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## STRESS AND BURNOUT AMONG FINNISH DAIRY FARMERS

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### ABSTRACT

Psychosocial risks among farmers have increasingly been examined because of the ongoing changes in agriculture, such as restructuring of the industry, transition from family farming towards entrepreneurship, and climate change. The aims of the study were to determine the stressors, prevalence of stress and burnout, and variables associated with these symptoms among Finnish dairy farmers. In total 265 respondents completed a postal survey; their average age was 48 years, 44% were females and 56% males. The farms of the survey sample were larger (54 field hectares, 29 cows) than an average farm in Finland (37 hectares, 24 cows) in 2010. The most common stressors were external, such as “agricultural policy of the EU” (European Union) and “the treatment of farmers in society and the media.” In addition, common stressors were related to farm and work, e.g. “amount of work,” unpredictability, and “animal diseases.” The prevalence of stress (42%) was found to have increased compared with earlier studies and was greater than among the general working population. All respondents as a group were classified as having slight symptoms of burnout, and one tenth (9%) of dairy farmers had experienced severe burnout. Stressors related to the workload and health were associated with stress and burnout symptoms. Also, a poor economic situation and loneliness were related to stress. Burnout correlated with a tie stall barn type and with farm not being involved in the milk production record system. Factors protecting against burnout included positive features of the work and living environment. The study revealed changes during the past decade and new features of the well-being at work on dairy farms in Finland.

**Keywords:** agriculture, burnout, dairy farm, stress, survey

### INTRODUCTION

During recent decades, agriculture has faced significant changes worldwide. Agriculture is gradually changing from traditional family farming towards entrepreneurship, including greater investments, increased risks, a more structured workplace with employees, and the adoption of new technologies.<sup>1</sup> Ongoing climate change is expected to affect agriculture, and exceptional weather conditions have been assessed as the main factor leading to rapid price fluctuations for agricultural products worldwide.<sup>2,3</sup>

Probably because of the ongoing changes in agriculture, psychosocial risks among farmers have been under increasing international examination during recent decades.<sup>4</sup> The changes have resulted

in new types of stressors, as farming is currently more capital-intensive, industrialized, and isolated<sup>1</sup> due to the structural change.<sup>5</sup> In addition, farmers are affected by increasing regulation, diminishing control over their work, intensification of their occupation, and concurrent weakening of the farm economy.<sup>6,7</sup> According to the Fourth European Working Conditions Survey carried out in 31 European countries, skilled agricultural and fishery workers most often (32%) reported work-related stress as affecting their health, compared with the corresponding prevalence (22%) among other professional sectors.<sup>8</sup> Furthermore, the sector of skilled agricultural and fishery workers was the only one in which the prevalence of stress had increased compared with an earlier follow-up study in 2000.<sup>9</sup> In the study by Brumby et al.<sup>10</sup> Australian farm men and women had poorer mental health status than urban or other rural populations. Lunner Kolstrup et al.<sup>4</sup> assessed dairy farming as a sector in which a hazardous and mentally straining working environment may elevate stress. In addition, it may be difficult to organize work absences, and old farming traditions may create invisible barriers to organizing work in a more functional way.<sup>11</sup>

A dairy farm is defined in Finland as a farm receiving more than two thirds of the farm's total return from milk production as calculated using the Standard Output Method.<sup>12</sup> A farmer is defined as a person “who carries the primary responsibility for running the farm,”<sup>13</sup> and the size of a farm is at least 5 hectares of agricultural land.<sup>14</sup> A farm involved in the milk production record system receives advice on production and information about quality and yields of milk. This provides possibility to assess the feeding of cows, the health of udders, and the profitability of the production. The results are benchmarked against farmers in the same district and the whole country.

Stress is usually defined as a conflict resulting from an imbalance between the possibilities and demands of the existing circumstances and a person's expectations, resources, or capacities.<sup>15</sup> Stress is described as a “harmful and emotional response” to this conflict.<sup>16</sup> Saarni et al.<sup>17</sup> determined that the farmers survey results indicated the lowest work ability among Finnish farmers compared to other population groups, and referred to the theory of Karasek and Theorell<sup>15</sup>, describing the situation as “low control, low support, and high demand.” Another stress theory, termed “the effort–reward imbalance model,” formulates stress as a situation where the efforts and rewards of work are not in balance: efforts such as the amount of work and the required physical or mental exertion are greater than the rewards, such as the economic situation, the success of an enterprise and work security.<sup>18</sup> The effort-reward imbalance model is based on an understanding of social exchange in which the costs and benefits should be more or less even. Griffin & Clarke<sup>19</sup> defined a stressor as an environmental demand, with the concept including both “external stimuli” and the negative reaction of the individual. Stress is not an illness, but when long-lasting and with a certain intensity, it may lead to a process resulting in the onset of mental or physical disease, such as cardiovascular diseases, diabetes, depression, musculoskeletal diseases, lowered immunity, and burnout.<sup>20</sup> Brumby et al.<sup>10</sup> observed a significant association between psychological distress and obesity among Australian farm men and women.

