Disability pension and symptoms of anxiety and depression: a prospective comparison of farmers and other occupational groups. The HUNT Study, Norway

Magnhild Oust Torske,1 Bjørn Hilt,2,3 Johan Håkon Bjørngaard,2,4 David Glasscock,5 Steinar Krokstad1,6

ABSTRACT

Objectives: Agriculture has undergone major changes, and farmers have been found to have a high prevalence of depression symptoms. We investigated the risk of work disability in Norwegian farmers compared with other occupational groups, as well as the associations between symptoms of anxiety and depression and future disability pension.

Methods: We linked working participants of the HUNT2 Survey (1995–97) aged 20–61.9 years, of whom 3495 were farmers and 25 521 had other occupations, to national registry data on disability pension, with follow-up until 31 December 2010. We used Cox proportional hazards regression to estimate hazard ratios (HRs) of disability pension, and to investigate the associations between symptoms of anxiety and depression caseness at baseline (score on the anxiety or depression subscales of the Hospital Anxiety and Depression Scale (HADS) ≥8) and disability pension.

Results: Farmers had a twofold increased risk of disability pension (age-adjusted and sex-adjusted HR 2.07, 95% CI 1.80 to 2.38) compared with higher grade professionals. Farmers with symptoms of depression caseness had a 53% increased risk of disability pension (HR 1.53, 95% CI 1.25 to 1.87) compared with farmers below the cut-off point of depression caseness symptoms, whereas farmers with symptoms of anxiety caseness had a 51% increased risk (HR 1.51, 95% CI 1.23 to 1.86).

Conclusions: Farmers have an increased risk of disability pension compared with higher grade professionals, but the risk is lower than in most other manual occupational groups. Farmers who report high levels of depression or anxiety symptoms are at substantially increased risk of future work disability, and the risk increase appears to be fairly similar across most occupational groups.

INTRODUCTION

Farmers are exposed to a wide array of work-related stressors, which include a hazardous physical work environment and long working hours,1 as well as financial difficulties and other uncertainties associated with farming.2 The ongoing structural changes in agriculture may be another source of stress.3 While farm size continues to increase in developed countries, the number of farmers decreases4 and anticipation of job loss has been shown to affect health even before a change in employment status occurs.5

Results of studies on the mental health of farmers vary. A systematic review found no conclusive evidence that the mental health of farmers differs from that of the general population, although the authors did conclude that farming is associated with ‘a unique set of characteristics’ which may be harmful to mental health.2 Two large cross-sectional studies which were not included in
the workforce,9 and is more pronounced in physically
employment and selection of unhealthy people out of
selection includes both selection of healthy people into
other occupational groups.11
Disability pension is one of the major premature ways
out of the workforce in Norway. In 2014, 9.4% of the
population aged 18–67 received disability pension.12
Depression, anxiety and low socioeconomic status are
associated with an increased risk of disability pension,13 14
but the impact of anxiety or depression on the
risk of future disability pension may not be the same
in different occupational groups. Farmers differ from
other manual occupations in several respects.
Norwegian farms are largely family-owned, and are
inherited by the oldest child (formerly the oldest son).
In addition, farmers are generally self-employed, and
thus have a higher degree of work autonomy than most
other manual occupations.1 Uncertainties regarding
farm succession in the family,15 or practical and financial
consequences of being self-employed, may play a role in
the disability pension process in farmers. In addition,
farmers appear particularly reluctant to seek medical
help for mental illness due to stigma.3 We hypothesised
that these or other factors which are unique to farming
may result in a lower selection of farmers with depres-
sion into disability pension than in other occupations.
Farmers with depression may be more likely to stay in
the workforce longer than people with depression who
work in other occupations, and depression may be one of
the explanations for the high prevalence of depression
symptoms found in cross-sectional studies of Norwegian
farmers, rather than an increased incidence of depression.
In the present study, we aimed to investigate the risk
of disability pension in Norwegian farmers compared with
other occupational groups, using data from a large
prospective population-based cohort with both health and
occupational data. Further, we investigated the associ-
ations between symptoms of anxiety and depression
and future disability pension, in farmers as well as in
other occupational groups.

