Mental health of British farmers

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Aims: To estimate the prevalence of neurotic symptoms in a sample of British farmers, to investigate whether farming characteristics are associated with psychiatric morbidity, and to test the hypothesis that British farmers have a higher prevalence of depression and thoughts of life not worth living than the British household population.

Methods: A total of 425 farmers from Hereford, Norwich, and Preston completed the Revised Clinical Interview Schedule (CIS-R) by computer between March and July 1999. The comparison cohort consisted of 9830 private householders aged 16–64 from the Office of Population Censuses and Surveys National Psychiatric Morbidity Surveys of Great Britain carried out in 1993 in which the CIS-R was administered. All analyses used the commands developed specifically for survey data available in Stata version 6.0.

Results: Taking a threshold of an overall score of 12 or more on the CIS-R, only 6% of farmers reported clinically relevant psychiatric morbidity. Psychiatric morbidity was not significantly associated with farm type or size in this study. Farmers reported a lower prevalence of psychiatric morbidity than the general population but were more likely to report thinking that life is not worth living, particularly after the low prevalence of psychiatric morbidity had been taken into account (odds ratio 2.56, 95% CI 1.39 to 4.69). When restricting the comparison to only rural or semirural householders, this increased risk was even more pronounced (odds ratio 3.26, 95% CI 1.51 to 7.02).

Conclusions: The relation between depression and suicidal ideation seems to be quite different among farmers and the general population and warrants further investigation. We have shown it is possible to measure mental health systematically in a sample of British farmers. This study should be repeated in the aftermath of the foot and mouth crisis.

Farmers in England and Wales appear to be one of the occupational groups with the highest risk of suicide, accounting for 1% of male suicides in the age group 16–64.1 Farmers who commit suicide tend to use methods to which they have easy access, and these methods are more likely to be lethal. For example, Hawton et al showed a considerable excess of deaths caused by firearms among 702 verdicts of suicide or undetermined cause in male farmers between 1981 and 1993, when compared with the distribution of methods of suicide in males in the general population.2 Hanging was also more frequent, while more than half of the cases of self poisoning involved agricultural or horticultural chemicals.

However, one cannot infer from these findings that the increased risk of suicide in farmers is only caused by accessibility of dangerous means. Identifying farmers as having a higher rate of suicide than expected could reflect a higher than average burden of overall psychiatric morbidity in this group. Another possibility is that farmers might have more suicidal thoughts or thoughts that life is not worth living. Previous studies have mainly investigated sources of stress among British farmers.3,4 Eisner et al administered the Hospital Anxiety and Depression Scale to 154 male farmers and age matched controls from a semirural general practice in North Yorkshire and reported that 19% more farmers than controls were suffering from anxiety and depression in 1996.5

This study aims to estimate the prevalence of neurotic symptoms in a representative sample of British farmers using a standardised validated questionnaire. It also aims to investigate whether farmers on smallholdings and those with livestock or mixed farming operations are more vulnerable to psychiatric morbidity than those on large or arable farms. Finally, we test the hypothesis that British farmers have a higher prevalence of depression and thoughts of life not worth living than the British household population.

METHODS

Farming cohort

A representative cohort of 606 farmers, farmworkers, and family members has been recruited since 1991 in the catchment areas of Hereford, Norwich, and Preston Public Health Laboratories to investigate occupational risk factors for zoonoses.6 A farmer was “an individual occupationally concerned with the tending of live animals or plants for at least one day per week”. A random sample of farmers was drawn from the Ministry of Agriculture, Fisheries and Food (MAFF) June Agricultural Census lists of agricultural holdings,7 and each farmer could then nominate a further adult on the same farmholding (usually his wife). Seventy seven per cent of the cohort were still enrolled in May 1998 and of these, 425 (91%) completed the Revised Clinical Interview Schedule (CIS-R) by computer between March and July 1999 as part of a study of the zoonotic aetiology of mental illness.