Burnout is defined as a conflict of one's relationship with the work or a serious disorder of well-being.<sup>21</sup> Burnout develops over a long time during stressful conditions, and it includes one to three dimensions that vary individually: exhaustion, cynicism, and a collapse in professional self-esteem.<sup>21</sup> A person may be completely exhausted and also doubt his or her capacity to perform

work tasks.<sup>21</sup> He or she may have cynical thoughts about meaningfulness of work and the joy of work may disappear. For examining burnout, the established inventory method, Maslach Burnout Inventory – General Survey, MBI-GS focuses “on the performance of the work in general,”<sup>21</sup> not only on the human service professions.<sup>22</sup>

A telephone survey among Finnish farm entrepreneurs ( $N = 1,182$ ) in 2004 indicated that 1 in 4 (26%) respondents had symptoms of weakness and fatigue. In addition, nearly one-fifth (19%) had symptoms of insomnia or difficulties in falling asleep that had been long-lasting during the previous month.<sup>23</sup> These results aroused an interest in investigating well-being at work among Finnish dairy farmers. The research questions of this study were the following:

1. What are the stressors among Finnish dairy farmers?
2. What is the prevalence of stress and burnout among respondents?
3. What variables are associated with stress and burnout?

## ***METHODS***

In 2009, a random sample of 400 Finnish dairy farms was selected from the farm register of the Ministry of Agriculture and Forestry, which contained 11,896 dairy farms out of a total of 64,175 Finnish farms.<sup>13</sup> Two similar questionnaires were mailed to each dairy farm. In an attached cover letter, the farmer, farming couple, or persons regularly taking care of cattle were asked to complete the questionnaires. After two mailing rounds (January and March, 2010) and a reminder postcard, 265 valid questionnaires were received from 188 (47%) farms in the sample. Altogether, 50% of farms responded to the request to participate, but in 12 cases the respondent informed about the cessation of dairy farming, about the death of the dairy farmer, or the questionnaire was not valid. The reasons why the rest of the sample farmers did not respond are not known. In addition to the information about stress and burnout among dairy farmers reported in this article, the questionnaire included questions about animal welfare and conditions in the barn and the relationship between the animals and the stockperson.

The characteristics of the respondents and farms in the sample and the corresponding figures of all Finnish farms are presented in Table 1. The values of average farmer age and the proportion of tie stall barns in the study sample were close to the average figures in Finnish agriculture.<sup>13,24</sup> Over half (56%) of the survey respondents were men and 44% were women. The farms of the survey sample were larger (54.0 field hectares, 29.0 cows) than an average farm in Finland (36.7 hectares, 24.3 cows) in 2010 (Table 1).<sup>13</sup> The farm work was usually carried out by farm family members (83%). One quarter (25%) of the farms had only one full-time worker. Most respondents (90%) had worked with cattle for over ten years.

### ***Stressors and resource variables***

The questionnaire included a table of 18 stressors and the following instruction: “Estimate your own stressors in your current situation in life. Which issues do you experience as strenuous, inconvenient or tiring?” The scale of response options was from 1 (“not strenuous at all”) to 7 (“very strenuous”). Correspondingly, 26 resource variables were included in table with a question: “Which of the following are resource variables that enable you to develop a positive attitude and cope in your

everyday life?” The instruction was to assess variables on a scale from 1 (“completely meaningless”) to 7 (“very important”).

Table 1. Characteristics of farms and farmers in the survey sample (mean, range, standard deviation, and *N*) and on average in Finland.

| Characteristics |                                       | Survey sample |       |       |                | Finland average   |
|-----------------|---------------------------------------|---------------|-------|-------|----------------|-------------------|
|                 |                                       | Mean          | Range | SD    | N <sup>c</sup> |                   |
| The respondents | Average age (years)                   | 47.8          | 21-80 | 10.35 | 262            | 50.6 <sup>a</sup> |
|                 | Share of females (%)                  | 44            | 24-80 | 10.51 | 116            | 35 <sup>a</sup>   |
|                 | Share of men (%)                      | 56            | 21-73 | 10.26 | 146            | 65 <sup>a</sup>   |
| The farms       | Number of cows                        | 29.0          | 4-220 | 26.41 | 186            | 24.3 <sup>a</sup> |
|                 | Field hectares (ha)                   | 54.0          | 7-365 | 45.33 | 184            | 36.7 <sup>a</sup> |
|                 | The proportion of tie stall barns (%) | 78.1          | -     | -     | 178            | 74 <sup>b</sup>   |

Note. No statistically significant differences were observed between female and male ages ( $P = .72$ ).

<sup>a</sup> Information Centre of the Agriculture and Forestry (Tike)<sup>13</sup>

<sup>b</sup> ProAgria. The share is among farms that take part in the milk production record system.

<sup>c</sup> *N* is variable, because all respondents did not give an answer to all questions.

The stressors included in the questionnaire were selected based on earlier literature references. The stressors were such as changes in agriculture policy or new legislation<sup>25-27</sup>, public perception or the position of the farmers<sup>26</sup>, future of the farm<sup>27,28</sup>, administrative burden<sup>29</sup>, the amount of paper work<sup>26,28</sup>, long hours of work or amount of work<sup>6,26,27</sup>, machinery breakdown<sup>27</sup>, uncontrollable natural forces<sup>25</sup>, animal diseases<sup>26,27</sup>, media criticism<sup>26-28</sup>, finances<sup>25-28</sup>, health problems<sup>26-28</sup>, isolation<sup>25-28</sup> and family problems<sup>28</sup>.

### ***Stress and burnout***

Stress was measured with the following question: “Stress means a situation in which a person feels tense, restless, nervous or anxious, or is unable to sleep because his/her mind is troubled all the time. Do you currently feel this type of stress?”<sup>30</sup> The response alternatives were: (a) not at all, (b) only a little, (c) some, (d) quite a lot, (e) a great deal, (f) I am not able to answer, and (g) no answer. The validity of this single-item measure of stress has been assessed with a conclusion; the content, criteria, and construct validity for group-level analysis is satisfactory when four independent data sets were included in the evaluation process.<sup>30</sup>

Burnout symptoms were measured with the MBI-GS, including 16 items and assessing three dimensions: exhaustion (5 items), cynicism (5 items) and professional self-esteem (6 items).<sup>21</sup> The scale of alternative responses was from 0 (“never”) to 6 (“daily”).

