Evaluation of safety culture in agriculture

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For COST ACTION 16123 SACURIMA

6th SAYKAD CONGRESS
International Health Related Quality of Life Meeting  
Izmir, 21-23 November 2019

Health and safety in agriculture

• Agriculture has the worst fatal accident record of all major employment sectors
  – Over 550 fatal accidents in farming across the EU each year
    • Fatal accident rate for the EU15 in 2000 was 12.6/100,000 workers
    • Rate for accidents with more than 3 days absence is over 6000/100,000 workers
  – Relative share of fatality burden
    • UK: 15-20% of fatalities for 1.5% of the workforce
    • Ireland: 50% of fatalities for 5% of the workforce

• Higher than average rate of self-reported illness
  - musculoskeletal disorders
  - skin diseases
  - viral and bacterial infections
  - allergies, asthma and cancer
  - hearing impairment
  - mental problems (incl. burnout and suicide)

Sources: Health & Safety Executive 2019; OSHA
Ways to address safety and health problems

• Address the consequences
  - Rapid intervention to save lives
  - Adequate medical and psychological care

• Address the causes
  Influence the behavioral and environmental determinants of health and safety problems through prevention and health promotion

Making prevention effective

« Evidence based prevention »

• Analogy with Evidence Based Medicine (EBM)
  - introduced in medicine in the 1990s
  - Idea: ensure that decision making is based on scientific evidence to ensure that the health resources are used most efficiently
  - transformed the practice of medicine

• Evidence based public health
  “The development, implementation, and evaluation of effective programs and policies in public health through the application of principles of scientific reasoning, including systematic use of data and information systems, and appropriate use of behavioral science theory and program planning models”

Building the evidence base for effective farm safety programs

1. Identify behavioral risk factors
2. Analyse the determinants of unsafe or unhealthy behavior
3. Develop and test interventions to influence health related behavior
4. Investigate conditions for successful implementation

1. Identify behavioral risk factors

Causes of fatalities in agriculture
Fatal injuries in farming, forestry, horticulture and associated industries, UK, 2011-12

- Transport – overturning vehicles or struck by moving vehicle 14 (55%)
- Injured by an animal 5 (12%)
- Contact with moving machinery or material being machine 1 (2%)
- Drown or asphyxiated 7 (17%)
- Trapped by something collapsing or overturning 1 (2%)
- Fall from a height 3 (7%)
- Electrocution 2 (5%)
- Struck by moving, falling or flying object 6 (20%)

Source: Health & Safety Executive 2013
Specific causes of fatalities

• Transport-related fatalities
  – Run over or crushed by tractors or all-terrain vehicles
  – Crushed by machinery (telehandler, forestry forwarder, trailer unit, turf harvester and cattle lorry)

• Being struck by a falling, flying or moving objects
  – Hit by trees or tree branches
  – Trapped by a grain mill, post rammer, locking ring

• Drowning or asphyxiations
  Water, slurry fumes/gas released from a tank, grain bin

• Trampled by farm animals

• Falls from heights
  Stairs, ladders, trees, ravines

• Electrocution
  Contact with overhead power lines

Source: Health & Safety Executive 2013

Causes of farmers’ ill health

• Musculo-skeletal disorders
  – Manual handling
    Almost 60% of workers in agriculture are exposed to painful positions at work half the time or more, the highest of any sector of industry
  – Carrying heavy loads
    Nearly 50% of workers in agriculture carry heavy loads half the time or more
  – Repetitive movements
    Over 50% of workers in agriculture are exposed to repetitive hand movements half the time or more
  – Vibrations
  – Cold work environments

• Skin diseases, asthma, cancer
  Exposure to dangerous substances and biological agents
  (both single short exposure & long-term accumulation of substances in the body)

• Infections
  Exposure to parasites, viruses or bacteria

• Mental health problems
  Stress, economic problems, low sense of control, …

Source: Health & Safety Executive 2013
2. Analyse the determinants of unsafe/unhealthy behavior

