Identifying knowledge, attitudes, behaviours and priorities among farmers regarding safety, health and risk management

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Workshop
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Milan, September 20, 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 workforce fatalities for 1.5% of the workforce
    • Ireland: 50% of workforce 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 2013; 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 behavioural and environmental determinants of health and safety problems through prevention and health promotion
Does prevention work?

Meta-analyses of effectiveness studies

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

• Burke et al (2006)
  - 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)
  – 47 programmes aimed at enhancing safety and health literacy among farmers
  – Programmes based on behavioural models tend to be more effective

Only a small number of programmes are based on behavioural models

<table>
<thead>
<tr>
<th>Reference</th>
<th>Risk</th>
<th>Behavior Determinant</th>
<th>Results/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elmore and Arcury</td>
<td>Pesticide exposure</td>
<td>Individual’s beliefs, susceptibility to risk, barriers to action</td>
<td>Belief to be susceptible to short-term consequences, not long-term. Perceived barriers: high work pressure and need for employment. Study limits: qualitative design, generalization to larger population.</td>
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<tr>
<td>DeBarr et al.</td>
<td>Youth tractor safety</td>
<td>Behavioral intentions (BI), attitudes (Att), subjective norms (SN), behavioral norms (BN)</td>
<td>Att and BI r = 0.60, SN and BI r = 0.65, SN and BI r = 0.61. R² combined model (Att, SN, BN) = 0.48, R² combined model (Att, SN, BN) = 0.53.</td>
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<tr>
<td>Lee et al. (1997)</td>
<td>Farm risk exposure among children</td>
<td>Behavioral intentions (BI), attitudes (Att), subjective norms (SN), perceived behavioral control (PBC)</td>
<td>R² combined model (Att, SN, FBC) = 0.67 to 0.79. Att (β = 0.50 to β = 0.60), SN (β = 0.24 to β = 0.26), FBC (β = 0.09 to β = 0.16). Limitation: behavior is not included.</td>
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<tr>
<td>Petrea (2001)</td>
<td>Respiratory protection</td>
<td>Behavioral intentions (BI), attitudes (Att), subjective norms (SN), perceived behavioral control (PBC)</td>
<td>Att and BI r = 0.42, SN and BI r = 0.37, PBC and BI r = 0.06, BI and self-reported behavior r = 0.53. R² combined model (Att, SN, PBC) = 0.28.</td>
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<td>Kidd et al. (2003)</td>
<td>Injury prevention in adolescents</td>
<td>Measurement of contemplation and action stages</td>
<td>Contemplation: F(1732) = 197.4; p &lt; 0.0001. Action: F(1730) = 106.1; p &lt; 0.0001. MS means post-intervention contemplation score: 3.3 for treatment and 2.5 for control. MS means post-intervention action score: 2.8 for treatment and 2 for control. Both significant at p &lt; 0.0001. 88% of students made behavior changes towards safety.</td>
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References:

Making prevention more 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 application of principles of scientific reasoning, including systematic uses of data and information systems, and appropriate use of behavioral science theory and program planning models”

Building the evidence base for effective farm safety programmes

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

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

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 behaviour

- **Psychological factors**
  - Cognitive factors
    - lack of knowledge
    - low (health) literacy
    - information processing (e.g., inaccurate risk perceptions)
  - Motivation and attitudes
    - subjective evaluation of advantages and disadvantages of behavioural options
    - perceived norms and competence
  - Stress

- **Environmental factors**
  - Physical environment (facilities, barriers)
  - Social environment (regulations, safety culture)
Motivational theory of factors influencing risk behavior

Theory of Planned Behaviour (Ajzen, 1991)
### TPB applied to farm accidents

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

<table>
<thead>
<tr>
<th></th>
<th>$R^2$</th>
<th>$\beta$</th>
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<tr>
<td><strong>Machinery use</strong></td>
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<tr>
<td>Attitude</td>
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<td>wagon loading</td>
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<td>machinery maintenance</td>
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<td>Perceived behavioral control:</td>
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<td>public road visibility</td>
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<td><strong>Animal handling</strong></td>
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<td>Perceived behavioral control:</td>
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## TPB applied to farmers’ health problems

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

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<td>-.04</td>
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| **NO DISEASE**         |       |         |      |       |
| Machinery use          |       |         |      |       |
| Attitude               | .30   | .23     | 5.16 | .00   |
| Subjective norm        |       | .40     | 9.18 | .00   |
| Perceived behavioral control: wagon loading |       | -.03    | -.78 | .43   |
| Perceived behavioral control: machinery maintenance |       | -.11    | -2.76| .01   |
| Perceived behavioral control: public road visibility |       | .06     | 1.42 | .16   |
| Pesticide use          | .43   |         |      |       |
| Attitude               |       | .47     | 11.55| .00   |
| Subjective norm        |       | .30     | 7.38 | .00   |
| Perceived behavioral control |       | .05     | 1.25 | .21   |
Adding the influence of environmental factors

Behavioral beliefs and outcome evaluations
Normative beliefs and motivation to comply
Beliefs about ease/difficulty of behavior

Attitude toward the behavior
Subjective norm (social pressures)
Perceived Behavioral Control

Behavioral Intentions

Cues to action
Safety Culture

Behavior

Other psychological variables (habits, compensatory beliefs, self-image, …)
Barriers
Rewards
“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
Sacurima COST Action Working Group 2

• 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 behaviours among farmers regarding safety, health and risk management and to measure safety culture on farms
  – Safety culture

• Measure determinants of safe behavior among farmers, be used for benchmarking national performance.
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 behaviour
  - documented impact of specific behavioural factors
  - role of determinants of risk behaviour using psychological models
- Understanding of behavioural determinants is a sound basis to develop preventive interventions
  - effectiveness needs to be demonstrated
  - conditions for successful implementation and sustainability need to be considered
- European scope of SACURIMA can be used proactively to enhance farm safety
“An ounce of prevention is worth a pound of cure”

- Benjamin Franklin

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