### ***Statistical methods***

The relationships of background variables with stress and work-related burnout were initially examined using correlation analysis, analysis of variance and cross tabulation. In addition, the information concerning 26 resource variables and 18 stressors was reduced to 9 summary factors (6 from resource variables and 3 from stressors) by using factor analysis (FA) (Table 2). FA with the maximum likelihood method was separately applied to resource variables and stressors. Non-orthogonal (oblique) promax rotation was used because of the moderately correlated factors. However, both rotation methods (orthogonal and oblique) led to very similar structures and interpretable solutions. Multiple imputation for missing data was used to obtain the factor scores for all respondents. The SAS procedure MI, which uses the multivariate normal approach via the Markov chain Monte Carlo (MCMC) method, was used for multiple imputations (SAS Institute, Cary NC, USA). The effects of the imputations on the FA structure were examined and found negligible. Factor scores were used as continuous predictor variables in logistic regression.

Binary logistic regression was used to model the probability of suffering from stress or work-related burnout. The analyses included both background variables and summary factors. Some of the continuous variables were classified into two or three classes because of the apparent lack of normality. Moreover, some categorical variables were re-classified into two or three classes because of scarce class frequencies in some cases. The presence of stress was assumed when the stress level was more than 3 (42% of cases), i.e. the respondent reported having some, quite a lot or a great deal of stress. Respectively, the presence of burnout was assumed when the burnout level was more than 1.5 (54% of cases), in which case the respondent was classified as having slight or severe burnout symptoms. The stepwise selection method was used in the analysis because of the large number of variables and their possible interactions. The appropriateness of the models was assessed by analysis of residuals. The normality of dependent variables and the residuals of the models were checked using box plots. Statistical analyses were performed with the software package SAS Enterprise Guide 4.3.

## ***RESULTS***

### ***Stressors***

On average, the most common stressors (Figure 1) represented external issues: “agricultural policy of the EU” [European Union] (average points 5.41), “the treatment of farmers in society and the media” (5.08), “the future of the agricultural sector” (5.04) and “administration of the farm” (5.04). Stressors related to farm and work were also common, such as “amount of work” (4.92), “lack of possibility to predict work situations” (4.87), “animal diseases” (4.87) and “complex responsibilities and duties” (4.83). The lowest average points were in the stressors “own or other persons’ alcohol or drug usage” (1.75), “lack of a companion” (1.88), “relationships with parents and parents-in-law” (2.13) and “family relationships” (2.23). In general, the stressors related to personal issues and social relations were not among the most common stressors. The greatest standard deviations were in the stressors “finances and economic situation” (*SD* 1.97), “loneliness” (1.90) and “problems with sleeping” (1.85), whereas the lowest standard deviations were in the stressors “own or other persons’ alcohol or drug usage” (1.48), “working with animals” and “agricultural policy of the EU” (both 1.56). (Figure 1)

Table 2. Exploratory factor analysis; included stressors or resource variables, loadings, and established summary factors.

|   | <b>Included stressors or resource variables</b>   | <b>Loading</b> | <b>Summary factor</b>           |
|---|---|----------------|---------------------------------|
| <b>Stressors</b>  | Agricultural policy of the EU                     | 0.92           | Governance and responsibilities |
|   | The treatment of farmers in society and the media | 0.83           |                                 |
|   | Administration of the farm                        | 0.68           |                                 |
|   | The future of the agricultural sector             | 0.67           |                                 |
|   | Complex responsibilities and duties               | 0.55           |                                 |
|   | Lack of possibility to predict work situations    | 0.52           |                                 |
|   | Physical load of work                             | 0.75           | Workload and own health         |
|   | Amount of work                                    | 0.72           |                                 |
|   | Own health  | 0.55           |                                 |
|   | Loneliness  | 0.99           | Loneliness                      |
|   | Lack of companion                                 | 0.60           |                                 |
| <b>Resource variables</b>                                   | Own family  | 0.98           | Family                          |
|   | Child or children                                 | 0.94           |                                 |
|   | Own spouse or companion                           | 0.79           |                                 |
|   | Love  | 0.60           |                                 |
|   | Work near nature                                  | 0.76           | Work and living environment     |
|   | Freedom in work                                   | 0.71           |                                 |
|   | Diversified work                                  | 0.64           |                                 |
|   | Living environment                                | 0.59           |                                 |
|   | Work atmosphere                                   | 0.56           |                                 |
|   | Farming lifestyle                                 | 0.52           |                                 |
|   | Neighbors   | 0.85           | Social relationships            |
|   | Relatives   | 0.73           |                                 |
|   | Support from other farmers                        | 0.62           |                                 |
|   | Friends   | 0.60           |                                 |
|   | The affection shown by farm animals               | 0.96           | Work with farm animals          |
|   | Working with farm animals                         | 0.78           |                                 |
|   | Follow-up of animal behavior                      | 0.74           |                                 |
|   | Success of farm enterprise                        | 0.99           | Success of farm enterprise      |
|   | Sufficient income                                 | 0.74           |                                 |
|   | Sufficient free time                              | 0.81           | Free time                       |
| Substitute farm work service or substitute during a holiday | 0.79  |                |                                 |
| Own hobby   | 0.50  |                |                                 |