Assessment of psychiatric morbidity

The CIS-R was used to assess the prevalence of symptoms of neurotic psychopathology in the week prior to interview.8 The CIS-R is made up of 14 sections, each covering a particular area of neurotic symptoms. The areas covered are: fatigue, sleep problems, irritability, worry, depression, depressive ideas, anxiety, obsessions, concentration and forgetfulness, somatic symptoms, compulsions, phobias, worry about physical health, and panic. Subjects can score between 0 and 4 (5 for the section on depressive ideas) on each section. Symptoms are regarded as severe if they have a score of 2 or more.
Summed scores from all sections range between 0 and 57; the overall threshold for significant psychiatric morbidity is 12.

The time taken to complete the questionnaire ranges from 10 to 30 minutes, because of the filtering nature of the questions. An example of this filtering is evident in the section on depressive ideas. Only subjects who scored at least one point on the depression section of the CIS-R were asked about depressive ideas in the week before interview. Only those who felt guilty, not as good as others, or hopeless in the last seven days were asked “In the past week have you felt that life isn’t worth living?”. Only those who answered positively were then asked “In the past week, have you thought of killing yourself?”. This filtering might underestimate the prevalence of thoughts of life not worth living in the cohort; however, the filtering rules applied equally to all subjects and therefore any bias is unlikely.

In addition to the 14 sections of the CIS-R, the questionnaire gathered information on sociodemographic characteristics, general health, and recent life events. Up to date information regarding types of livestock that the informant came into contact with and the frequency of this contact was also ascertained. Mental health questionnaire data were available for 425 farmers.

Sample of British private household population
Data were obtained from the private household sample of the Office of Population Censuses and Surveys (OPCS) National Psychiatric Morbidity Surveys of Great Britain carried out in 1993 in which the CIS-R was administered. The initial findings have been published in a set of reports and papers which provide further details of the survey and questionnaire. A stratified, clustered probability sample was drawn from the Small Area Postcode Address Files for Great Britain. Two hundred postal sectors were selected with probability proportional to size, and stratified by regional health authority and socioeconomic group. Ninety addresses were randomly selected from each postal sector to yield a sample of 18,000 addresses. Interviewers visited 12,730 private households which contained at least one adult aged 16–64, selected one individual at random, and successfully interviewed 10,108 (response rate 79%). After excluding proxy interviews and subjects who refused to answer parts of the questionnaire, data were available for 9830 subjects.

Statistical analyses
All analyses used the commands developed specifically for survey data available in Stata version 6.0 (Stata Corp, College Station, TX, USA). These estimation commands allowed for clustering by farm holding and clustering by postal sector among the OPCS data. Odds ratios (ORs) and 95% confidence intervals (95% CIs) were calculated using logistic regression. Analyses involving the OPCS sample were adjusted for sex, age in five year age bands, working status, and longstanding illness, disability, or infirmity.

RESULTS
Characteristics of farmers
Table 1 presents the sociodemographic and socioeconomic characteristics of the farmers. The majority of the sample were male, employed full time in agriculture, and had been in their current job for 16 years or more. The average age among the sample was 51.5 years, with ages ranging from 20 to 83 years. Seventy four per cent of the farmers interviewed were principal farmers of the farmholding. Livestock farmers were represented in the largest proportion, and of those most were either mainly dairy farmers of reared both cattle and sheep. Of the farmers categorised as working on an “other” type of farmholding, approximately half now worked in a non-farming occupation and the remainder were retired. Just over half of the farmers worked on holdings between 50 and 200 hectares in size. Thirty per cent of farmers had a longstanding illness, disability, or infirmity, which included high blood pressure, arthritis, asthma, and diabetes.

Prevalence of neurotic symptoms
Table 2 lists the prevalence rates of clinically relevant levels of each of the 14 neurotic symptoms covered by the CIS-R. The most commonly reported symptoms related to fatigue, with just over 15% of farmers reaching the threshold for a clinically relevant level of symptoms. The second highest ranking prevalence rates were for symptoms of irritability and sleep problems (approximately 8.5%). Four to five per cent of the farmers reported clinically relevant symptoms of depression or...
depressive ideas. Taking a threshold of an overall score of 12 or more on the CIS-R, 5.9% of farmers (95% CI 3.5% to 8.3%) reported significant psychiatric morbidity.

