



Profiling the safety environment on Saskatchewan farms



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ABSTRACT

Objectives: Our objectives were four fold: (1) to provide a contemporary update on the prevalence of hazards on farms; (2) to document the safety practices of farm owner-operators; (3) to measure investments in farm safety and (4) to assess their relationship with injury within a current regulatory environment.

Methods: The study sample included 1218 farms that provided reports via a mailed questionnaire as part of a larger prospective cohort study. Participating farms were operated as individual family farms (56%), family corporations (26%), or formal partnerships (17%). Leading commodities produced included grain (88%) and beef or dairy cattle (42%). The median acreage was 1480 acres, with 28% operating more than 2500 acres. Analyses were descriptive and etiological and focused on the prevalence of hazards, investments in safety, safety practices and work habits, and how they related with farm injury.

Results: Physical conditions on farms and associated farm operator attitudes and beliefs were often inconsistent with safe work practices. Investments in farm safety and also engagement in safe farm work practices were inversely related ($p < 0.05$) to the presence of hazards.

Results: After adjustment for confounding, these investments and practices were related to decreased risks for farm injury, but not serious farm injury.

Conclusions: Reliance on safety standards that are mainly voluntary continues to put some farm people at risk for injury. Yet those that do comply with obvious and known safety measures are likely to have fewer exposures to physical hazards and unsafe work practices.

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1. Introduction

Agricultural injuries are a major public health problem in North America (Pickett et al., 1999, 2001; Rautiainen and Reynolds, 2002) and organized efforts to prevent these injuries are ongoing. Possible approaches to prevention include: education of farm workers in various aspects of farm safety (Hagel et al., 2008; Lee et al., 2004), implementation of enforced regulations and policy solutions (Thelin, 1998; Springfield et al., 1998), voluntary participation in incentive driven safety programs (Day et al., 2004; Rautiainen et al., 2004), as well as engineered solutions that control work conditions and the physical state of the farm work environment

(Carrabba et al., 2008; Reynolds and Groves, 2000). While all such options are viable, traditionally, there has been a reliance on educational approaches (Lehtola et al., 2008). In the absence of regulations or engineered changes to the farm work environment, such approaches have been questioned in terms of their efficacy within agricultural contexts (Lehtola et al., 2008; Rautiainen et al., 2008). To complicate matters further, formal efforts to implement more stringent regulatory controls on farms are sometimes opposed by the industry, especially for policies aimed at immediate members of farm families (Kelsey, 1994; Miller, 2012).

Given the limited empirical evidence available to support the benefits of such strategies in preventing injury on the farm, and the longstanding opposition to regulatory approaches, a more promising method of prevention may be the encouragement of farm operators to limit and control physical hazards. This can be accomplished via such initiatives such as farm safety audits (Rautiainen et al., 2010), incentive programs aimed at the removal of known hazards (Schneiders et al., 2001), and the reliance on voluntary safety standards surrounding work practices

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(International Labour Organization, 2011). If such approaches continue to be embraced as prevention strategies, evidence is required with respect to their effectiveness at a population level. Such approaches would ideally result in the limiting and control of known physical hazards associated with major farm trauma. They would also result in larger investments in farm safety by farm owners, as well as work and supervisory practices that encourage safety and meet contemporary industrial standards.

We had the opportunity to study the physical safety environments of a large population of farms in Saskatchewan, Canada, a jurisdiction where the Occupational Health and Safety Act (Government of Saskatchewan, 2013) and its regulations (OHS) are in place and apply to farm workplaces. Participants in our study were enrolled farm-wise in the Saskatchewan Farm Injury Cohort Study, an ongoing effort to understand determinants of health within farm and rural populations (Pickett et al., 2008). Our objectives were as follows: (1) to provide a contemporary update on the prevalence of specific major physical risk factors for traumatic injury, as identified in previous studies (Pickett et al., 1999, 2001), such as the absence of rollover protection structures on tractors and barriers around water hazards; (2) to document the safety practices of farm owner-operators, their work habits, their investments in farm safety, and their attitudes towards safety; (3) to derive scales that can be used to measure investments in farm safety and also safe work practices by owner-operators, then relate these to the presence of known risk factors for injury, then to the occurrence of injury; (4) to assess whether the current approach to the regulation of these worksites continues to put some farm people at risk for injury. Our intention was that this basic information would describe the current safety environment at the population level in a group of farms that operate under this OHS framework. This in turn could be used a starting point on which future efforts can be focused.