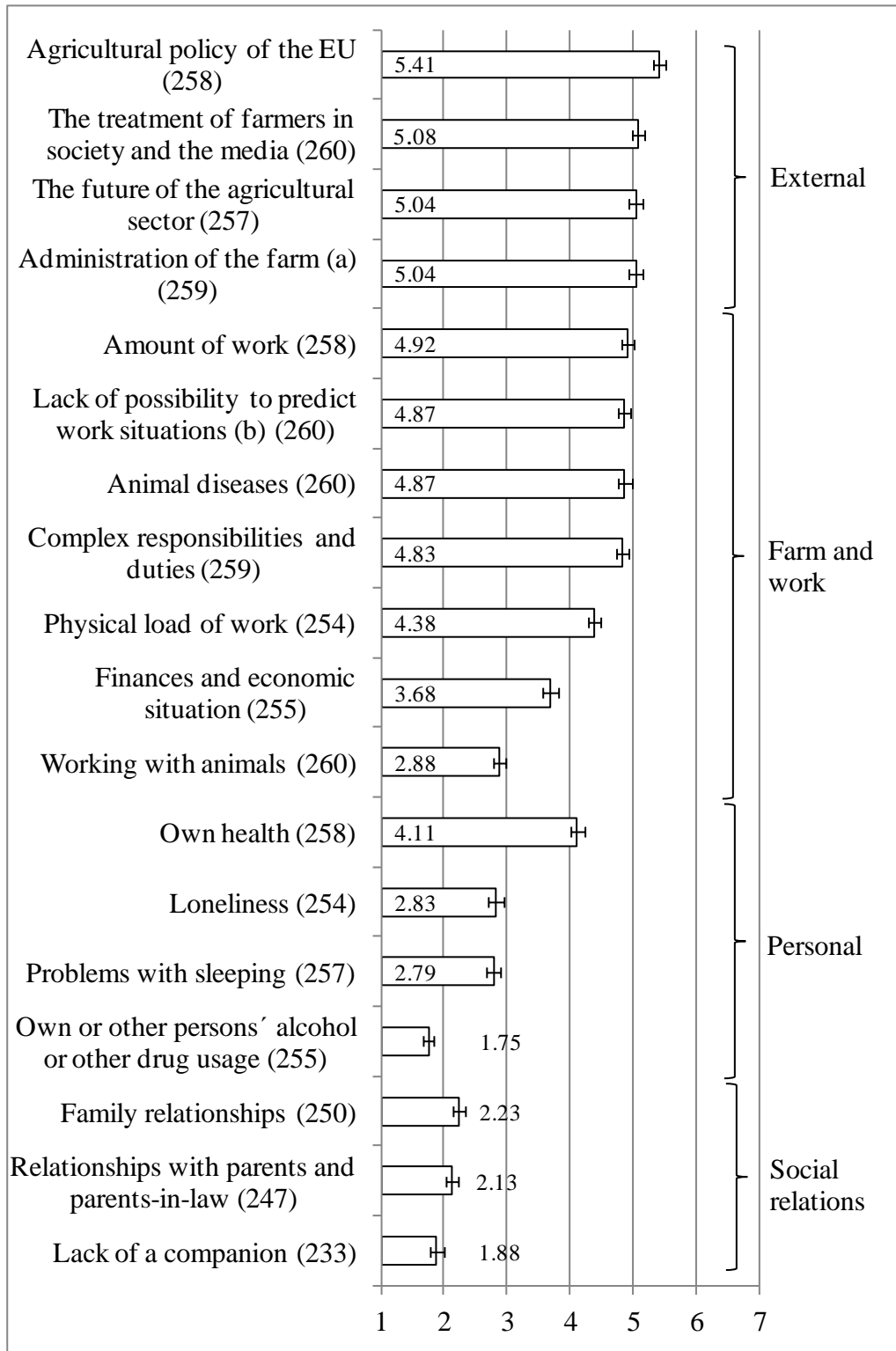


Figure 1. Stressors as average points (bars) and standard errors of means (bars  $\pm$  SE) according to a postal survey among Finnish dairy farmers. The scale of the responses is 1–7, in which 1 means “not strenuous at all” and 7 “very strenuous”. The number of responses is presented after each stressor in parentheses.

(a) Including subsidy forms and inspections

(b) For example machine breakdowns, varying weather conditions and animals



### **Summary factors**

The nine summary factors established from stressors and resource variables by exploratory factor analysis are presented in Table 2.

### **Prevalence of stress and associated variables**

According to the survey, 42% of the dairy farmers reported having some, quite a lot, or a great deal of stress. Over half (55%) of respondents choose the alternatives “not at all” or “only a little” in relation to stress symptoms.

In the binary logistic regression analysis, the variable “stress” was used as a binary variable (1 = stress,  $n = 92$ , including some, quite a lot or a great deal of stress; 0 = no stress,  $n = 126$ , including not at all or only a little stress). The model interpreted 32% of the reported stress symptoms. The variables associated with stress are presented in Table 3. Statistically significant associations with stress were detected for the variables “poor economic situation of the farm” (odds ratio [OR] = 2.43, 95% confidence interval CI: 1.08–5.50) and summary factor “workload and own health” (OR = 1.88, 95% CI: 1.17–3.02) including the stressors “physical load of work,” “amount of work,” and “own health.” Also the summary factor “loneliness” was associated with stress (OR = 1.45, 95% CI: 1.02–2.06), including the stressors “loneliness” and “lack of a companion” (Table 3).