MATERIALS AND METHODS
The HUNT Study (Helseundersøkelsen i Nord-
Trøndelag, the Nord-Trøndelag Health Study) includes
three large total population-based cohorts from
Nord-Trøndelag County, Norway; HUNT1 (1984–1986),
125 000 participants in total.16–18 Nord-Trøndelag
County is situated in central Norway, and has around
135 000 inhabitants. The county has a large agricultural
population and is largely rural; the largest of its six main
towns has around 21 000 inhabitants.19
We used HUNT2 as the baseline for our study. All
92 936 residents of Nord-Trøndelag aged 20 and above
were invited to take part in HUNT2, and 66 140 partici-
ipated (participation rate 71.2%). Data on the partici-
pants were collected using several questionnaires, as well
as measurements such as weight and height.17 In total,
65 232 answered the first questionnaire (Q1) of HUNT2,
and we used this population as the base for our study.
Using the unique 11-digit personal identification
number given to all residents of Norway, HUNT2 was
linked with national registry data from Statistics Norway
on disability pensions and retirement pensions. To be
eligible for a disability pension in Norway, you must be
aged between 18 and 67 years, and your ability to work
must be permanently reduced by at least 50% due to
illness or injury. This tax financed scheme covers all resi-
dents of Norway.20

Study participants
The selection criteria for our study were: (1) age
<62 years at the time of participation in HUNT2, (2)
currently working, (3) available occupation data and (4)
not currently receiving disability pension, full or partial
or having received disability pension in the past. A flow
chart showing the selection of study participants is
shown in figure 1.

The statutory age of retirement in Norway is 67 years.
The process of receiving a disability pension is lengthy,
and we excluded participants aged 62 years or older to
avoid possible bias resulting from participants very near
the statutory age of retirement who may not have time
to reach the end point. There were 47 178 HUNT2 par-
ticipants aged 61.9 years or younger at the time of
screening, 38 057 of whom stated that they were cur-
rently in paid employment and/or were self-employed.
However, 129 of them also stated that they had never
been in paid employment and were excluded, as were
7744 who did not have an identifiable occupation. The
questions on occupation were on questionnaire 2 (Q2),
which was handed out at the health examination station
at the time of participation and returned by mail. This
resulted in a lower participation rate on Q2 than on Q1,
which was sent by mail together with the study invitation
and handed in at the time of study participation. Of the
7744 who did not have an identifiable occupation, 6152
(79.4%) had not returned Q2.
We excluded 673 participants who had received dis-
ability pension, full or partial, before participation in
HUNT2. To minimise reverse causality, we excluded the
first 2 years of follow-up, including the 495 participants
who received a disability pension or were censored due
to retirement pension, death or emigration in this period. Thus, our final study population consisted of 29,016 people.

Measurement of occupation
Measurement of occupation was based on self-report. The occupational groups used in HUNT2 were comparable to the Erikson-Goldthorpe-Portocarero (EGP) social class scheme, and we used a simplified version of the EGP scheme. The EGP scheme uses characteristics of employment relations, such as decision latitude and job autonomy, to classify occupations and there is no implicit hierarchical rank. A substantial proportion of the study participants (9.1%) stated that they had two or more occupations and, for the purpose of our study, we assigned one occupation to each respondent. We assumed that if a respondent had several occupations, the occupation having the highest socioeconomic status would be the one exerting the main influence on health. Consequently, we classified the respondents with two or more occupations according to their presumed highest ranking occupation.

