

## WORKING ENVIRONMENT CONDITIONS IN RURAL AREAS ACCORDING TO PSYCHOSOCIAL INDICES

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Thelin AG: Working environment conditions in rural areas according to psychosocial indices. *Ann Agric Environ Med* 1998, 5, 139–145.

**Abstract:** The aim of this work was to study psychosocial working environment factors among farmers and other people living in rural areas. The study was carried out as a cross-section investigation. All persons visiting local occupational health service centres for a health check up have been asked to answer an inquiry which was based on the Karasek-Theorell questionnaire on job strain. Five extra items on worry about the future were added. The questionnaire was completed by over 3,800 persons. Three of four indices showed significant difference with respect to sex. Women experienced less stimulance at work, authority over work and had a greater fear of the future. Farmers had a significantly higher index for psychological demands, stimulance at work as well as authority over work than other occupational groups. The index for authority over work was very high in comparison with presented results for different occupations in other studies. With respect to worry about the future, the farmers had a significantly higher index than nearly all the other occupational groups. The low risk of coronary heart disease (CHD) among farmers reported in other studies can probably be related to good psychosocial working environment as measured by the indices in this study as well as other known life style factors.

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**Key words:** farmers, Karasek-Theorell index, psychosocial factors.

### INTRODUCTION

The conditions in rural areas, mainly in the agriculture sector, have obviously changed during recent years. There are fewer employed in the green industries and the reduction in population in certain rural areas is now so great that it is difficult to maintain the traditional patterns and functions in these areas.

The conditions for farmers have also changed quickly and the situation in recent years has been characterized by instability and uncertainty about future conditions. Bureaucracy and a feeling of reduced freedom are common today in an industry which is traditionally characterized as having great individual freedom [24].

A series of investigations in different industrialized countries have shown that farmers have a low mortality and morbidity in comparison to those in other occupations [4, 7, 14, 19, 23]. However, there is some indication that the morbidity profile of farmers is gradually changing to resemble that of other occupations [1, 16]. There are also highly significant differences in morbidity and mortality between males and females working in agriculture [23].

Living in thinly populated areas and self employment are two circumstances which have an advantageous effect on morbidity [5, 16, 21, 22]. The lower usage of the medical care system by people in these circumstances can probably be explained partly by the distance to medical care and the self reliance and responsibilities of these

**Appendix 1.** Questions about stress at work.

|   | Cross off one answer: | never/almost<br>never    | seldom                   | sometimes                | often                    |
|---|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Do you have to work very fast?   |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Do you have to work very intensively?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Does your work require too great a work effort?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Do you have enough time to do everything?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Are there often conflicting requirements at work?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Do you have the possibility of learning new things through your work?                    |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Does your work demand a high level of skill or expertise?                                |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Does your job require you to take the initiative?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Do you have to do the same thing over and over again?                                    |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Do you have a choice in deciding how you do your work?                                  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Do you have a choice in deciding what you do at work?                                   |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Do you worry that you can't manage to do your work?                                     |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Are you worried about your financial situation?   |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Are you worried about losing your work or being unemployed?                             |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. Do you sometimes have difficulty sleeping?  |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Are you sometimes angry or furious when you think about the authorities or consultants? |                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

people [20]. However, it is difficult to explain the low relative risk of contracting cancer (RR = 0.84) [2, 14, 23, 32, 33] and the lower relative risks of ischemic cardiac disease (RR = 0.66) [3, 23] among male agricultural workers just from these two factors.

The lower morbidity observed among farmers can be explained partly by known life style factors. Swedish farmers smoke less than other workers [19, 20]. They often have low blood pressure [19]. They are physically active. Obesity is not common, and the blood lipid levels are probably more of advantageous than those in other occupations [2]. It is probable that, the farmers, and perhaps also others living in rural area, by tradition have a stable and balanced psychosocial working environment which also contributes to a low morbidity.

Low morbidity and mortality in certain cases can be related to powerful selection mechanisms, a so-called healthy worker effect. In an investigation of Swedish agricultural workers [25], it was shown that farmers had less tendency to change occupation due to poor health than those in other occupations, and therefore the involvement of a selection process can probably be excluded [17, 31] as an explanation of the low morbidity.

The aim of the present study was to obtain better information about the psychosocial working environment conditions of farmers and others working and living in rural areas. Within the framework of the Swedish Farmers' Safety and Preventive Health Association, farmers and those employed in other occupations and connected to this branch of the health care system were requested to reply to a questionnaire. The answers were summarized to form psychosocial indices, according to Karasek and Theorell [12]. Five extra questions were used to determine the presence of possible worry about the future - a "worry about the future index".