Table 3. The variables associated with stress symptoms according to multivariable logistic regression analysis.

| <b>Variable</b>                                   | <b>Adjusted OR (95% CI)</b> |
|---|-----------------------------|
| Gender: female vs. male                           | 1.83 (0.96-3.48)            |
| Workload and own health (sf; stressors)           | 1.88 (1.17-3.02)            |
| Economic situation of farm: poor vs. satisfactory | 2.43 (1.08-5.50)            |
| Economic situation of farm: good vs. satisfactory | 0.67 (0.33-1.36)            |
| Governance and responsibilities (sf; stressors)   | 1.55 (0.98-2.44)            |
| Loneliness (sf; stressors)                        | 1.45 (1.02-2.06)            |

Note. sf = a summary factor, established from the stressors (Table 2).

### **Prevalence of burnout and associated variables**

The indicator MBI-GS classified the dairy farmers as follows: 46% of respondents did not have burnout symptoms, 45% had slight, and 9% had severe burnout symptoms. As a group, all respondents were categorized as having slight burnout symptoms.

The logistic regression analysis (Table 4) included 227 observations (38 observations were lacking). The model interpreted 36% of the reported burnout (Nagelkerken, max-rescaled  $R^2$ ). “Work and living environment” as a summary factor reduced the probability of burnout (OR = 0.55, 95% CI: 0.34–0.88). This summary factor included resource variables “work near nature,” “freedom in work,” “diversified work,” “living environment,” “work atmosphere” and “farming lifestyle” (Table 2). The summary factor “workload and own health” was associated with burnout (OR = 2.43, 95% CI: 1.59-3.73), including the stressors “physical load of work,” “amount of work” and “own health.” If the summary factor “workload and own health” (Table 2) increased by one, the

probability of burnout increased by 143%.

Table 4. Multivariable logistic regression analysis; the variables associated with burnout symptoms (slight or severe burnout).

| Variable  | Adjusted OR<br>(95% Wald CI) |
|---|------------------------------|
| The amount of cows  | 0.98 (0.97-1.00)             |
| Being involved in the milk production record system: yes vs. no | 0.43 (0.18-1.06)             |
| Work and living environment (sf; resource variables)            | 0.55 (0.34-0.88)             |
| Work with farm animals (sf; resource variables)                 | 0.67 (0.44-1.01)             |
| Loneliness (sf; stressors)                                      | 1.35 (0.96-1.91)             |
| Workload and own health (sf; stressors)                         | 2.43 (1.59-3.73)             |

Note: sf = summary factor, established from the stressors or resource variables (Table 2).

The correlations between the background variables and burnout symptoms were also analysed. The type of cattle housing had a significant association ( $P = .0124$ ) with burnout; over half (59%) of those respondents having a tie stall barn had slight or severe burnout, whereas the corresponding proportion among the respondents having a loose housing barn was only 37%. Being involved in the milk production record system also had a significant ( $P = 0.0362$ ) association with burnout; slight burnout symptoms were more prevalent on those farms that were not involved in the milk production record system than on the farms belonging to the system. No statistically significant associations with burnout were detected for the variables gender, marital status, education, production volume or working alone or with several dairy farm workers.

Some variables were observed to have some impact on burnout symptoms. Age may have an association ( $P = 0.0531$ ); the respondents born during the 1950s or earlier more frequently experienced slight or severe burnout symptoms compared to the younger respondents. One tenth (11%) of the respondents born during the 1960s had severe symptoms of burnout, whereas the corresponding proportion among the respondents born in the 1970s was 5%. The number of cows also had a trending ( $P = 0.0813$ ) association with burnout; severe burnout symptoms were more prevalent among those respondents who had fewer than 20 or more than 40 cows.

## DISCUSSION

According to the postal survey, all the dairy farmers ( $N = 265$ ) as a group were classified as having slight burnout symptoms, and one tenth (9%) of the respondents experienced severe burnout symptoms. Associations with burnout symptoms form a picture of a respondent who is struggling with the stressors “physical load of work,” “amount of work,” and “own health”, which form the summary factor “workload and own health.” In addition, burnout symptoms had an association with a tie stall barn as a cattle barn type, and the farm is not involved in the milk production record system, which provides advice on milk yields, quality, and education on production. The farmer is more likely to be born during the 1950s or earlier.

The symptoms of cynicism among dairy farmers can perhaps be explained by the most commonly reported stressors, which were external: “agricultural policy of the EU,” “the treatment of farmers in society and the media,” “the future of the agricultural sector,” and “administration of the farm.” These issues are mainly in the hands of EU policy makers. The administrative duties of farmers also mainly result from subsidy payments. During recent years, the effects of politics on agriculture has increased and the rapid changes have been difficult to foresee.<sup>32</sup> As an example, the subsidies (national and from the European union) has been a remarkable share of the agricultural and horticultural gross profit, and these payments depend on political negotiations<sup>33</sup>. The most often reported stressors (Figure 1) are impossible to improve or change for farmers and involve decisions that are made at a distance.