2. Methods

2.1. Sample and data collection

The data source was the baseline cross-sectional survey from Phase 2 of the Saskatchewan Farm Injury Cohort Study (SFIC) (Pickett et al., 2008). Data were collected from January to May, 2013. The sample included farms from 50 rural municipalities that participated in Phase 1 and agreed to ongoing participation ($n = 588$), as well as newly recruited farms from 24 additional municipalities ($n = 628$). The overall baseline sample for Phase 2 consisted of 1218 farms, of which 1108 had a survey respondent identify themselves as the primary owner-operator of the farm. Participation rates were 94% (74/79) at the municipal level and 27% (1216/4523) at the farm level.

Survey recruitment and follow-up procedures were tested via extensive pilots and a randomized trial, and are described elsewhere (Pickett et al., 2008; Day et al., 2008). For the Phase 2 baseline survey, a mailed questionnaire was sent to participating farms and completed by a single respondent. The Dillman total design method for self-administered questionnaires was utilized to maximize response rates (Dillman, 2000). Informed consent was indicated by completion and return of the questionnaire. Study procedures were approved by the Behavioural Research Ethics Board at the University of Saskatchewan (BEH #11-270).

2.2. Study variables

2.2.1. Major physical workplace hazards

Participants reported a number of specific physical hazards that are known major risk factors for farm injury (Pickett et al., 1999,

2001). These included counts of: (1) farm tractors; (2) combines; (3) grain augers; (4) grain bins; (5) water hazards; (6) animal corals; and (7) ladders. For each risk factor, counts of the presence of specific safety features were also recorded: for tractors in use on the farm; “how many are equipped with a rollover protection structure”; for combines and grain augers; “how many have all safety guards and shields in place”; for grain bins; “how many are equipped with a ladder cage”; for water sources located on the farm; “how many have a barrier around them or are in a penned area”; for corals; “how many have a man escape”; for ladders; “how many have all the rungs in place and are free of debris at all times”.

2.2.2. Safety practices

Based in part upon an existing inventory (Harrell, 1995), a series of items assessed specific safety practices of the farm owner-operator using Likert-like response options (4 categories: “Always”, “Often”, “Occasionally”, or “Never”, with an additional “Don’t Know” category). Items included: “when operating farm machinery he/she keeps all safety shields and guards in place”; “when using hand tools, such as grinders or drills, he/she wears eye protection”; “when he/she is applying agricultural chemicals such as fertilizers, pesticides, or herbicides, he/she wears protective devices such as gloves or a respirator”; “when working around animals and machinery he/she wears steel toed work boots or shoes”; “in noisy working conditions he/she wears hearing protection”; “he/she trains and observes workers prior to operating a piece of equipment”; and “he/she trains and observes workers prior to taking on a new job involving large animals”.

2.2.3. Work habits (Harrell, 1995)

Using a similar scale with 4 response options for owner-operators (“Always” through “Never”), respondents reported on the following items: “he/she often undertakes hazardous farm activities without thinking about the possible consequences”; “he/she usually find that there aren’t enough hours in a day to get the work completed on the farm”; “most of the time he/she works at a fairly leisure pace”; and “while doing farm work how often does he/she experience a “near miss” that under different circumstances might have resulted in person injury or property loss”.

2.2.4. Safety investments

These were assessed using the same response options (“Always” through “Never”), and included the items: “when necessary he/she invests time to improve safety conditions on the farm”; and “when necessary he/she invests money to improve safety conditions on the farm”.

2.2.5. Safety attitudes (Harrell, 1995)

Items designed to assess the safety attitude of the owner-operator were similarly described using a Likert-like scale (4 categories: “strongly agree”, “agree”, “disagree”, or “strongly disagree”) and included: “any good farmer who is actively involved in his/her operation will invariably have an accident sometime in his career”; “farm safety should have the highest priority on every agricultural operation”; and “he/she doesn’t worry much about being hurt when he/she is working”.

2.2.6. Farm injury outcomes

Farm injuries were defined on the study questionnaire as “... all injuries that occurred in a farm environment whether you were working or not. This includes injuries that occurred off farm but involved farm work (e.g. driving tractor on public road). This also includes being poisoned or burned.” Injuries were reported for the calendar year of 2012, both for farm owner-operators as well as the entire study population. A serious injury was further defined as any farm injury that resulted in hospitalization or medical treatment.

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