The occupational groups in HUNT2, in the order of decreasing socioeconomic status used by us, were: (1) ‘Management position in public or private enterprise,’ (2) ‘Self-employed professional (eg, dentist, lawyer),’ (3) ‘Lower professional occupation (eg, nurse, technician, teacher),’ (4) ‘Non-professional occupation (shop, office, public service),’ (5) ‘Farmer or forest owner,’ (6) ‘Self-employed businessperson,’ (7) ‘Skilled worker, artisan, foreman,’ (8) ‘Driver, chauffeur,’ (9) ‘Fisherman,’ and (10) ‘Semiskilled, unskilled worker’. We merged some of the 10 occupational groups from HUNT2 into the following six categories based on the EGP social class scheme: Higher grade professionals (1, 2), lower grade professionals (3), routine non-manual workers (4), farmers (5), self-employed businessmen (6), skilled manual workers (7–9) and unskilled manual workers (10).

Measurement of symptoms of anxiety and depression
We used the Hospital Anxiety and Depression Scale (HADS) as a measure of symptoms of anxiety and depression. The HADS is a screening tool consisting of 14 questions on a self-administered questionnaire. There are seven questions related to anxiety (HADS-A) and seven questions related to depression (HADS-D). Each question is scored on a scale from 0 to 3, yielding two subscales ranging from 0 to 21, where a higher score indicates a higher level of distress. We defined having valid HADS-A or HADS-D scores as having answered at least five out of the seven questions on the HADS-A or HADS-D subscale, respectively. If a participant had answered five or six questions on one subscale, the respondent’s total subscale score was multiplied by 7/5 or 7/6, respectively. We used a cut-off of eight to define ‘caseness’ on both subscales, indicating a possible and probable case of anxiety or depression. This cut-off has been found to give an optimal balance between sensitivity and specificity, both of which are around 0.80 for both anxiety and depression.

Statistical methods
We used Directed Acyclic Graphs (DAGs) to evaluate possible confounding. We considered age and sex to be confounders, in the association between occupation and disability pension, and in the association between depression or anxiety and disability pension. We did not adjust for education, because both education and occupation are ways of measuring socioeconomic status.

We estimated the HR of disability pension in different occupational groups using the Cox proportional hazard regression analysis. We started follow-up 2 years after participation in HUNT2. The end point was the date of being granted disability pension. Subjects were censored at the date of retirement pension, loss to follow-up (emigration), age 67 or death, whichever came first. The dates of death of HUNT participants were updated.
regularly from the National Registry. Right censoring was at 31 December 2010, which was the last day for which data on disability pensions were available. The analyses were performed both stratified by and adjusted for sex. We adjusted for age, and included occupational group as a categorical variable in the model.

Whether physical health status at baseline is a mediator or a confounder in the relationship between occupation and disability pension is debatable, but we adjusted for it in model 2. Since answering ‘yes’ to the question “Do you suffer from any long-term illness or injury of a physical or psychological nature that impairs your functioning in everyday life? (Long-term means at least 1 year)” could also include anxiety or depression, we used its follow-up question as a measure of long-lasting physical illness: “If yes, how would you describe your impairment due to physical illness?” The categories were ‘slight’, ‘moderate’ or ‘severe’. Anyone who had not answered this follow-up question was classified as ‘no’, except respondents who had not answered the first question on having any long-lasting illness or injury, who were set to missing.

We used the Cox proportional hazard regression model to investigate the association between symptoms of anxiety or depression caseness and future disability pension in different occupational groups. The analyses were stratified by occupational group. We entered symptoms of anxiety caseness as a dichotomous variable in the model, and used study participants in the same stratum (occupational group) without symptoms of anxiety caseness as the reference category. In model 1, we adjusted for age and sex. We considered long-lasting physical illness to be a confounder in the relationship between symptoms of anxiety caseness and disability pension, and adjusted for it in model 2. We then repeated the analyses, using symptoms of depression caseness instead of anxiety.

To estimate the impact symptoms of anxiety and depression caseness had on the 5-year risk difference in study participants aged ≥50, we estimated the marginal effect using logistic regression, adjusting for sex and age. Since younger workers have a lower risk of being granted disability pension, we also estimated the 5-year risk difference in study participants aged ≥50 only.

In the sensitivity analyses, we analysed the time periods <7 years and ≥7 years of follow-up separately. The proportional hazards assumption on the models was also tested using log-minus-log plots.

