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Rebecca Wheeler & Matt Lobley

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# Anxiety and Associated Stressors Among Farm Women in England and Wales

Rebecca Wheeler and Matt Lobley

Centre for Rural Policy Research, University of Exeter, Exeter, UK

## ABSTRACT

**Objectives:** The findings presented here derive from a wider study that sought to establish a baseline understanding of mental health and wellbeing among the agricultural community in England and Wales. This paper focuses on selected questions that investigated levels of anxiety and associated stress factors among farm women, a group which has been relatively neglected within previous research on farming mental health in the United Kingdom.

**Methods:** A questionnaire survey was widely distributed to members of the agricultural community in England and Wales ( $n = 15,296$ ) in both paper and online formats. The survey included a number of standardised instruments to assess mental health and wellbeing, including the Generalised Anxiety Disorder-7 scale (GAD-7). Focusing on a sub-sample of female respondents ( $n = 3487$ ), this paper details the findings from the GAD-7, alongside those from a selection of other questions investigating sources of stress, loneliness and perceived business viability.

**Results:** A significant proportion of female respondents were experiencing anxiety at the time of survey completion, with 23.3% reaching the threshold for clinically relevant anxiety based on their GAD-7 scores (medium or severe anxiety, scores  $\geq 10$ ). A further 34.6% were classified as experiencing mild anxiety (scores 5–9) whilst 42.1% were not suffering from anxiety (scores 0–4). Medium/severe anxiety was identified as being associated with a number of stress factors, feelings of loneliness and pessimistic perceptions of farm business viability. There were important age-based differences, with working-aged women identified as more likely to suffer from anxiety, loneliness and certain stressors than older women.

**Conclusion:** The findings reported here indicate concerning levels of anxiety among farming women and this should be seen as a call to action. There are clear associations between anxiety and a range of stressors and, although we cannot ascertain causality, these point to issues that demand attention in efforts to improve mental health within this social group. The factors contributing to anxiety are, however, multiple and complex and farm women may be affected by particular gender-based challenges that have not yet been explicitly explored in relation to mental health. Further research is needed to investigate and understand these issues in greater depth.

## KEYWORDS

Anxiety; GAD-7; mental health; agriculture; farm women

## Introduction

### *Farm women and mental health*

This paper uses findings from a large-scale survey to provide an unprecedented understanding of anxiety levels and related stress factors among farming women in England and Wales. Understanding and improving levels of mental health in farming is essential in order to care for the essential workers who produce our food and manage our rural landscapes. In the United Kingdom (UK), the topic is beginning to receive much warranted attention in both academic literature and policy circles, with recent research highlighting high levels of psychological morbidity,<sup>1</sup> poor subjective wellbeing,<sup>2</sup> loneliness,<sup>3,4</sup> and

health-related quality of life,<sup>5</sup> and the Department for Environment, Food and Rural Affairs (DEFRA) recognizing it as an area requiring action.<sup>6</sup> Internationally, farming men in particular have been identified as vulnerable to poor physical and mental health and suicide<sup>7–13</sup> and as reluctant to seek help<sup>14–17</sup>. There has, however, been limited recent research focusing specifically on the health and wellbeing of farm women. Whilst quantitative studies on mental health within farming populations do usually include women as well as men, they are rarely attended to in any depth in published analyses, at least in a high-income country context (exceptions include<sup>18–21</sup>) and we know little about their risk

**CONTACT** Rebecca Wheeler  [r.wheeler3@exeter.ac.uk](mailto:r.wheeler3@exeter.ac.uk)  Centre for Rural Policy Research, University of Exeter, Prince of Wales Road, Exeter, EX4 4PJ UK  
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factors and determinants of health,<sup>21,22</sup> although qualitative research has provided valuable insights on relevant issues, particularly around gender and work roles.<sup>23–25</sup>

Studies of mental health in farming often focus either explicitly on men (e.g.,<sup>7–10,13,15–17</sup>), or on the principal farmer or farm workers<sup>26</sup>, roles that continue to be dominated by men (73% of the UK's agricultural workforce are male<sup>27</sup>). There can, therefore, be a tendency for research to overlook the large proportion of females who are not necessarily “primary” farmers or farm employees, but who live and/or work on the farm in different capacities (exceptions include<sup>18,28,29</sup>), with only one study we are aware of focusing on farm women's wellbeing in the UK context (over 20 years ago)<sup>30</sup>. This reflects wider issues around women in European agriculture lacking economic visibility<sup>31</sup> and being underrepresented in official statistics<sup>25,32,33</sup>. Dominant narratives that construct agriculture as a male occupation<sup>34</sup> and cultural scripts about masculine stoicism<sup>35</sup> may also have contributed to an apparent assumption that farming men require the most attention and support. This is an assumption that demands revisiting, however, as demonstrated in a recent paper (drawing on the same survey data presented here) that highlighted particularly low self-rated health among younger and middle-aged farm women in England and Wales, as well as gender-based disparities across most age groups.<sup>5</sup> Studies from elsewhere that have included farm women also suggest they have poorer mental health than men<sup>36–38</sup>, a perhaps unsurprising finding given that women are also more likely to suffer from anxiety<sup>39</sup> and depression<sup>40</sup> than men among general populations.