**MATERIAL**

Approximately 40% of the full time farmers in Sweden have an occupational health service. Most of them are affiliated to the Swedish Farmers' Safety and Preventive

Health Association. In connection with the traditional medical examination, to which the majority of the members are called every second year, a questionnaire was distributed and answered. Of a total of 3,839 persons (approx. 8% of the members) invited to take part, 8 refused and 2 returned partially filled in questionnaires which could not be completed.

The replies were analyzed with respect to sex, age, area, occupation and time of answering the questionnaire. Since the investigation was carried out only during 1994 and the variation during the year was not in general significant, the pattern of answers according to time was not analyzed in the present report. Of those responding, 2,871 were males and 958 females. The variation in age was significant, with a majority of persons born during the 1940's and 50's (Tab. 3).

Ten of the Swedish Farmers' Safety and Preventive Health Associations' altogether 30 units were involved in the present investigation. A unit covers an area often equivalent to a half or an entire county. They are placed closer together in prime agricultural areas and are fewer in the more forested areas. The 10 units are listed in Table 3.

The occupations of the persons in this investigation have more often been in the "green" industries, that is, within forestry and agriculture. However, 811 persons

**Table 1.** Questions concerning worry about the future. The answer for each individual question compared with the other questions concerning worry about the future. Multiple regression (T-value and p-value).

| Question | 12                     | 13                      | 14                     | 15                     | 16 |
|----------|------------------------|-------------------------|------------------------|------------------------|----|
| 12       | x                      |                         |                        |                        |    |
| 13       | T = 16.84<br>p = 0.000 | x                       |                        |                        |    |
| 14       | T = 5.29<br>p = 0.0000 | T = 15.63<br>p = 0.0000 | x                      |                        |    |
| 15       | T = 9.09<br>p = 0.0000 | T = 4.43<br>p = 0.0000  | T = 5.71<br>p = 0.0000 | x                      |    |
| 16       | T = 3.03<br>p = 0.0025 | T = 14.69<br>p = 0.0000 | T = 0.59<br>p = 0.5531 | T = 3.38<br>p = 0.0007 | x  |

**Table 2.** Index for worry about the future compared to the indices for psychological demands, stimulance and authority over work, separately for males and females. Multiple regression (T-value and p-value).

|                        | Males                    |                          |                          |                        | Females                  |                          |                          |                        |
|------------------------|--------------------------|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|------------------------|
|                        | Psychological demands    | Stimulance at work       | Authority over work      | Worry about the future | Psychological demands    | Stimulance at work       | Authority over work      | Worry about the future |
| Psychological demands  | x                        |                          |                          |                        | x                        |                          |                          |                        |
| Stimulance at work     | T = 9.920<br>p = 0.0000  | x                        |                          |                        | T = 8.822<br>p = 0.0000  | x                        |                          |                        |
| Authority over work    | T = 1.087<br>p = 0.2770  | T = 11.382<br>p = 0.0000 | x                        |                        | T = -2.921<br>p = 0.0036 | T = 9.168<br>p = 0.0000  | x                        |                        |
| Worry about the future | T = 21.038<br>p = 0.0000 | T = -2.727<br>p = 0.0064 | T = -3.680<br>p = 0.0002 | x                      | T = 10.356<br>p = 0.0000 | T = -1.917<br>p = 0.0556 | T = -2.853<br>p = 0.0044 | x                      |

were employed in other industries, but generally resided in rural areas or in smaller, densely built-up areas. Of those responding, 1,712 persons were farmers. That is, the person indicated as being a farmer was responsible for the farm. Family members (except wives) who were active but not responsible were noted as family members and their responses were not analyzed separately. Of the females, 216 were married to farmers and active within agriculture. They did not have any other occupation and were reported as being farm wives. 306 were farm workers and 126 so-called substitutes (also farm workers but having less influence and control over their working area since they work at different farms as substitutes when the farmer is free or ill). Certain other occupational groups, such as forestry workers, horticultural workers, etc., had very few representatives in this investigation and therefore were not reported separately.

**METHODS**

The first 11 questions comprised a Swedish variant of Karasek and Theorells questionnaire for investigating so called "job strain" (Appendix 1). The first five questions were weighed together to form an index evaluating psychological demands and concern qualitative requirements and conflicts at work. The next four questions were weighed together to provide an index of stimulance which is roughly equivalent to the possibility of utilizing an individual's knowledge and abilities, and the possibility of developing new skills. The last two questions measured the possibility of affecting the work situation, or authority over an individual's work area. Higher points were equivalent to higher requirements, greater possibilities of affecting the work area and more stimulance in the work.