The results in table 2 showed a decreased risk of disability pension in occupational groups of higher socioeconomic status. Farmers had a twofold increased risk (age-adjusted and sex-adjusted HR 2.07, 95% CI 1.80 to 2.38) compared with higher grade professionals. This risk increase in farmers was lower than in other manual occupations, but higher than in non-manual occupations. Compared with male higher grade professionals, male farmers had a 145% higher risk (HR 2.45, 95% CI 2.07 to 2.90) of disability pensioning. In women, the risk increase was 47% (HR 1.47, 95% CI 1.15 to 1.89).

The association between symptoms of anxiety caseness and the risk of disability pension in different occupational groups, adjusted for age and sex, are shown in table 3. Farmers with symptoms of anxiety caseness had a 51% increased risk of disability pension of (HR 1.51, 95% CI 1.23 to 1.86) compared with farmers without symptoms of anxiety caseness. Symptoms of anxiety caseness increased the risk of disability pension in all the occupational groups, and the HRs were quite similar, with a range from 1.51 to 1.75. The 5-year risk difference in disability pension is shown in online supplementary table S1. The 5-year risk differences were higher in the group aged ≥50 than for all ages, but the risk differences were relatively similar in the different occupational groups.

The association between symptoms of depression caseness and the risk of disability pension in different occupational groups are presented in table 4. Farmers with symptoms of depression caseness had a 53% increased risk of disability pension of (HR 1.53, 95% CI 1.25 to 1.87) compared with farmers without symptoms of depression caseness. Symptoms of depression caseness increased the risk of work disability in all occupational groups, but the variation in HR was higher than that for anxiety. On the basis of the relative risk measures (HR), we found that higher grade professionals and unskilled manual workers had the highest HRs following the high depression symptoms load at baseline. However, when estimating an absolute measure, the 5-year risk difference showed only minor differences between occupations (see online supplementary table S1). The risk difference in the self-employed group was negative (−1.6%, 95% CI −15.8% to 12.7%), suggesting that the self-employed with symptoms of depression caseness at baseline had a lower risk of disability pension than their colleagues without symptoms of depression caseness at baseline. However, the estimate is uncertain because of the small number of events with symptoms of depression caseness in the self-employed category.

Results of the sensitivity analyses can be found in online supplementary tables S2–4. The HRs of disability pension were similar in the first 7 and past 7 years of follow-up in most of the occupational groups. There was a tendency for the risk increase following symptoms of depression or anxiety caseness at baseline to be stronger in the first 7 years of follow-up than in the last 7 years of follow-up.

RESULTS
Characteristics of the study participants are shown in table 1. Of all the occupational groups, farmers had the highest mean depression symptoms score and the highest prevalence of depression caseness. Farmers also reported the highest prevalence of poor or not very good self-reported health, and of long-lasting physical impairment.

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Table 1 Characteristics of the study participants

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Working participants of the HUNT2 Survey (1995–97), aged 20–61.9 years of age.

*Lasting at least 1 year, causing impairment of daily function.
†Caseness=score ≥8 on the anxiety symptom subscale.
‡Caseness=score ≥8 on the depression symptom subscale.
HADS-A, the anxiety subscale of the Hospital Anxiety and Depression Scale; HADS-D, the depression subscale of the Hospital Anxiety and Depression Scale; SD, standard deviation.
We found that although farmers, especially males, had an increased risk of disability pension compared with higher grade professionals, they had a lower risk of disability pension than most other manual occupational groups. Symptoms of anxiety and symptoms of depression were risk factors for future disability pension in farmers as well as in other occupational groups, and