Among the 18 farmers who reported moderate to severe symptoms of depression, their concerns were mainly a result of family problems (n = 8) or work problems (n = 5). The twenty-four farmers who had clinically relevant levels of worry were mainly concerned about family (n = 14), money (n = 4), and work (n = 3).

Associations between psychiatric morbidity and farming characteristics

Table 3 shows the prevalence of general psychiatric morbidity in relation to the type of farming carried out on the holding. The prevalence was greater among farmers working on livestock or mixed farms than among those working on arable farms, but the confidence intervals around the estimates were wide. A greater proportion of farmers working on holdings of less than 100 hectares reported neurotic symptoms than those working on larger farms, but again the confidence intervals were wide.

We also investigated associations between a clinically relevant level of psychiatric morbidity and sociodemographic characteristics. Morbidity was most strongly associated with being female (OR 2.93; 95% CI 1.35 to 6.37), having a serious illness or injury in the past six months (OR 3.01; 95% CI 1.11 to 8.19), and reporting a longstanding illness (OR 3.81; 95% CI 1.55 to 9.33).

Unemployment (OR 2.53; 95% CI 0.29 to 22.1), describing your financial situation as very difficult (OR 3.75; 95% CI 0.58 to 8.19), and reporting a longstanding illness (OR 3.81; 95% CI 1.10 to 3.98). Further adjustment for the low level of psychiatric morbidity (CIS-R score as a quadratic function; results not shown in table 4), farmers were two and a half times more likely than the household population to think life was not worth living (OR 2.56, 95% CI 1.39 to 4.69). Since a rural environment is associated with lower prevalence of psychiatric morbidity than an urban environment, the analyses were repeated comparing the farmers with only 3273 subjects from the OPCS study who lived in rural or semirural localities. Again the adjusted odds of psychiatric morbidity was reduced among farmers (OR 0.64, 95% CI 0.40 to 1.03), while the farmers were even more likely than other rural householders to think that life was not worth living (OR 2.09, 95% CI 1.10 to 3.98). Further adjustment for overall psychiatric morbidity increased the odds ratio (OR 3.26, 95% CI 1.51 to 7.02).

DISCUSSION

Prevalence of neurotic symptoms

The three neurotic symptoms that were most prevalent among farmers, namely fatigue, irritability, and sleep problems, have also been shown to be the three most common symptoms in the British household population. However, the lower prevalence of depression and depressive ideas among the farmers when compared with data from the OPCS survey is surprising. Eisner et al reported higher levels of anxiety and depression among male farmers (34%) than among age matched controls in 1996 (difference in proportions 18.9%, 95% CI 7.3% to 30.5%). Given the evidence for an increased risk of suicide among farmers compared to other occupational groups, a

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Prevalence of symptoms measured by the CIS-R, in ranked order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurotic symptom</td>
<td>n</td>
</tr>
<tr>
<td>Fatigue</td>
<td>62</td>
</tr>
<tr>
<td>Irritability</td>
<td>37</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>36</td>
</tr>
<tr>
<td>Somatic symptoms</td>
<td>29</td>
</tr>
<tr>
<td>Worry</td>
<td>24</td>
</tr>
<tr>
<td>Depressive ideas</td>
<td>23</td>
</tr>
<tr>
<td>Concentration and forgetfulness</td>
<td>22</td>
</tr>
<tr>
<td>Depression</td>
<td>18</td>
</tr>
<tr>
<td>Anxiety</td>
<td>13</td>
</tr>
<tr>
<td>Worry about physical health</td>
<td>9</td>
</tr>
<tr>
<td>Compulsions</td>
<td>6</td>
</tr>
<tr>
<td>Obsessions</td>
<td>5</td>
</tr>
<tr>
<td>Phobias</td>
<td>5</td>
</tr>
<tr>
<td>Panic</td>
<td>2</td>
</tr>
<tr>
<td>Overall psychiatric morbidity</td>
<td>25</td>
</tr>
</tbody>
</table>

Prevalence estimates and 95% CIs account for sample clustering by farmholding.

