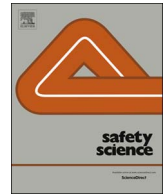


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# The effect of active and passive occupational health and safety (OHS) training on OHS awareness and empowerment to participate in injury prevention among workers in Ontario and British Columbia (Canada)

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## ABSTRACT

**Objective:** To investigate whether differences in methods of Occupational Health and Safety (OHS) awareness training result in differences in worker awareness of rights and responsibilities and worker empowerment to participate in injury prevention.

**Methods:** Repeated cross-sectional surveys were conducted on 3911 working adults employed in two Canadian provinces – British Columbia and Ontario. Participants were asked if they had participated in OHS awareness training in the preceding 12 months. Using information on type of training received respondents were grouped into those receiving active and passive training. Adequacy of awareness of workplace hazards and empowerment to participate in injury prevention were measured by six and five statements respectively. Multivariable logistic regressions examined association between type of training and awareness and empowerment outcomes.

**Results:** In multivariable models workers who reported receiving OHS awareness training reported higher levels of OHS awareness compared to those who did not receive training, with the relationship being stronger for active training (OR = 2.87, 1.96–4.21), and active and passive training (OR = 2.22, 1.66–2.98), compared to passive only training (OR = 1.52, 1.16–1.99). Only combined active and passive training was associated with higher empowerment (OR = 1.70, 1.33–2.17), with estimates for other types of training being close to the null.

**Conclusion:** Exposure to OHS awareness training is associated with higher OHS awareness among workers in a broad range of occupations. Mode of training is important, with more active training associated with stronger impacts on awareness than passive training methods.

## 1. Introduction

Work-related injury<sup>1</sup> is an important public health problem. Globally, 2.3 million occupational fatalities are reported each year and many more millions of workers experience non-fatal work-related injuries ([International Labour Organization, 2014](#)). The global economic and societal burden of injuries arising from work is substantial: the International Labour Organization (ILO) has estimated an annual four percent loss in global gross domestic product, or approximately US\$ 2.8 trillion of direct and indirect costs annually ([International Labour Organization, 2013](#)).

As a result, in many developed economies legislative and/or regulatory requirements are in place that require certain occupational

health and safety (OHS) programs to be implemented to reduce the risk of work-related injury. Despite the high prevalence of worker training as a primary prevention activity there is limited research evidence on the effectiveness of training. One of the most recent systematic reviews in this area concluded that OHS training positively impacts behaviors in the workplace, but there was insufficient evidence to make conclusions about the effectiveness of training on knowledge, attitudes and OHS outcomes ([Robson et al., 2012](#)).

In addition to OHS training in the recognition and control of workplace hazards, many jurisdictions require employers to inform workers of their basic rights and responsibilities under OHS legislation. In July 2014 the Canadian province of Ontario (ON) introduced mandatory awareness training for all workers and supervisors ([Expert](#)

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<sup>1</sup> Throughout this paper the terms “injury” and “injuries” will be used to refer to both injury/injuries and illness/illnesses.

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Advisory Panel on Occupational Health and Safety, 2010). This mandatory program for employees includes a set of educational elements that informs workers about their duties and rights at the workplace, right-to-know laws, frequent hazards, the roles of important OHS parties, and occupational illness (Ontario Ministry of Labour, 2014). It was thought that participation in mandatory awareness training would increase worker and supervisor knowledge of basic rights and responsibilities and will ultimately prevent workplace injuries (Expert Advisory Panel on Occupational Health and Safety, 2010). A recent study demonstrated lower rates of physical- and mental injuries and injuries requiring medical attention among workers with adequate awareness and/or empowerment (Lay et al., 2017).

The purpose of this paper was to examine the impact of awareness training on worker OHS awareness and empowerment to participate in injury prevention. Specifically we wanted to examine the relationship between receiving training, and the type of training received, and self-reported adequacy of awareness and empowerment. A secondary objective was to examine if there were differences in the relationship between training and awareness and empowerment outcomes in a province where training was mandatory (ON), compared to a province where no similar province-wide program of mandatory training had been introduced (British Columbia, BC).