The burnout and its different dimensions among dairy farmers may be compared with the sample of industrial workers in France, Germany, Sweden, and Finland ( $N = 4,799$ )<sup>31</sup>. The comparison between these two studies has to be considered only as suggestive, since the surveys were not carried out during the same year. All differences were statistically significant ( $P \leq .001$ ), as dairy farmers experienced more burnout in general (1.76 MBI-GS measured rating) than industrial workers (1.37). Dairy farmers reported more cynicism (2.02) than industrial workers (1.23), and dairy farmers reported more exhaustion (1.81) than industrial workers (1.16). The survey among the industrial workers was conducted in 2000 during a merger.<sup>31</sup>

It has been assessed that farms have a tradition of using their own workforce on livestock farms.<sup>34</sup> Statistics Finland has carried out a follow-up study focusing on time use among Finnish citizens.<sup>35</sup> Results from the latest survey years (2009–2010;  $N = 3,795$ ) indicate that male farm entrepreneurs work the greatest number of hours per year (2,452 h) compared to other socio-economic groups. During the past ten years, the number of persons working on farms has decreased by 30%, but the number of working hours has only decreased by 13%.<sup>36</sup> These results support the existence of the stressors “amount of work” and “physical load of work” in the present study. While technological development is improving the working conditions, the workload among dairy farmers may still be considerable. Heavy workload may also be the consequence of the weakening farm economy.

“The treatment of farmers in society and the media” was also assessed as a notable stressor. The current societal demands on the agricultural sector are multifunctional, since farms are expected to not only produce food but also take care of the environment, animal welfare, food quality and rural development.<sup>37</sup> These expectations may pose a contradictory situation for farmers if, at the same time, they face problems with their own health or economic difficulties. Several studies have reported that farmers have a declining social status in societies.<sup>1,6,38</sup>

The results concerning the prevalence of stress among dairy farmers may be compared with those of earlier surveys that have included the same stress question.<sup>30</sup> The prevalence of stress (42%) among dairy farmers in 2010 had increased compared with an earlier study; according to the telephone survey in 2004, the prevalence of stress was 33% among the dairy farmers ( $n = 491$ )<sup>39</sup>, but the research methods of the two surveys were not the same. The dairy farmers of this study experienced more stress than recorded among the Finnish working age population ( $N = 2,118$ ), as the prevalence of stress among this population group was 34% in 2013, but the survey methods (postal/telephone

surveys) differed from each other.<sup>40</sup> Stress symptoms were associated with poor economic situation and summary factors ‘workload and own health’ and ‘loneliness’. The ongoing restructuring of the agriculture have increased the isolation<sup>1</sup>, as the amount of Finnish farms has declined by 38% and the size of remaining farms has increased by 54% during the first 15 years as a member of the EU, 1994–2009.<sup>33</sup>

A positive finding in the present study was that stressors related to social relations were not common among dairy farmers. In addition, the summary factor “work and living environment” reduced the prevalence of burnout. Thus, “work near nature,” “freedom in work,” “diversified work,” “living environment,” “work atmosphere,” and “farming lifestyle” as resource variables still have the capacity to empower those working on dairy farms.

The results of this study are based on self-reports and personal assessments by the respondents. “Negative affectivity,” meaning that the results are responsive to the variation in how much people emphasise distress and negative aspects, should be considered when evaluating the validity of the study.<sup>41</sup> Cross-sectional studies can appraise prevalence of outcome<sup>42,43</sup> and risk factors<sup>43</sup>. Results reveal demographic and clinical characteristics of the study group at baseline and sometimes cross-sectional associations of interest.<sup>44</sup> The strength-of this study is that it was based on a representative sample of Finnish dairy farmers. However, the cross-sectional methods do not allow describing the causality.<sup>42-45</sup> In addition, since a cross sectional study is conducted at a certain point in time or over a limited time period, the results do not give “an indication of the sequence of events.”<sup>43</sup> It is also possible that ill or not well-being persons do not participate<sup>45</sup>.

## **CONCLUSION**

The results of the study showed that the most common stressors among Finnish dairy farmers (N = 265) were external factors, such as “the agricultural policy of the EU,” “the treatment of farmers in society and the media,” “the future of the agricultural sector,” and “administration of the farm.” Stressors related to farm and work, such as “amount of work” and “lack of possibility to predict work situations,” were also common. The prevalence of stress had increased compared to earlier studies among dairy farmers and was greater among dairy farmers than among the general Finnish working population. All respondents as a group were categorized as having slight symptoms of burnout, while 9% experienced severe burnout. Stressors related to workload and own health were associated with stress and burnout symptoms. In addition, a poor economic situation and loneliness were related to stress and positive assessment of work and living environment reduced the probability of burnout. Having a tie stall barn as a cattle barn type and being not involved in the milk production record system associated with burnout.

The study revealed changes during the past decade and new features of the well-being at work on dairy farms in Finland. The study results indicated increasing of stress and burnout symptoms, which may have negative ramifications on the productivity of the farms, farm development, animal welfare, and the sustainability of food production. The practical implementation of support may be challenging, as the stress and burnout may be out of sight, and stigmatization of mental health problems as well as long distances may hinder help seeking. Health care sector, policy makers, agronomists, and agribusinesses should be aware of this situation and look for means and act to

support farmers. The stressors may start a process, where an earlier stressor worsens the situation, leading to a negative, circle which starts to proceed towards stress symptoms and possibly further towards burnout. A person suffering from severe burnout may not be able to seek help. On farms the negative development may be noticed only when some external outcome related to product quality or animal welfare issue emerges. We should have a comprehensive ability to stop the negative circle earlier, when problems are easier to solve and the amount of human strain is lower.