Association between depressive ideas and farming occupation

Table 4 compares the prevalence of moderate to severe symptoms of depression, depressive ideas, and thoughts of life not worth living among the cohort of farmers and a random sample of 9830 adults aged 16–64 living in private households in Great Britain. Three per cent of farmers thought life was not worth living in the week before interview (95% CI 1.4% to 4.7%) and 0.7% had thoughts of killing themselves (95% CI 0% to 1.5%). Odds ratios were adjusted for sex, age, working status, and long term illness to account for differences in these characteristics. The odds of reporting psychiatric morbidity was significantly reduced among farmers. There was no significant association between farming occupation and reporting symptoms of depression or depressive ideas. Although not statistically significant, the odds of thinking life was not worth living was greater among the farmers. After further adjustment for the low level of psychiatric morbidity (CIS-R score as a quadratic function; results not shown in table 4), farmers were two and a half times more likely than the household population to think life was not worth living (OR 2.56, 95% CI 1.39 to 4.69).
relatively high prevalence of symptoms of depression and depressive ideas might also have been expected in our study.

On the other hand, the farmers in our cohort were more likely to report thinking that life is not worth living when compared to the British household population, particularly after the low prevalence of psychiatric morbidity had been taken into account. When the farmers were compared with other rural or semirural householders this risk became even more pronounced. This may contribute to the high suicide risk in farmers. Farmers might be reluctant to admit problems or to report the more severe symptoms of depression, while their experience of death of livestock might cultivate a more fatalistic attitude towards their own life. Alternatively, social transmission of suicidal ideation might occur whereby individuals may be more likely to be aware of suicide among colleagues. It is certainly of interest that the relation between depression and suicidal ideation seems to be quite different among farmers and the general population.

For the farmers who did report clinically relevant levels of depression or worry, the main reason for their concerns related to family problems rather than monetary problems, which is surprising when compared to previous results. Ten per cent of the cohort reported their financial situation to be quite difficult or very difficult, and 14% had outstanding debt which is surprising when compared to previous results. The survey of stress in farmers by Simkin et al reported that over 70% of household sample were male; age of farmers was 20–83 years; 2% of household sample were unemployed; 30% of farming cohort v 37% of household sample reported a longstanding illness, disability, or infirmity.

### Associations between farming characteristics and neurotic symptoms

Psychiatric morbidity was not significantly associated with farm type or size in this study. However, comparisons within the farming cohort were severely limited by the small number of cases of psychiatric morbidity. Studies of suicide among farmers in England and Wales have reported a similar lack of association with farm type, whether using national death certificate data linked with farming data at an ecological level or by using individual data in a psychological autopsy study. The survey of stress in farmers by Simkin et al reported that those running mixed farms found the effects of the changing legal and political framework for British agriculture more stressful than farmers with single operations (relative risk 1.35, 95% CI 1.08 to 1.68, p < 0.01).

The level of psychiatric morbidity among the farmers was found to be associated with female gender, reporting a serious illness/injury, and reporting a longstanding illness, which is consistent with the results from the OPCS national survey.

### Strengths and limitations of the study

This survey benefits from using the CIS-R as a standardised assessment suitable for lay interviewers in assessing minor psychiatric disorder in a community and occupational setting. The computerised CIS-R assessment can provide an easy, quick, inexpensive, yet thorough assessment which is acceptable to interviewees and also helps to eliminate observer bias. Good agreement between a previous version of the computerised assessment and assessments administered by psychiatrists has been shown, with a correlation coefficient for overall score of approximately 0.8. Furthermore, no evidence of bias between the computer and a human interviewer has been found (mean scores 8.77 v 8.69, 95% CI for difference ~0.70 to 0.87).

