



A cross-Canada knowledge transfer and exchange workplace intervention targeting the adoption of sun safety programs and practices: Sun Safety at Work Canada



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ARTICLE INFO

Keywords:

Knowledge transfer and exchange
Occupational health and safety
Workplace-based research
Intervention research
Sun safety
Ultraviolet exposure
Skin cancer
Heat stress
Conceptual framework

ABSTRACT

Outdoor workers have a higher risk for skin cancers and heat stress. Workplaces need solutions relevant to their needs, proven to be effective in the real-world, and trialed in workplace settings. This article examines a workplace-based knowledge transfer and exchange intervention project, called Sun Safety at Work Canada. The objective was to have sun exposure included as a hazard within the workplaces' health and safety management systems. Knowledge brokers from the research team engaged intensively and supported workplaces in the municipal and electrical-utility sectors to enhance sun safety for their outdoor workers. They provided assessment and feedback, sun safety resources, and sun safety training. The adoption of sun safety programs and practices was evaluated three times, in 12 workplaces, across three Canadian provinces. The intervention, interview questions and analyses were based upon an Organization Implementation Model. This article focuses on the barriers and facilitators to the adoption of sun safety, elements of the knowledge transfer and exchange intervention, and influences from the external environment. Over 40 h of interview data with workplace champions and key informants were analyzed using matrix-based methods and thematic coding. Barriers and facilitators to adoption included: the priority given to sun exposure as an occupational hazard; the workplaces' available resources; the ability to engage key supervisors and workers; aspects of the intervention; and assistance from the knowledge brokers. The lack of provincial occupational health and safety legislation specific to ultraviolet exposure, and the regional climate also affected adoption. This intervention process is applicable to other hazards in occupational settings.

1. Background

1.1. Workplace-based intervention research

Workplaces prefer to make changes based on evidence-based knowledge. However, they want advice and guidance (such as evidence-based best practices, guidelines, programs, policies or procedures) that are not just based on research findings, but which have been tested in workplace settings. Workplace-based studies have grappled with real-world constraints, and hence workplaces consider them as having stronger credibility and relevance. The goal of workplace-based

knowledge transfer and exchange intervention studies is to examine the adoption of new, emerging evidence-based knowledge on health and safety, which could improve the health of workers. These studies are often facilitated by researchers, or knowledge brokers acting as workplace facilitators on behalf of the research team. However, workplace-based intervention research is difficult to do, and certainly difficult to do well. Hence, relatively few studies have been conducted and evaluated. A systematic review recently conducted by Mullan et al. (2015) that examined the adoption of interventions in the construction sector to change safety behaviors, found only 15 studies, from multiple countries in different sub-sectors of construction, dating from 1999 to

Abbreviations: OHS, Occupational health and safety; OHSMS, Occupational health and safety management system or Occupational health and safety program; PPE, Personal protective equipment (equipment worn to protect workers from coming into bodily contact with an occupational hazard)

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<http://dx.doi.org/10.1016/j.ssci.2017.10.013>

Received 5 May 2017; Received in revised form 13 October 2017; Accepted 18 October 2017

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2013, that met their methodological criteria.

Leaders in the field of implementation science have called for standardized and detailed reporting procedures of all interventions (Gold et al., 2016; Pinnock et al., 2015; Slaughter et al., 2015). Standards for Reporting Implementation Science (StaRI) have been developed. Moreover, diligent reporting of processes and outcomes are required about how workplace interventions are adapted to the local context. This would help others understand what was done and allow them to judge the quality of the outcomes. This information could then inform the work of future researchers and practitioners. To this end, this article has followed the StaRI recommendations, where appropriate, in the reporting and evaluation of this qualitative, workplace-based intervention study (Pinnock et al., 2015).

Furthermore, leaders in the field of implementation science have called for intervention research that is theory-driven to help the science develop (Greenhalgh et al., 2004; Kitson et al., 2013; Rycroft-Malone et al., 2011), as have leaders in the field of safety science (Mullan et al., 2015). Many implementation frameworks have been developed that generalize constructs which are believed to impact the adoption of a new innovation (Damschroder et al., 2009; Graham et al., 2009; Rogers, 2005). In all, at least 60 implementation frameworks were identified in 2012, and since then many more have been developed (Nilsen, 2015; Tabak et al., 2012). Although frameworks are important for guiding the development and implementation of interventions designed to promote the uptake of evidence-based knowledge, they do not provide specific directions that could be used for any particular implementation context. They do not guide specifically when, how, and why to adapt, and what effect these adaptations will have on adoption.

Finally, to overcome the inherent difficulty in implementing and adapting interventions to local contexts, this study's workplace interventions were supported by knowledge brokers who were members of the research team. Although the effectiveness of knowledge brokers was deemed to need more research (Bornbaum et al., 2015), others (Elueze, 2015; Kramer et al., 2004) have found that having knowledge brokers facilitate the intervention on behalf of the research team to be an effective implementation strategy.