Application of theoretical frameworks explaining risk behavior

Theories of human behavior with relevance for accident prevention

- Psychological factors
  - Cognitive factors
    - lack of knowledge
    - information processing
      - inaccurate risk perceptions
      - stress
  - Motivation and attitudes
    subjective evaluation of advantages and disadvantages of behavioral options

- Environmental factors
  - Physical environment
  - Social environment

Motivational theories of factors influencing risk behavior

Theory of Planned behavior (Ajzen, 1991)

TPB applied to farm accidents

Table 1 Beta values, t-values and p-values of attitude, subjective norm and perceived behavioral control for the prediction of intentions of the entire group of respondents.

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Van den Broucke & Colemont (unpublished)
TPB applied to farmers’ health problems

Table 4 Beta values, t values and p-values of attitude, subjective norm and perceived behavioral control for the prediction of intention for occupational disease

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Adding the influence of environmental factors
“Safety culture”

• Definitions of safety culture
  – “The way in which safety is managed in a workplace. It is the combination of beliefs, perceptions and attitudes of employees toward the safety of workers and the overall safety of the work environment. Cultivating a safety culture is a key aspect in maintaining workplace safety.”
  – “A positive safety culture is the culture of a workplace in which all the employees think of safety as an important thing and behave in a way that prioritizes their own safety as well as the safety of those around them. This includes using proper personal equipment, following the safety laws and just generally being conscious of safety and safe practices at all times.”

  Safeopedia (2018)

• Characteristics of organisations with a positive safety culture
  – communications founded on mutual trust
  – shared perceptions of the importance of safety
  – confidence in the efficacy of preventive measures

3. Develop and test interventions to influence behavior
Existing campaigns and programs to prevent harm to workers in agriculture

- ‘Think safety Farm safely’ campaign (Ireland)
  “Better to lose a minute in life than to lose your life in one minute.”

- 'Make the promise' campaign and Farm Safety and Health Awareness Days (UK)

- PreventAgri (Belgium)
  comprises awareness raising, training, research and intervention

- Safety Certificates by Social Insurance Institution for Farmers (Austria)
  - award for farmers who pay attention to safety
  - subject to strict criteria
    e.g., a general standard of health and safety practice, safe work organisation, protective equipment, tidy working area, safe vehicles, safe buildings, ...

Internet based campaigns

- Video clips of real farmers sharing real accident experience on Survivor Stories

- Farm self-assessment software
  - helps farmers carry out a risk assessment of their farms and apply good health and safety practices
  - raises the levels of health and safety awareness
  - step-by-step route into learning about what farmers need to do to protect their health and safety and to comply with the law, without being overwhelmed.
  - simplifies the process of risk assessment and is intended to help farmers

Source: Griffin, P (2013) Safety and Health in Agriculture
"Farming – a hazardous occupation – how to improve health & safety?"
Do prevention campaigns work?

“We hope farmers will find [the self-assessment tool] useful to help improve awareness of health and safety and so reduce the risk of costly accidents on their farms”

- Roger Nourish, HSE’s Agriculture and Food Sector

The evidence on effectiveness

Meta-analyses of effectiveness studies

- De Roo & Rautiainen (2000)
  - 25 farm safety education programs
  - Most reported positive changes following the interventions, but limitations in the design of evaluations make the results of many studies invalid

  - 95 quasi-experimental studies (n=20991) on worker safety
  - Comparison between least engaging (lecture, pamphlets, videos), moderately engaging (programmed instruction, feedback interventions), and most engaging (training in behavioral modeling, hands-on training)
    - Training involving behavioral modeling, a substantial amount of practice, and dialogue is generally more effective than other methods of safety and health training.

- Coman (in progress)
  - 39 programs aimed at enhancing safety and health literacy among farmers
  - Programs based on behavioral models tend to be more effective

Only a small number of programs are based on behavioral models.


