • systematically extracting and summarizing key elements of the included studies • describing the results from individual studies • synthesizing the results and reporting them

3.0 What research was included in this review?

Electronic databases were searched for studies published between 1980 and March 2005 that provided evidence on the risk and/or protective factors for youth work injuries. Articles considered for this study included peer-reviewed papers, reports and dissertations.

Studies focusing only on youth agricultural injuries were excluded; however, studies that examined several industries, including the agricultural industry, were considered for the review. Studies on occupational disease and illness in young workers were analyzed but will be the subject of a separate report.

4.0 How did the review proceed?

4.1 Literature search

The team searched seven electronic databases for English, French, German and Spanish studies on young workers.

In addition, the team searched through research projects listed on the web sites of the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) and the Association of Workers' Compensation Boards of Canada (AWCBC) and contacted researchers in the field to solicit any additional articles they had published on young workers.

A total of 6,043 studies met the initial search criteria.

4.2 Study relevance

Two reviewers independently screened the title and abstract of each of the 6,043 papers against the inclusion/exclusion criteria. When the reviewers could not reach a consensus about whether a study met the criteria, a third reviewer was consulted.

For a study to be included in this systematic review:

- it had to be a quantitative study reporting on original research
- the majority of the sample was aged 12 to 24 years old
- the sample had to be involved in either formal or informal work arrangements (excluding agriculture or military recruits)
- it had to include a health outcome of interest (injury, illness or disease) unintentional, nonfatal injuries
- at least one risk factor had to be assessed.

A total of 5,948 studies were excluded from the initial abstracts because they did not meet these criteria.

4.3 Quality appraisal

Using a set of 31 criteria, the methodological quality of each study was rated independently by the lead author and one of four other reviewers. After this initial assessment, the author and the reviewer met to reach consensus for each study. If consensus could not be reached, experts involved in previous systematic reviews were consulted in order to reach consensus. A further 23 studies were excluded at this level, leaving 72 studies that went on to the data extraction phase.

4.4 Data extraction

The researchers extracted methodological information and data from studies that met the quality appraisal criteria. One reviewer summarized each study's findings and the methodology used. The lead author checked the extracted findings information against the original article and the extracted methodological information against the data obtained in the Quality appraisal stage.

Five studies were excluded at the data extraction stage, leaving 46 focusing on occupational injury and 21 on occupational disease. The latter studies will be synthesized in a separate report.

4.5 Evidence synthesis

The diversity of study designs, measures, and statistical analyses posed challenges for the research team as it prepared to synthesize the findings across the relevant remaining studies.

When determining if there was sufficient evidence that a risk factor was associated with work injury, the team focused on the findings of multivariate studies. These studies consider the impact of other potential risk factors in their analyses. The team then estimated the contribution of a specific risk factor to injury risk and categorized each as either: no association with work injury; a significant positive association; or a significant negative association.

The team adapted guidelines used in a previous systematic review of observational studies to determine whether the evidence on each risk factor should be considered "sufficient." These guidelines state that quality, quantity and consistency need to be considered.

Quality means that the study must meet the minimum methodological criteria (in this study— two criteria). Quantity means that, at least two multivariate studies examined any particular risk factor. Consistency means that the majority of multivariate studies had to find a significant association between the given risk factor and the injury outcome.

5.0 Results

5.1 Evidence on risk and protective factors for young workers

This review systematically assessed the evidence on risk and protective factors for teenage and young adult workers. The bulk of the studies, especially those using multivariate analyses, focused on teenage workers. However, where comparable data were provided for young adults, the same risk pattern was observed. The table below summarizes the evidence synthesis.