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<tr>
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<tr>
<td>Farmers</td>
<td>3495</td>
</tr>
<tr>
<td>Self-employed</td>
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<tr>
<td>Skilled manual workers</td>
<td>4647</td>
</tr>
<tr>
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<td>4325</td>
</tr>
<tr>
<td>Total person-time at risk:</td>
<td>318,009</td>
</tr>
<tr>
<td>Women</td>
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</tr>
<tr>
<td>Higher grade professionals</td>
<td>803</td>
</tr>
<tr>
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</tr>
<tr>
<td>Non-manual routine workers</td>
<td>4899</td>
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<tr>
<td>Farmers</td>
<td>919</td>
</tr>
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<tr>
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<td>707</td>
</tr>
<tr>
<td>Unskilled manual workers</td>
<td>2434</td>
</tr>
<tr>
<td>Total person-time at risk:</td>
<td>156,051</td>
</tr>
<tr>
<td>Men</td>
<td></td>
</tr>
<tr>
<td>Higher grade professionals</td>
<td>2327</td>
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<tr>
<td>Lower grade professionals</td>
<td>1967</td>
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<tr>
<td>Farmers</td>
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<tr>
<td>Self-employed</td>
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<tr>
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<td>3940</td>
</tr>
<tr>
<td>Unskilled manual workers</td>
<td>1891</td>
</tr>
<tr>
<td>Total person-time at risk:</td>
<td>161,959</td>
</tr>
</tbody>
</table>

NA, not applicable.

**DISCUSSION**

We found that although farmers, especially males, had an increased risk of disability pension compared with higher grade professionals, they had a lower risk of disability pension than most other manual occupational groups. Symptoms of anxiety and symptoms of depression were risk factors for future disability pension in farmers as well as in other occupational groups, and

<table>
<thead>
<tr>
<th>Table 3</th>
<th>HRs with 95% CIs for disability pension according to baseline symptoms of anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
</tr>
<tr>
<td></td>
<td>n events</td>
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<tr>
<td>Higher grade professionals</td>
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</tr>
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<td>Lower grade professionals</td>
<td>5916</td>
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<tr>
<td>Non-manual routine workers</td>
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<tr>
<td>Farmers</td>
<td>3454</td>
</tr>
<tr>
<td>Self-employed</td>
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<tr>
<td>Skilled manual workers</td>
<td>4613</td>
</tr>
<tr>
<td>Unskilled manual workers</td>
<td>4282</td>
</tr>
</tbody>
</table>

there did not appear to be any substantial differences between occupations.

Even though farmers have a physically demanding job, and had the highest prevalence of ‘poor’ or ‘not very good’ self-reported health at baseline, we found that farmers had a low risk of disability pension compared with most other manual occupational groups. Although the high prevalence of poor self-reported health may partially be caused by farmers having a higher mean age than most of the other occupational groups, this suggests that farmers may work longer with compromised health before receiving a disability pension. A Swedish study found that farmers continued to work full-time or part-time around retirement age to a larger extent than employees. Farmers may stay occupationally active despite health symptoms due to uncertainty surrounding farm succession, being self-employed or other unique social or practical factors related to farming. Another possible explanation may be that farmers have a high level of control or autonomy in their work situation. In the Job Demand Control (JDC) model, the combination of high job demands and low job control is associated with mental strain. Farmers have been found to have ‘low strain’ jobs, characterised by low levels of work intensity and high levels of job autonomy, and thus are at low risk of stress and with more favourable health outcomes. This is not in accordance with our findings of high prevalences of depression caseness and self-reported poor health in farmers.

In addition to the potential beneficial effect of high job control on health, a high level of job control may also enable farmers to adjust their work so they can keep working despite having a health problem. They may decrease or change their production, or work slower, but compensate by working longer hours. The mean number of hours of paid work per week among farmers is surprisingly low in this study, and is not in accordance with the literature, including a study from the HUNT2 Survey (1995–97). Cox proportional hazard regression. Follow-up from 2 years after baseline measurements until 31 December 2010. Model 1: Adjusted for age and sex. Model 2: Adjusted for age, sex and long-lasting limiting physical illness. HADS-D, Hospital Anxiety and Depression Scale, depression subscale. Cut-off for caseness: ≥8.