The questions weighed together to obtain these indices have been used in a great number of studies, are validated, and are easy to use [30]. They are generally easy to understand and do not require any special instructions.

In addition, five questions concerning worry about the future with respect to the individual's work situation were constructed and included in the questionnaire (Appendix 1). These questions were also easy to understand and were

answered without any problems. Using multiple regression analyses, the independence of the questions was tested (Tab. 1). Question No. 14 about fear of unemployment and question No. 16 about aggression gave results which did not differ significantly from each other, whereas the other questions were independent and therefore probably evaluated different things.

The distribution of the answers for each question and for the respective indices was evaluated and found to be normal in both cases (skewness between -0.275 and + 0.683). In addition, the index obtained for the questions concerning worry about the future was evaluated with respect to its relationship to the other three indices, using multiple regression. The worry index differed significantly and positively from the index for psychological demands (Tab. 2) and significantly and negatively from the index for stimulance and for authority over work situation for both males and females. This appeared to be a relatively logical and not unexpected result. The statistical analyses noted above were carried out with multiple regression and the comparisons between groups with the ANOVA test, both simple and OneWay, using the SPSS software.

**RESULTS**

All the indices, with the exception of the one for psychological demands, showed significant differences with respect to sex. Women experienced less stimulance at work, poorer authority over work, and had a greater

**Table 3 a.** Index for psychological demands, stimulance at work, authority over work and worry about the future. Males and females.

| Group   | n     | Psychological demands   | Stimulance at work       | Authority over work      | Worry about the future  |
|---------|-------|-------------------------|--------------------------|--------------------------|-------------------------|
| Males   | 2,871 | 12.94                   | 11.73                    | 7.07                     | 10.87                   |
| Females | 958   | 12.36                   | 11.04                    | 6.38                     | 11.41                   |
| ANOVA   |       | F = 39.883<br>p = 0.000 | F = 124.565<br>p = 0.000 | F = 202.114<br>p = 0.000 | F = 33.609<br>p = 0.000 |

**Table 3 b.** Index for psychological demands, stimulance at work, authority over work and worry about the future. Males.

|                      | n    | Psychological demands   | Stimulance at work     | Authority over work     | Worry about the future  |
|----------------------|------|-------------------------|------------------------|-------------------------|-------------------------|
| <b>• Age group</b>   |      |                         |                        |                         |                         |
| 1920 - 1929          | 75   | 11.24                   | 11.07                  | 7.71                    | 9.76                    |
| 1930 - 1939          | 480  | 12.51                   | 11.49                  | 7.20                    | 10.61                   |
| 1940 - 1949          | 777  | 13.18                   | 11.75                  | 7.22                    | 11.10                   |
| 1950 - 1959          | 875  | 13.45                   | 11.87                  | 7.03                    | 11.34                   |
| 1960 - 1969          | 576  | 12.59                   | 11.83                  | 6.82                    | 10.32                   |
| 1970 - 1979          | 88   | 11.85                   | 11.44                  | 6.32                    | 9.95                    |
| Anova                |      | F = 24.677<br>p = 0.000 | F = 8.397<br>p = 0.000 | F = 6.201<br>p = 0.000  | F = 15.334<br>p = 0.000 |
| <b>• Region</b>      |      |                         |                        |                         |                         |
| Bjuv                 | 64   | 12.44                   | 11.54                  | 7.09                    | 10.70                   |
| Kristianstad         | 287  | 12.49                   | 11.47                  | 6.94                    | 10.59                   |
| Kalmar               | 307  | 13.08                   | 11.50                  | 7.07                    | 10.94                   |
| Vänersborg           | 393  | 13.20                   | 11.94                  | 6.98                    | 11.24                   |
| Skara                | 353  | 13.16                   | 11.99                  | 7.31                    | 10.84                   |
| Skänninge            | 415  | 12.94                   | 11.69                  | 7.14                    | 10.76                   |
| Gotland              | 157  | 13.32                   | 11.65                  | 6.92                    | 11.60                   |
| Örebro               | 266  | 13.15                   | 11.57                  | 7.13                    | 10.92                   |
| Västerås             | 447  | 12.70                   | 12.05                  | 7.16                    | 10.62                   |
| Östersund            | 182  | 12.52                   | 11.29                  | 6.56                    | 10.64                   |
| Anova                |      | F = 2.709<br>p = 0.004  | F = 7.615<br>p = 0.000 | F = 4.073<br>p = 0.000  | F = 3.119<br>p = 0.001  |
| <b>• Profession</b>  |      |                         |                        |                         |                         |
| Farmers              | 1575 | 13.50                   | 11.74                  | 7.45                    | 11.15                   |
| Agricultural workers | 263  | 11.43                   | 11.43                  | 6.64                    | 9.89                    |
| Farm substitutes     | 79   | 11.46                   | 11.32                  | 5.68                    | 10.90                   |
| Other work           | 495  | 12.59                   | 11.85                  | 6.54                    | 10.63                   |
| Anova                |      | F = 26.641<br>p = 0.000 | F = 3.122<br>p = 0.001 | F = 42.288<br>p = 0.000 | F = 6.342<br>p = 0.000  |