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### **REFERENCES**

1. Uthardt L. *Jordbrukaren mellan tradition och förnyelse. [Farmers between tradition and modernization. A study about farmers of EU-Finland in Southern and Western Finland]*. Doctoral thesis. Turku, Finland: Åbo Akademi University Press; 2009. *In Swedish*
2. Moriondo M, Bindi M, Kundzewicz ZW, Szwed M, Chorynski A, Matczak P, Radziejewski M, McEvoy D, Wreford A. Impact and adaptation opportunities for European agriculture in response to climatic change and variability. *Mitigation and Adaptation Strategies for Global Change*. 2010; 15: 657–679.
3. Niemi J. Summary. In: Niemi J, Ahlstedt J, eds. *Finnish Agriculture and Rural Industries 2009*. Vammala, Finland: Vammalan Kirjapaino Ltd.; 2009:5-7. Available at: <http://jukuri.luke.fi/handle/10024/475475> Accessed July 22, 2015.
4. Lunner Kolstrup C, Kallioniemi M, Lundqvist P, Kymäläinen H-R, Stallones L, Brumby S. International perspectives on Psychosocial Working Conditions, Mental Health, and Stress of Dairy Farm Operators. *J Agromedicine*. 2013; 18: 244-255.
5. Donham KJ, Thelin A. Psychosocial Conditions in Agriculture. In: Donham KJ, Thelin A, eds. *Agricultural Medicine. Occupational and Environmental Health for the health Professions*. Oxford: Blackwell Publishing Ltd; 2006: 281-301.
6. Parry J, Barnes H, Lindsey R, Taylor R. *Farmers, Farm Workers and Work-Related Stress*. Suffolk, UK: HSE Books; 2005.
7. Ådahl S. *Good lives, hidden miseries. An Ethnography of Uncertainty in a Finnish Village*. Doctoral thesis. Helsinki, Finland: Helsinki University Printing House; 2007.
8. Parent-Thirion A, Macias EF, Hurley J, Vermeylen G. *Fourth European Working Conditions Survey*. Luxembourg: Office for Official Publications of the European Communities; 2007.
9. Milczarek M, Schneider E, González ER. *OSH in Figures: Stress at Work – Facts and Figures*. Luxembourg: European Communities; 2009.
10. Brumby, S., Chandrasekara, A., McCoombe, S., Kremer P. & Lewandowski, P. Farming fit? Dispelling the Australian agrarian myth. *BMC Research Notes*. 2011; 4: 89. Available at: <http://www.biomedcentral.com/content/pdf/1756-0500-4-89.pdf> Accessed October 1, 2015.
11. Kallioniemi MK, Kymäläinen H-R. Women on Finnish dairy farms: hard work in the midst of traditions and changes. *Rural Society*. 2012; 22: 78-89.

12. Natural Resources Institute Finland (Luke). *Number of Agricultural and Horticultural Enterprises by Production Sector and ELY Centre, 2014 and 2010-2014. Structure of Agricultural and Horticultural Enterprises*. Jokioinen, Finland: Natural Resources Institute Finland (Luke); 2015. Available at: <http://stat.luke.fi/en/structure-of-agricultural-and-horticultural-enterprises> Accessed July 21, 2015.
13. Information Centre of the Ministry of Agriculture and Forestry (Tike). *Yearbook of Farm Statistics*. Information Centre of the Ministry of Agriculture and Forestry. Helsinki, Finland: Edita Prima; 2011.
14. Finlex. *Maatalousyrittäjän eläkelaki [The Law Concerning Farm Entrepreneur Pensions]*. 22.12.2006 / 1280. Available: <http://www.finlex.fi/fi/laki/alkup/2006/20061280>. Accessed October 5, 2015.
15. Karasek RA, Theorell T. *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. New York, NY: Basic Books; 1990.
16. National Institute for Occupational Safety and Health. *Stress at work*. Cincinnati, OH: Publications Dissemination, Education and Information Division; 1999. Available at: <http://www.cdc.gov/niosh/docs/99-101/pdfs/99-101.pdf> Accessed February 23, 2015.
17. Saarni SI, Saarni ES, Saarni H. Quality of life, work ability, and self employment: a population survey of entrepreneurs, farmers, and salary earners. *Occup Environ Med*. 2008; 65: 98-103.
18. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, Peter R. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med*. 2004; 58: 1483-1499.
19. Griffin MA, Clarke S. Stress and well-being at work. In: Zadeck S, ed. *APA Handbook of Industrial & Organizational Psychology*. Vol. 3. Washington DC: American Psychological Association; 2010: 359-397.
20. Sonnentag S, Frese M. Stress in organizations. In: Borman WC, Ilgen DR, Klimoski RJ, eds. *Comprehensive Handbook of Psychology, Volume 12, Industrial and Organizational Psychology*. New York, NY: Wiley; 2003: 453-491.
21. Schaufeli WB, Leiter MP, Maslach C, Jackson SE. The MBI General Survey. In: Maslach C, Jackson SE, Leiter MP, eds. *Maslach Burnout Inventory Manual*. Palo Alto, CA: Consulting Psychologist Press; 1996: 19-26.
22. Bakker AB, Demerouti E, Schaufeli WB. Validation of the Maslach Burnout Inventory – General Survey: an Internet study. *Anxiety Stress Coping*. 2002; 15: 245-260.
23. Kallioniemi MK, Simola AJ, Kymäläinen HR, Vesala HT, Louhelainen JK. Mental symptoms among Finnish farm entrepreneurs. *Ann Agric Environ Med*. 2009; 16: 159-168.
24. ProAgria. *Navettatyypit tuotosseurantakarjoissa [Cattle Barn Types Among the Milk Production Record Farms]*. Tietohaarukka. Helsinki, Finland: Ruokatieto; 2011. In *Finnish*
25. Deary IJ, Willock J, McGregor M. Stress in farming. *Stress Med*. 1997; 13: 131-136.
26. Simkin S, Hawton K, Fagg J, Malmberg A. Stress in farmers: a survey of farmers in England and Wales. *Occup Environ Med*. 1998; 55: 729-734.
27. Firth HM, Williams SM, Herbison GP, McGee RO. Stress in New Zealand farmers. *Stress Health*. 2007; 23; 51-58.
28. Booth NJ, Lloyd K. Stress in farmers. *Int J Soc Psychiatry*. 1999; 46: 67-73.
29. Glasscock DJ, Rasmussen K, Carstensen O, Hansen ON. Psychosocial factors and safety behaviour as predictors of accidental work injuries in farming. *Work Stress*. 2006; 20: 173-189.
30. Elo AL, Leppänen A, Jahkola A. Validity of a single-item measure of stress symptoms. *Scand J Work Environ Health*. 2003; 29: 444-451.
31. Pahkin K, Honkanen H, Huuhtanen P, Jäppinen P. *Työympäristön ja henkilöstön hyvinvoinnin kehittäminen yhteenliittyvissä organisaatioissa [The development of work*