### Table 4 HRs with 95% CIs for disability pension according to baseline symptoms of depression

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Higher grade professionals</td>
<td>3116</td>
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<tr>
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<td>5924</td>
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<td>Non-manual routine workers</td>
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<tr>
<td>Farmers</td>
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<td>Self-employed</td>
<td>1378</td>
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<tr>
<td>Skilled manual workers</td>
<td>4617</td>
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<tr>
<td>Unskilled manual workers</td>
<td>4291</td>
</tr>
</tbody>
</table>

The HRs with 95% CIs for disability pension according to baseline symptoms of depression. Person-time = number of hours of paid work per week. It is possible that the distinction between paid and unpaid working hours may get blurred on a farm, especially if the respondent also has an off-farm job.

The literature on mental health and disability pension in farmers is scarce, but in a cohort of Finnish farmers, high psychological distress was associated with an increased cause-specific risk of disability pension during the 10-year follow-up period, including disability pensions granted for all causes and for depression. Symptoms of anxiety and depression were associated with an increased risk of disability pension in all occupational groups in our study. However, two occupational groups, in the opposite ends of the socioeconomic spectrum, had a stronger association between symptoms of depression and future disability pension than the other occupational groups: Higher grade professionals and unskilled manual workers. Higher grade professionals generally have the lowest risk of adverse health outcomes, but it may be particularly demanding to stay occupationally active when suffering from depression if your job involves high demands on social and cognitive performance. However, the risk difference in higher grade professionals is similar to that of almost all of the other occupational groups. This suggests that higher grade professionals had a higher HR than the other occupational groups in the stratified analyses because of their underlying low risk of disability pension. On the other hand, although unskilled manual workers had the highest HR of receiving disability pension, they still had a relatively strong association between symptoms of depression caseness and disability pension, as well as the
highest risk difference of all the occupational groups. This suggests that unskilled manual workers, who have the least amount of job control, and are exposed to the most adverse socioeconomic conditions, may be more likely to receive a disability pension following symptoms of depression at baseline than other occupational groups. This supports the findings of a large Finnish study, in which return to work after a work disability episode due to depression was slower in workers of low socioeconomic status and recurrent work disability episodes due to depression were more common.30

Having a physically demanding job has been shown to be associated with an increased risk of disability pension, even compared with workers in other blue-collar jobs in the same industry.33 This suggests that staying in the workforce while having chronic, physical pain may be more difficult when having a physically demanding job. However, our results indicate that despite socioeconomic differences in health8 and healthcare utilisation,32 this may not be the case for mental illness, such as anxiety and depression. The risk increase associated with anxiety and depression caseness at baseline appeared to be relatively similar across most occupational groups, with the possible exception of unskilled manual workers. This is consistent with a review article which found that socioeconomic status was not related to the recurrence of a major depressive disorder.33 Thus, it does not seem likely that a decreased selection of farmers with depression into disability pension is part of the explanation for the high prevalence of depression symptoms found in farmers. This suggests that other causes, such as stress, financial problems, a high workload or other factors, may be behind the cross-sectional findings of a high prevalence of depression symptoms in Norwegian farmers.67

Strengths and limitations

Our study has several strengths. HUNT2 is a total population-based survey with a high participation rate. For end points and censoring, we used national registry data on disability pension, retirement pension and death, all of which can be considered complete. Emigration was negligible and, as a result, we were able to follow a large number of men and women over a period of up to 14 years with minimal loss to follow-up. The population of Nord-Trøndelag County follows Norwegian trends in disability and mortality14 closely, and our results should be generalisable to other parts of Norway. The extent to which our results are generalisable to other welfare states is unknown, but we believe our results may be of interest internationally.