fear of the future (Tab. 3 a). The analyses were carried out using the simple factor ANOVA, with consideration taken of possible interactions between sex, age, area and occupation.

Younger, and older persons had a lower psychological demand for their work than did the middle-aged. This was also found for authority over work and for worry about the future. Interestingly, the younger persons, irrespective of sex, felt that they had a greater authority over work than the older ones (Tables 3 b, c).

Significant variations were also noted for geographical area (Tables 3 b, c). Both region and occupation were also evaluated using the OneWay ANOVA, making it possible to compare the individual groups.

In areas 2 (Kristianstad), 9 (Västerås) and 10 (Östersund), males had a significantly lower psychological demand for

their work than did those in the majority of the other regions. In regions 5 (Skara) and 9 (Västerås), the index for stimulance in work was significantly higher than for the other regions. In Östersund (region 10), the index for authority over work was significantly lower for males than in all the other regions. Finally, the index for worry about the future was significantly higher for males living on Gotland (region 7) than in all the other regions.

Significant variations were observed between those in the occupations of farmer, farm wife, agricultural worker, farm worker substitute and persons working outside of agriculture or forestry. Thus, farmers had a significantly higher index for psychological demands than did those in the other occupations. They also had significantly higher indices for the stimulance at work and authority over

**Table 3 c.** Index for psychological demands, stimulance at work, authority over work and worry about the future. Females.

|                      | n     | Psychological demands | Stimulance at work | Authority over work | Worry about the future |
|----------------------|-------|-----------------------|--------------------|---------------------|------------------------|
| • Age group          |       |                       |                    |                     |                        |
| 1920 - 1929          | 12    | 10.33                 | 9.83               | 6.41                | 9.00                   |
| 1930 - 1939          | 151   | 12.05                 | 10.52              | 6.37                | 11.78                  |
| 1940 - 1949          | 280   | 12.64                 | 11.18              | 6.46                | 11.49                  |
| 1950 - 1959          | 293   | 12.40                 | 11.23              | 6.47                | 11.53                  |
| 1960 - 1969          | 182   | 12.45                 | 11.03              | 6.24                | 11.14                  |
| 1970 - 1979          | 40    | 11.48                 | 10.98              | 5.85                | 10.38                  |
|                      | Anova | F = 2.636             | F = 4.452          | F = 1.340           | F = 3.386              |
|                      |       | p = 0.022             | p = 0.001          | p = 0.245           | p = 0.005              |
| • Region             |       |                       |                    |                     |                        |
| Bjuv                 | 11    | 12.36                 | 10.55              | 6.45                | 11.55                  |
| Kristianstad         | 83    | 11.83                 | 11.08              | 6.37                | 10.99                  |
| Kalmar               | 88    | 12.51                 | 10.86              | 6.76                | 12.08                  |
| Vänersborg           | 175   | 12.35                 | 10.71              | 5.94                | 11.11                  |
| Skara                | 109   | 11.95                 | 11.14              | 6.56                | 11.44                  |
| Skänninge            | 94    | 13.01                 | 11.34              | 6.13                | 11.66                  |
| Gotland              | 49    | 13.12                 | 10.78              | 6.08                | 11.98                  |
| Örebro               | 85    | 12.81                 | 10.95              | 6.49                | 11.16                  |
| Västerås             | 175   | 12.17                 | 11.42              | 6.87                | 11.24                  |
| Östersund            | 89    | 12.03                 | 10.89              | 5.99                | 11.62                  |
|                      | Anova | F = 2.783             | F = 1.708          | F = 5.193           | F = 1.807              |
|                      |       | p = 0.003             | p = 0.083          | p = 0.000           | p = 0.063              |
| • Profession         |       |                       |                    |                     |                        |
| Farmers              | 137   | 12.84                 | 10.98              | 6.93                | 11.60                  |
| Farmers wives        | 214   | 12.33                 | 10.59              | 6.76                | 11.43                  |
| Agricultural workers | 43    | 11.93                 | 10.74              | 6.51                | 10.14                  |
| Farm substitutes     | 47    | 11.40                 | 11.09              | 5.62                | 11.23                  |
| Other work           | 316   | 12.37                 | 11.15              | 5.86                | 11.39                  |
|                      | Anova | F = 4.168             | F = 3.265          | F = 11.330          | F = 0.820              |
|                      |       | p = 0.000             | p = 0.001          | p = 0.000           | p = 0.598              |