- environment and wellbeing at work during integration of organizations*] Helsinki, Finland: Finnish Institute of Occupational Health (FIOH); 2003. In *Finnish*
32. Ministry of Agriculture and Forestry (MMM). *Maatalouspolitiikan vaihtoehdot -työryhmä, loppuraportti [The Alternatives of Agricultural Policy, Working Group, Final Report.]*. Helsinki, Finland: Ministry of Agriculture and Forestry; 2007. Available at: [http://www.mmm.fi/attachments/mmm/julkaisut/tyoryhmamuistiot/2007/51W4JhTjU/trm2007\\_1.pdf](http://www.mmm.fi/attachments/mmm/julkaisut/tyoryhmamuistiot/2007/51W4JhTjU/trm2007_1.pdf) Accessed February 9, 2015. In *Finnish*
  33. Niemi J. First 15 years in the EU for Finnish agriculture and food economy. In: Niemi J, Ahlstedt J, eds. *Finnish Agriculture and Rural Industries 2010*. Jokioinen, Finland: Agrifood Research Finland; 2010: 5-9. Publications 110. Available at: <http://jukuri.luke.fi/handle/10024/442544> Accessed June 22, 2015.
  34. Pyykkönen P, Tiilikainen S. *Töiden organisointi Suomen maataloudessa [Organizing the Work in Finnish Agriculture]*. 2009. Available at: [http://ptt.fi/wp-content/uploads/2013/04/rap217\\_2506091023.pdf](http://ptt.fi/wp-content/uploads/2013/04/rap217_2506091023.pdf) Accessed February 4, 2015. In *Finnish*.
  35. Pääkkönen H, Hanifi R. *Ajankäytön muutokset 2000-luvulla [The Changes of Time Use During Decade 2000]*. Statistics Finland. Helsinki, Finland: Edita Prima; 2011. Available at: [http://tilastokeskus.fi/tup/julkaisut/tiedostot/isbn\\_978-952-244-331-1.pdf](http://tilastokeskus.fi/tup/julkaisut/tiedostot/isbn_978-952-244-331-1.pdf) Accessed July 22, 2015. In *Finnish*
  36. Kyyrä J, Mattila P, Väre M. *Maatalouslaskenta 2010 [Agricultural Count 2010]*. Information Centre of the Ministry of Agriculture and Forestry (Tike). Tampere, Finland: Juvenes Print; 2011. In *Finnish*
  37. Greer A. Agricultural policy. In: Woods M, ed. *New Labour's Countryside: Rural Policy in Britain since 1997*. Bristol, UK: The Policy Press; 2008: 149-166.
  38. Loblely M, Johnson G, Reed M, Winter M, Little J. *Rural Stress Review*. Available at: <https://ore.exeter.ac.uk/repository/bitstream/handle/10036/32794/StressReviewFinalReport.pdf?sequence=1> Published 2004. Accessed January 28, 2015.
  39. Simola A. Henkinen hyvinvointi [Mental wellbeing]. In: Rissanen P, ed. *Työterveys ja maatalous Suomessa 2004 [Occupational Health and Agriculture in Finland 2004]* Kuopio, Finland: Finnish Institute of Occupational Health (FIOH); 2006: 55-72. Available at: [http://www.ttl.fi/fi/toimialat/maatalous/tiedonlahteita/Documents/Tyoterveys\\_ja%20maatalous\\_Suomessa\\_2004.pdf](http://www.ttl.fi/fi/toimialat/maatalous/tiedonlahteita/Documents/Tyoterveys_ja%20maatalous_Suomessa_2004.pdf) Accessed July 22, 2015. In *Finnish*
  40. Perkiö-Mäkelä M, Hirvonen M. *Työ ja terveys -haastattelututkimus 2012, taulukkoraportti [Work and Health — Interview Study in 2012: Tabular Report]*. FIOH. Tampere, Finland: Tammer-Paino; 2013. In *Finnish*
  41. Cox T, Griffiths A, Rial-González E. *Research on Work-related Stress*. Luxembourg: European Agency for Safety and Health at Work; 2000.
  42. Mann CJ. Observational research methods. Research design II: cohort, cross sectional, and case-control studies. *Emerg Med J*. 2003; 20: 54–60.
  43. Levin KA. Study design III: Cross-sectional studies. *Evid Based Dent*. 2006; 7: 24-25.
  44. Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. *Designing clinical research*. Philadelphia, PA: Wolter Cluwer Health, Lippincott Williams & Wilkins; 2007.
  45. Altmets K, Puur A, Uusküla A, Saaval A, Sakkeus L, Katus K. Self-reported activity limitations among the population aged 20–79 in Estonia: a cross-sectional study. *Eur J of Public Health* 2011; 21: 49–55.