1.2. Workplace-based intervention research on sun safety for outdoor workers

The StaRI guideline for reporting implementations (Pinnock et al., 2015) calls for the identification of the aspect of care that the new service being implemented aims to address, and to critically report the evidence underpinning the new service to be implemented. Hence, this study is based on a strong body of evidence of the importance to health of sun safety particularly for outdoor workers. In this project, "sun safety" refers to programs, policies, and practices which are meant to protect outdoor workers from skin damage and/or heat stress resulting from the sun. Outdoor workers are over-exposed to the sun and are often not well protected (Carey et al., 2014; Duffey et al., 2012; Kearney et al., 2013; Nahar et al., 2013). They are particularly vulnerable to skin cancer (Bauer et al., 2011; Schmitt et al., 2011). Heat stress (Adam-Poupart et al., 2013) and eye damage (Yam and Kwok, 2014) are also of significant concern. In 2015, 4560 non-melanoma skin cancers were attributed to outdoor workers in Canada by CAREX Canada (Peters et al., 2016).

Sun safety for outdoor workers has been researched in Australia (Rye et al., 2014; Janda et al., 2014) and in the United States (Buller et al., 2012; Hiemstra et al., 2012; Rabin et al., 2010). This body of research has demonstrated that skin cancer and other negative sun-related health effects are largely preventable by limiting exposure to sunlight (Glanz et al., 2007; Diepgen et al., 2012). Wearing protective clothing, sunscreen, eyewear, and lip balm, seeking shade, and avoiding peak hours of exposure to UV radiation are effective ways to mitigate UV exposure (Australian Radiation Protection and Nuclear Safety Agency, 2006; Vecchia et al., 2007). Following work-rest cycles,

avoiding alcohol, drugs, caffeine and certain medications, drinking plenty of water, following an acclimatization procedure, seeking shade, improving physical fitness, and wearing lightweight, loose-fitting clothing are all effective ways to mitigate the risk of heat stress (WorkSafeBC, 2007).

This two-year, Canadian workplace-based intervention research project, builds upon this body of knowledge. The project was funded by the Canadian Partnership Against Cancer (<http://www.partnershipagainstcancer.ca>), and it was called Sun Safety at Work Canada. Researchers, policymakers, and practitioners were involved in framing and conducting the study. Their full role in the project has been previously described (Kramer et al., 2015, 2017). The aim of the project was to help Canadian workplaces enhance their sun safety and create a nationally applicable sun safety program.

From 2015 to 2016, 17 workplaces which had outdoor workers in Ontario, British Columbia, Nova Scotia, and New Brunswick were recruited. The research team assigned a knowledge broker for each workplace. The knowledge brokers' main point of contact in the workplaces was often the professional who was involved in guiding the development, implementation and monitoring of the organization's occupational health and safety management system. This professional led the adaptation of the Sun Safety at Work Canada project to their workplace, facilitated ownership of the new sun safety program, and supported its sustainability. Throughout this article we refer to this professional as the "Occupational Health and Safety (OHS) Lead."

This study's protocol has been previously reported (Kramer et al., 2015). The protocol described the rationale and methodology for a workplace-based implementation study to integrate sun safety programs into multiple workplaces' occupational health and safety management systems. It described how the workplaces were going to be supported to assess the health and safety risks of sun exposure of their outdoor workers, implement control strategies that built on their existing programs, and embed the controls into their existing occupational health and safety management system or occupational health and safety program (hereafter jointly referred to as OHSMS). The protocol also introduced the project's implementation model which has helped frame all aspects of the project.

A second article reported on the cross-case analysis of the data that were collected at the initiation of the study (Kramer et al., 2017). That article focused on the program's initial engagement with 14 of the 17 workplaces that were recruited for the study. (Attrition and the rationale for excluding certain workplaces from the analyses are described below in the Methods section). The basis for that article was the evaluation of the baseline qualitative data that were collected from the workplaces after their recruitment to the project, but before the commencement of the knowledge transfer and exchange intervention. The article focused on what we learned about the "workplace context." Three overarching themes (and seven sub-themes) in the workplace context were predicted to have an impact on the workplaces' eventual adoption of sun safety programs, policies and procedures. Therefore it was important to learn as much about these contextual factors as possible. These themes were: (1) Organizational structure, including (a) industry and the nature of the work, and (b) integration with existing processes; (2) Organizational safety culture, including (c) social norms, (d) leadership, and (e) available resources; and (3) Readiness to change, including (f) importance of OHS and sun safety, and (g) nature and characteristic of the change.

The Sun Safety at Work Canada project had a large evaluation component. More data were collected than are reported on in this article (i.e., worker surveys, audit of sun safety controls present in the workplace, surveys from the OHS Leads who were the workplace internal champions, and UV dosimetry readings). This article reports on the cross-case and cross-time analysis of the interview data that were collected from the 12 workplaces that engaged for the full duration of the study - at the initiation of the intervention, during the intervention, and then at the end of the intervention. (Again, attrition and the

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