work than did those in the majority of the other occupations. Most importantly, male farmers had a very high index for authority over work. With respect to fear of the future, however, the farmers had a significantly higher index than nearly all of the other occupational groups. Here, agricultural workers differed significantly from farm substitutes.

## DISCUSSION

It has long been known that certain psychosocial factors as, for example, Type A behaviour, are related to an increased risk of coronary heart disease (CHD) [6]. In a Swedish investigation, it was observed that the risk of contracting ischemic heart disease was four times higher for males with Type A behaviour than for other men [15]. It was also

observed in the Framingham material that women with Type A behavior were also at greater risk of CHD [9].

With respect to the psychosocial working environment conditions, it has been difficult to obtain a good measurement of psychosocial stress which could be related to increased morbidity. In 1979, Robert Karasek presented "The job strain model" [10], which has proved to be of great use. In a developmental phase, Karasek and Theorell constructed a useable index [12], which has been validated [30] and at present offers a workable method for evaluate one type of psychosocial stress at work.

During a time of rapid changes it is desirable to find a means of measuring (an index) which reflects the fear for the future at work - risk of losing employment, economic security, etc. In an attempt to create such an index, five

questions have been constructed and tested in the present study; at the same time, Karasek-Theorell's three indices (psychological demands, stimulance at work and authority over work) have been used to evaluate the psychosocial working environment of those in agriculture and forestry.

The replies to the questionnaire were evaluated with respect to their statistical validity and independence. The results indicated that the five questions about attitude to the future could be used together to form an index, the relevance of which to the risk of developing different types of disease naturally must be determined by following the present material in subsequent studies. A comparison between the index for worry about the future and the three established psychosocial indices showed that the responses to the five questions could not be related to the reply pattern for the other indices, but appeared to measure a condition having another dimension.

A comparison of the present results with those of other studies [29] using the same three indices showed that the males and females in the present study population had a somewhat higher index for psychological demands, a somewhat lower one for stimulance at work, and a markedly higher index for authority over work. This was quite reasonable with respect to the fact that a high proportion of the investigated were self-employed (farmers). Those who were employees (substitutes, persons having occupations outside of the "green industries", and possibly farm workers) showed an index for authority over work (job decision latitude) which was nearer that observed, for example, in an investigation of 150 men in different occupations [27].

The women in the present study had a lower index for stimulance at work and authority over work than the men, whereas no significant difference was seen with respect to psychological demands. This appeared to be a stable pattern and has been observed in earlier studies [12].

Previously, it has been shown that farmers have a lower risk of CHD [7, 19, 23]. Traditional risk factors such as smoking, blood pressure levels and cholesterol levels are probably of importance in this case for the low morbidity. A number of investigations have shown that the relationship between psychological requirements and stimulance at work can be related to the risk of CHD [11, 12]. There is also evidence that these indices and changes in them can be related to blood pressure levels and possibly also cholesterol levels [18, 26, 28]. Therefore the low risk of CHD among farmers can, in all likelihood, be related to the good psychosocial working environment as measured by the indices in the present study. Of all the occupational groups, farmers had the best relationship between psychological demands and stimulance at work.

The results obtained with respect to age and geographical area were difficult to evaluate in a cross-section investigation. However, it was probable that the poorer relation between psychological demands, stimulance at work and authority over work measured in Östersund in comparison to the other regions reflected a higher risk for CHD observed in that area. It has long been known that

the morbidity and mortality due to ischemic heart disease was greater in northern than in southern Sweden [13, 18].

### Acknowledgements

This research project has been supported by the Swedish Farmers' Safety and Preventive Health Association.

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