Table 1: Summary of evidence status for risk factors

Risk factors	Level of evidence for independent association with work injury
Demographic/individual factors	
Gender	Sufficient evidence of **no** association
Age	Sufficient evidence of **no** association among teenagers
Visible minority	Preliminary evidence
Personality	Sufficient evidence of no association
Substance use	Insufficient evidence
Job Workplace factors	
Industry	Sufficient evidence of association, but variability in which industries are high risk
Occupation/work hazards	Sufficient evidence of association
Perceived work overload	Sufficient evidence of association
Work hours	Sufficient evidence of **no** association
Job tenure	Insufficient evidence
Supervisor attributes	Insufficient evidence
Safety training	Insufficient evidence

In general, the study found that when it comes to injury risk, the type of job or workplace mattered more than the nature of the young workers themselves. Specifically, there was consistent evidence that number of work hazards and perceived work overload were associated with injury risk. A potential exception to the preeminence of job/workplace factors in work injury risk was that teenagers of visible minority groups showed an elevated injury risk even after job/workplace factors were controlled.

5.2 Research gaps

The study found a number of gaps in the literature on risk factors for young worker injuries that should guide future research in young worker injury. Of note was the lack of studies directly linking physical and cognitive development to work injury risk. This type of research is urgently needed because there is a common belief that immaturity is a major cause of work-related injury in this age group.

Researchers should also obtain more information about the potential work injury risk of young workers within visible minority groups. More information is needed to determine what factors lead to elevated risk among these groups and whether specific prevention interventions are required.

There was little information on protective factors—such as safety training—or on the influence of supervisors and the social environment in the workplace. Studies of adult workers have shown that these factors influence hazard exposure and how work is carried out.

5.3 Methodological quality of the literature

The existence of some studies that included both demographic/individual and job/workplace factors helped improve understanding of the contribution of each set of factors. At the same time, the cross-sectional designs used for virtually all the young worker studies render the conclusions somewhat tentative. Future research should provide more detailed answers about what might underlie these associations and help to further clarify causal relationships.

5.4 Strengths and limitations of the review

One of the main strengths of this review is its use of explicit search and evaluation procedures that help eliminate bias in the selection and synthesis of evidence. This review also invited stakeholders to assist in formulating the research question and to discuss the preliminary findings to ensure its relevance to real world experience.

There are some limitations to this study. Although a number of databases were search, the focus was on peer-reviewed, published literature in major electronic databases and in the reference sections of selected studies. Our review was also limited to articles published in English, French, German, and Spanish.

6.0 Recommendations

6.1 Recommendations for workplace parties

Based on the synthesis of the evidence, the researchers made the following recommendations for workplace parties (employers, organized labour, relevant government agencies, prevention/compensation system):

- Focus on reducing unsafe work conditions to decrease injuries among high-risk subgroups such as young males.
- Increase awareness about work overload being a risk factor for work injuries among young workers and supervisors.

6.2 Recommendations for future research

Here are some ways researchers in this field might strengthen the quality of their own evidence on risk factors for young workers' injury. Future studies should:

- Use and report recruitment methods that lead to samples of young workers that are representative of the target group of interest.
- Provide more evidence demonstrating the accuracy of risk factor and outcome measures.
- Employ longitudinal designs that allow for the temporal patterning of risk factors and outcomes to be examined and confounding of risk factors to be better controlled.
- Include in multivariate analyses, a comprehensive range of demographic/individual and job/workplace risk factors. In particular, specific measures of mechanisms thought to underlie broader descriptive variables should to be included.

7.0 Conclusion

This systematic review included 46 relevant studies that assessed the evidence on risk and protective factors for teenage and young adult workers.

Further research is required to provide further insight and clarity into some factors. However, the systematic and comprehensive approach to this review did result in findings that can inform evidence-based prevention of injuries among young workers.

The key message arising from this report is that it is **the characteristics of the workplace and the job that put a young worker at higher risk, not the young worker's individual characteristics**. Exposure to work hazards and work overload have the strongest association for risk.

These results suggest work-related factors should be a priority of workplace parties. Future interventions, programs and policies aimed at reducing youth injury must target these factors.