Sacurima COST Action (Safety Culture and Risk Management in Agriculture)

- Understand the determinants of safety behavior in agriculture
  - Individual determinants (knowledge, attitudes, perceived risks, perceived norms, “safety literacy”)
  - Contextual/environmental determinants (safety culture)

- Produce an innovative tool to measure
  - Knowledge, attitudes, perceived risks, norms and behaviors among farmers regarding safety, health and risk management and to measure safety culture on farms
  - Safety culture

- Measure determinants of safe behavior among farmers, and use it for benchmarking national performance
Draft Survey Tool to Measure Agricultural Safety Culture and Risk behavior

- **Background information** (age, gender, type of farm, …) (8 items)
- **Injury history** (3 items)
- **Safety practices** (falls prevention, machinery handling, pesticides and chemicals handling, animal handling) (17 items)
- **Attitudes, norms perceived behavioral control, and intentions** (35 items)
- **Safety culture in the farmer community** (5 items)
- **Obstacles to safety behavior** (tiredness, stress, workload, weather conditions, …) (7 items)

### SACURIMA Survey Tool

**Part 2: Injury history**

9. Have you personally been involved in an accident on the farm you are working on the last 10 years?
   - No
   - Yes, … accidents

10. Has anyone also been involved in an accident on the farm you work in the last 10 years?
    - No
    - Yes, … accidents

11. Of all the accidents that have occurred on your farm, how severe was the most serious accident?
    - Injury requiring 3-5 days off work
    - Injury requiring 6-10 days off work
    - Injury requiring 11-30 days off work
    - Injury requiring 30 days or more

**Part 3: Your safety practices**

For each of the following working practices, please tick the box that best describes your opinions:

- Falls prevention
- Machinery handling
- Animal handling
- Chemicals/pesticides handling

**Part 4: Your and others' views with regard to safety behavior**

40. Do you work with machines on your farm?
   - No
   - Yes

41. I think it important to read the manual carefully before using a machine for the first time

42. I think dangerous to work with machinery without proper protection or guarding

43. Other farmers would disappear if I didn’t use machinery without proper protection or guarding

44. Most farmers would be standing in the way before they drove away

45. I am quite to buy a machine even if I don’t have the money

46. Whether machine is worth it depends on how it is used

47. I intend to read the manual before using a new machine in the future

48. I intend to take precautionary measures when working with machinery in the future

49. Do you have animals on your farm?
   - No
   - Yes
Survey to Measure Agricultural Safety Culture and Risk behavior

• **Objective**
  
  collect comparative data on the safety practices and its main determinants among agricultural workers in the countries that participate in COST Action SACURIMA

• **Method**
  
  – Data collection method to be decided by each participating country
    • face-to-face interviews preferred
    • telephone-based interviews or self-report (handed out paper versions or online survey) can be considered
  
  – Convenience sampling procedure
  
  – Translation of the survey questionnaire in each country’s language(s)
  
  – Minimum sample size is 200 farmers per country
4. Investigate conditions for successful implementation of prevention programs

Importance of implementation fidelity
- Degree to which an intervention is delivered as planned
- Investigate potential moderators of the implementation

Conclusions

• Farming is a hazardous and increasingly stressful occupation
• The specificity of agriculture and the risks facing farmers and their families are often missed or neglected in general health and safety
• Farm safety campaigns should be based on a sound understanding of the risk or health-damaging behavior
  - documented impact of specific behavioral factors
  - role of determinants of risk behavior using psychological models
• Understanding of behavioral determinants is a sound basis to develop preventive interventions
  - interventions should target the determinants of unsafe/healthy behavior
  - effectiveness of preventive interventions can be measured by looking at change in behavioral determinants
  - conditions for successful implementation and sustainability need to be considered
• The European COST Action SACURIMA can contribute to enhancing farm safety
  - measure determinants of unsafe behavior among farmers
  - benchmark national performance and identify priorities
  - evaluate interventions and policies to enhance safe behavior by farmers
“An ounce of prevention is worth a pound of cure”

- Benjamin Franklin

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