The cohort of farmers originally recruited into this longitudinal study reflected the age and sex distribution of people employed in agriculture as recorded in the 1991 Census. Seventy seven per cent of the original cohort were still enrolled in 1998, and 91% of these completed the CIS-R in 1999 to give an excellent response rate. In comparison to the 1999 June Agricultural Census results for Great Britain, the remaining sample under-represented holdings of less than 20 hectares and contained an excess of principal farmers. However, the distribution of farm types in our sample adequately reflected the distribution among British farms (24% dairy, 23% cattle and sheep, 14% cropping, 5% pigs and poultry, 2% horticulture, 30% mixed or other types in our sample).

Although data were available for 425 farmers, the statistical power is limited when comparisons within the farming cohort are made in relation to psychiatric morbidity. These subgroup analyses cannot be used to test hypotheses; instead we would recommend that a standardised assessment of psychiatric morbidity be carried out in a larger sample of UK farmers.

Comparisons between the whole farming cohort and an external cohort of British householders utilised a larger sample. Both cohorts were administered the same questionnaire.

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**Table 4** Odds ratios for self reported symptoms in relation to farming

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cases (n)</th>
<th>Non-cases (n)</th>
<th>Prevalence (%)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall psychiatric morbidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK household population</td>
<td>1541</td>
<td>8061</td>
<td>16.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Farmers</td>
<td>25</td>
<td>400</td>
<td>5.9</td>
<td>0.57 (0.36 to 0.89)</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK household population</td>
<td>992</td>
<td>8838</td>
<td>10.1</td>
<td>1.00</td>
</tr>
<tr>
<td>Farmers</td>
<td>18</td>
<td>407</td>
<td>4.2</td>
<td>0.63 (0.39 to 1.03)</td>
</tr>
<tr>
<td>Depressive ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK household population</td>
<td>949</td>
<td>8881</td>
<td>9.7</td>
<td>1.00</td>
</tr>
<tr>
<td>Farmers</td>
<td>23</td>
<td>402</td>
<td>5.4</td>
<td>1.00 (0.63 to 1.60)</td>
</tr>
<tr>
<td>Life not worth living</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK household population</td>
<td>346</td>
<td>9484</td>
<td>3.5</td>
<td>1.00</td>
</tr>
<tr>
<td>Farmers</td>
<td>13</td>
<td>412</td>
<td>3.1</td>
<td>1.78 (0.99 to 3.21)</td>
</tr>
</tbody>
</table>

Prevalence estimates and odds ratios account for sample clustering by postal address in the UK survey data and by farmholding in the farming cohort. Odds ratios were adjusted for sex, in age in five year bands (16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60+), working status (full time, part time, unemployed, economically inactive) and longstanding illness, disability, or infirmity (yes, no).

These adjustments accounted for the following differences in characteristics: 74% of farming cohort v 46% of household sample were male; age of farmers was 20–83 years v age of householders was 16–64 years; 2% of farming cohort v 9% of household sample were unemployed; 30% of farming cohort v 37% of household sample reported a longstanding illness, disability, or infirmity.
to assess psychiatric morbidity and the results were adjusted for differences in sex, age, employment status, and presence of longstanding illness. Unfortunately we lacked data that would have allowed adjustment for level of social support. However, previous studies have reported that, together with other rural householders, are not lacking in social support. The OPCS survey which was carried out in 1993 was six years prior to the farming survey in 1999, and it would be difficult to estimate how the prevalence of psychiatric morbidity might vary over this period. However, the questionnaires were administered at similar times of the year in both cohorts: March to July among the farmers and April to September in the OPCS study.

A further limitation of this study arises because the questions relating to thoughts of life not worth living were only asked of a highly selected group of respondents, namely those who scored at least one point on the depression section of the CIS-R and also felt guilty, not as good as others, or hopeless in the week before interview. It is likely therefore that the present results underestimate the proportion of the population who experience suicidal thoughts. However, the rules concerning filtering were applied equally to all subjects and it is unlikely that any bias arose as a consequence.