Our hypotheses were as follows. We expected differences in the type of training received and awareness and empowerment outcomes, with more active modes of training, such as workshops or instructor led training, having a stronger impact compared to passive modes of training, such as on-line courses or workbooks (Aguinis and Kraiger, 2009; Burke and Hutchins, 2007; Burke et al., 2006). We also expected different impacts of training on awareness and empowerment outcomes. In line with the conceptual model of Robson (Robson et al., 2012) we anticipated that the strongest impact of training would be on awareness, given that awareness is the first step of enabling change in health enhancing behaviors (Hiatt, 2006), and that the determinants of empowerment to participate in injury prevention are more complex than simply the provision of knowledge (Spreitzer, 1995). Finally, we expected differences in the jurisdictional context in which training is administered. This hypotheses did not have a specific direction of effect as it is unknown whether making training mandatory would lead to increased effectiveness (as training could be provided to workers who may not normally receive training), or less effectiveness (as minimal mandatory aspects of training may be provided rather than more comprehensive programs).

## 2. Methods and materials

### 2.1. Study population

As part of an ongoing research program to assess the impacts of awareness training, cross-sectional surveys were conducted in April and October 2015 on working adults employed at least 15 h a week at firms with five or more workers in BC and ON. In April 2015, a sample of 1962 working adults completed the survey and in October 2015 the sample consisted of 1949 workers (Total N for both surveys = 3911). The majority of these respondents were recruited by email or telephone from an existing panel of approximately 90,000 Canadians, who had agreed to participate in intermittent surveys. A smaller sample was recruited by a commercial survey provider using Random Digit Dialing (RDD). Response rates for information collected from the research panel and using RDD were 21.9%, and 10.7% respectively. Approval was granted by University of Toronto Health Sciences Research Ethics Board.

### 2.2. Main independent variable: OHS awareness training

Survey questions were included about whether participants had participated in OHS awareness training in the preceding 12 months

(yes/no), the mode of the training (workshops, online training, workbooks, or external training). Information was also collected on the source of the training (their employer, a government agency, or an external provider). Respondents could indicate multiple options for how they received training and from whom.

Using these responses we classified respondents into one of the following four training groups: respondents who did not receive training; respondents who received only passive training (online training or workbooks); respondents who received only active training (workshops or external training); and respondents who received both passive and active training. This grouping recognizes the potential for different impacts of instructor led (active) versus non-instructor-led (passive) training (Aguinis and Kraiger, 2009; Burke and Hutchins, 2007; Burke et al., 2006).

### 2.3. Main outcome: OHS awareness and empowerment

OHS awareness and empowerment were measured using a 27-question survey tool consisting of four dimensions of OHS vulnerability (Smith et al., 2015). Adequacy of awareness was measured by responses to six statements about worker awareness of hazards and knowledge of their rights and responsibilities. Adequacy of a worker's empowerment to ask questions and raise concerns about health and safety at work was measured using five statements. Respondents were considered to have adequate access to awareness or empowerment if they had agreed (Strongly agree or Agree) with all statements in that section, resulting in a dichotomous variable. A list of the questions used to measure adequate awareness and empowerment is provided in Table 1.

### 2.4. Potential confounders

A variety of covariates were included into analytical models based on previous literature. The demographics included age (< 30 years, 30–39 years, 40–49 years, 50–59 years, and ≥ 60 years), gender (male vs. female), and location of birth (Canada vs. other). Other covariates were province of residence (BC vs. ON), workplace size (5–19 employees, 20–99 employees, 100–499 employees, and ≥ 500 employees), exposure to hazards, and adequacy of workplace policy and procedures. Exposure to hazards was measured by nine questions, asking participants to indicate on a seven-point response scale how often they experienced hazards, ranging from never to every day. Workers were considered as exposed to hazards if they had experienced two or more hazards at least weekly, or if they were exposed at least weekly to: lifting 20 kg more than ten times a day; working more than two meters

**Table 1**  
Questions used to measure adequacy of awareness and empowerment.

<b>Awareness: at my workplace...</b>	
I am clear about my rights and responsibilities in relation to workplace health and safety	
I am clear about my employers' rights and responsibilities in relation to workplace health and safety	
I know how to perform my job in a safe manner	
If I became aware of a health or safety hazard in my workplace, I know who (at my workplace) I would report it to	
I have the knowledge to assist in responding to any health and safety concerns at my workplace	
I know what the necessary precautions are that I should take while doing my job	
<b>Empowerment: at my workplace...</b>	
I feel free to voice concerns or make suggestions about workplace health and safety at my job	
If I notice a workplace hazard, I would point it out to management	
I know that I can stop work if I think something is unsafe and management will not give me a hard time	
If my work environment was unsafe I would not say anything, and hope that the situation eventually improves	
I have enough time to complete my work tasks safely	

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