The HADS is not a clinical diagnosis of depression or anxiety, and a respondent can get a transiently increased score when going through, for instance, physical illness, divorce or personal loss. Compared with other occupational groups, a higher proportion of farmers reported having poor health, whereas a higher proportion of farmers were married, and a lower proportion were divorced (data not shown). We do not have data on other potentially stressful situations that may transiently influence the HADS score, but we do not have any reason to believe that farmers differ systematically from other occupational groups. Symptoms of anxiety and depression caseness were only measured once. We do not know if the participants suffered from anxiety or depressive symptoms in the years between HUNT2 participation and the end of follow-up, and the associations between anxiety or depression and disability pension were weaker in the last 7 years of follow-up than in the first 7 years. One study found that of the HUNT2 participants aged 45–64 years who reported an HADS-D score of ≥8, around 40% had a HADS-D score of ≥8 in HUNT3, 11 years later.35

The EGP scheme uses characteristics of employment relations to classify occupations, and any observed health differences between occupational groups can thus be attributable to differences in working relations, autonomy and rewards systems. This may make the EGP scheme less suitable for investigating health gradients, although the EGP scheme also inherently reflects material resources.32 Perhaps more importantly, the EGP scheme is not hierarchical and our hierarchical method of assigning group membership to participants who had several occupations therefore constitutes a weakness. For some of the occupations, it is not necessarily clear where they belong in a hierarchical system, especially in one that is based on characteristics of employment relations. This is particularly challenging for farmers, self-employed and possibly also fishermen, due to the nature of their jobs and their high degree of work autonomy. Farming is a manual occupation, but farmers have a high decision latitude; they often own large properties and run their own businesses. Fishermen may be in a similar situation as farmers, whereas the self-employed are likely to be a diverse group. Self-employed academics, such as physicians and lawyers, were included in the higher grade professionals group, but the self-employed businessmen in our study are still likely to be working in diverse fields and with varying levels of skill.

Furthermore, for the participants who had stated that they had several occupations, we do not know which occupation is their main occupation. Our assumption that the socioeconomic status of a participant was determined by the occupation with the highest socioeconomic status may not hold if that occupation was not their main occupation. This is particularly relevant because our group of interest, farmers, often have an off-farm job as well. Of the 3495 respondents we classified as farmers, 24.5% had two or more occupations. In total, 4273 respondents stated that they were farmers, and 38.2% had two or more occupations.

Even though the number of study participants is high, there were not enough cases of disability pension among participants with symptoms of anxiety or depression to stratify the analyses by sex. Thus, we were unable to investigate possible sex differences in the associations

between symptoms of anxiety or depression and disability pension.

A non-participation study of HUNT3 found that non-participants had lower socioeconomic status and higher mortality than participants, and that depression was a more restricting factor for participation than anxiety. HUNT2 had a higher participation rate than HUNT3, but, assuming that the underlying processes were similar in HUNT2, both the risk of disability pension and the association between symptoms of depression caseness and disability pension are likely to be underestimated. The underestimation may be more pronounced in occupational groups of low socioeconomic status than in groups of high socioeconomic status.

CONCLUSIONS

We found that farmers had an intermediate risk of disability pension, although the risk was low compared with manual occupations. Male farmers were at higher relative risk than female farmers. Even though farming is physically demanding, our results indicate that farmers may work longer with physical health problems before receiving a disability pension than other occupations. However, despite differences in work conditions and socioeconomic status, self-reported symptoms of anxiety and depression caseness appear to have a fairly similar relation with the risk of future disability pension in most occupational groups. More research is needed to elucidate the causes of the high depression symptom level of farmers, as well as the processes surrounding disability pension in farmers.

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Contributors MOT, BH, JHB and SK designed the study. MOT conducted the analyses with assistance from JHB and SK. MOT wrote the first draft of the manuscript. BH, JHB, DG and SK revised the draft, and all authors contributed to and approved the final version of the manuscript.

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Competing interests None declared.

Patient consent Obtained.

Ethics approval All participants of HUNT2 provided written informed consent. The HUNT Study was approved by the Regional Committee for Medical and Health Research Ethics (REC Central), as was this study (2012/1359).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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Disability pension and symptoms of anxiety and depression: a prospective comparison of farmers and other occupational groups. The HUNT Study, Norway
Magnhild Oust Torske, Bjørn Hilt, Johan Håkon Bjørngaard, David Glasscock and Steinar Krokstad

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