Conclusions

British farmers have a lower prevalence of psychiatric morbidity than the British household population but are more likely to report thinking that life is not worth living, particularly after the low prevalence of psychiatric morbidity has been taken into account. This fatalistic attitude towards their own life, together with access to lethal methods, may contribute to the high suicide risk in farmers. Future studies interested in assessing the characteristics of farmers that might make them particularly susceptible to thoughts of life not worth living will need to use a much larger sample and would benefit from using both quantitative and qualitative methods. In our study psychiatric morbidity was assessed during a period after the BSE crisis, but surveys should now aim to investigate the effect of the extra stress likely to be experienced by British farmers as a result of the recent outbreak of foot and mouth disease.

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Main messages

• Fatigue, irritability and sleep problems were the most prevalent neurotic symptoms among British farmers.

• British farmers reported a lower prevalence of overall psychiatric morbidity than the British household population.

• British farmers were more likely to report thinking that life is not worth living, particularly after the low prevalence of psychiatric morbidity had been taken into account.

• When the farmers were compared with other rural or semi-rural householders this risk became even more pronounced.

• The relation between depression and suicidal ideation seems to be quite different among farmers and the general population.

Policy implications

• Farmers may have a tendency to think of suicide at lower reported levels of stress than other members of the population.

• A clearer understanding of the relation between depression and thinking that life is not worth living among farmers might provide a way of reducing suicide rates.

• The mental health of rural communities should be monitored and the project should be repeated in the aftermath of the foot and mouth crisis.

REFERENCES


COMMENTARY

There is long standing concern about the high rate of suicide in British farmers which is not a recent phenomenon. Around one farmer a week kills himself in England and Wales, and between a third and a half use firearms (compared with 1% of all suicides). Other high risk occupations are doctors, vets, and pharmacists. People in these occupational groups share the attributes of having the knowledge of how to kill themselves, access to the means of suicide, and arguably experience high
levels of stress and work demands. The main pathway to suicide is thought to lead from life stresses and lack of social supports, to depressive symptoms, to severe depression, to suicidal thoughts, to suicidal plans, and then to suicidal action.

This study has used well tested epidemiological methods to compare psychiatric morbidity and suicidal ideation in a random sample of farmers compared with a national survey of the general household population as a whole, and also compared with the rural and semirural subset of the national survey. The analysis reported here shows that, contrary to expectation, farmers do not report either as much general psychiatric morbidity or as much specific depression as the general population.

Fatigue, irritability, and sleep problems are the three most common symptoms in both farmers and in the general population, but farmers surprisingly had lower levels of depression and depressive ideas than in the general population. However, farmers were more likely to report thinking that life was not worth living, especially when compared with other rural and semirural people living at home. It is conceivable that farmers do actually experience similar or higher rates of depression than the general population, but are reluctant to admit those symptoms, or it may be that a given level of depression is more likely to trigger suicidal ideation in farmers than in the general population because of their familiarity with other farmers who have committed suicide, and because of their close familiarity with the death of their livestock. Again, contrary to expectation, the farmers who were depressed or anxious were more likely to be concerned about family problems than about financial problems. Unfortunately the paper does not report the social supports experienced by the farmers, which are important in their own right in preventing depression and suicide as well as having a buffering effect against acute life events and chronic stresses. Clearly more research is needed to understand the mechanism for increased suicide in farmers, but this study has supported the view that the answer is likely to be multifactorial.

In methodological terms, it is also interesting to speculate whether certain occupational groups have a cultural propensity to under-report depressive symptoms compared to other neurotic symptoms, or whether the relation between depressive symptoms and other symptoms is actually different between occupational groups.

On a more general issue, farmers rely principally on general practice for their occupational health care, and this study highlights the importance of primary care assessment of suicidal risk, particularly in view of the implication from these findings that for a given expressed level of depression, a farmer may experience more suicidal ideation than a non-farmer.

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