This article uses data from a large survey of the agricultural community of England and Wales to explore farming women's mental health in more depth. In particular, we focus on the results of one instrument used to assess anxiety levels at the time of survey completion, the Generalised Anxiety Disorder-7 scale (GAD-7), alongside analysis of questions that indicate potential contributors to anxiety among many participants, including

loneliness, poor business performance and other sources of stress.

### **Generalised anxiety disorder and the GAD-7**

We all experience some level of anxiety – feelings of unease, worry or fear – on occasion, but anxiety becomes more concerning when it is considered excessive and/or prolonged. Distinct from (but often comorbid with) more specific anxiety disorders such as phobias, social anxiety, and post-traumatic stress disorder, generalized anxiety disorder (GAD) is “characterized by chronic and persistent worry, which is multifocal (e.g., about finances, family, health, and the future), excessive, and difficult to control” [<sup>41</sup> p.2059]. It can be accompanied by physical and cognitive symptoms such as “restlessness, feeling keyed up or on edge, being easily fatigued, difficulty concentrating or mind going blank, irritability, muscle tension, and sleep disturbance” [<sup>42</sup> p.906].

Anxiety disorders are one of the most common mental disorders and are frequently comorbid with other problems such as depression<sup>43</sup>, yet they continue to be under-recognized and under-treated<sup>39</sup>. Women have consistently been found to be approximately twice as likely as men to suffer from anxiety disorders, including GAD, in a variety of international contexts, for a variety of biological and cultural reasons<sup>39,40,44</sup>. Younger people are also more likely to suffer from anxiety disorders than older people<sup>45</sup>. Specific anxiety disorders tend to start in adolescence and peak in middle-age before decreasing again in older age; whereas GAD tends to have a slightly later onset. Kessler et al.<sup>46</sup>, for instance, report the median age at onset of GAD in the United States as 31 (compared to 11 for all anxiety disorders).

Developed by Spitzer et al.<sup>47</sup>, the Generalised Anxiety Disorder-7 (GAD-7) is a standardized measure used to screen for and assess generalized anxiety, which has been shown to be reliable and valid in both clinical and nonclinical settings<sup>48</sup>. It has been widely used internationally and is designed for self-completion, making it suitable for inclusion in our survey of farming people in England and Wales. We provide further details about this instrument and our wider research

design below, before describing the results of the GAD-7 with a particular focus on women. We also present findings from other selected survey questions, which provide insights into some of the factors that are associated with anxiety among farm women (although note that causal relationships cannot be determined).

## Methods

### Survey design

The findings reported here all derive from a large-scale survey of the farming community in England and Wales, which was conducted in 2021 and funded by the Royal Agricultural Benevolent Institution (RABI). The research was reviewed and approved by the College of Social Sciences and International Studies Research Ethics Committee at the University of Exeter (Ref: 202021–031). The questionnaire was piloted with 17 farmers and minor adjustments subsequently made to ensure all questions were clear and appropriate for the target population.

As well as the GAD-7 (described below), the survey included a number of questions about respondents' personal and farm characteristics, social relationships, perceptions of business performance and physical and mental wellbeing.<sup>1</sup> The questions pertinent to this paper are described further below.

### The GAD-7

The GAD-7 consists of seven questions about how often the individual has been bothered by specific problems over the previous two weeks (a full version of the GAD-7 can be found in the Supplementary Information). For each question, there are four response categories ranging from “Not at all” to “Nearly every day”. Scores of 0–3 are assigned to each of these response categories respectively and then summed to provide a single score of between 0 and 21. Scores of 0–4 indicate no anxiety, whilst scores of 5–9 indicate “mild” anxiety, 10–14 “moderate” anxiety and 15–21 “severe” anxiety. Scores of 10 or more (i.e. moderate or severe anxiety) are generally considered to represent clinically relevant anxiety requiring further evaluation<sup>49</sup>.

### Stress factors

A list of 20 potential causes of stress in farming was presented, and respondents were asked to indicate the extent to which they considered each of these to be a stress in their life today. There were five possible response categories, ranging from “not at all” to “a large extent”. For the purpose of the analysis discussed in this paper, a factor was considered to be a stressor for the respondent if they indicated it was causing them stress “quite a lot” or “to a large extent”. The full list of potential stress factors can be viewed in the results section below.

### Loneliness

The survey included two measures of loneliness that are recommended in national guidance<sup>50</sup> and used in official surveys such as the Community Life Survey<sup>51</sup>. The first is the internationally recognized UCLA three-item loneliness scale, which consists of three indirect questions about loneliness. The second consists of a direct question (*How often do you feel lonely?*), with five response categories ranging from “never” to “often/always”. For brevity, only the results from the direct question are discussed in this paper, but further findings from the indirect questions can be found in the full survey report<sup>52</sup>.

### Business viability

The survey contained a number of questions about the farm business, including respondents' perceptions of recent business performance and future prospects; current business-related challenges and opportunities; and succession. In this paper, we focus on the results from the question, *Do you consider your (or your family/employer's) farm business to be viable over the next 5 years?*, which had three response categories: “yes”; “no”; and “not sure”.

### Survey distribution

The survey was widely distributed in hardcopy and online formats, and all members of the farming community – including farmers, farm workers, contractors and members of farm families (whether actively farming or not) – were encouraged to complete and return it. The hardcopy

survey was sent to a mailing list of 28,000 farms in England and Wales (which was purchased from a data services company, Experion), and the Dillman Tailored Design Method<sup>53</sup>, which involves sending out a reminder postcard and second survey mailing to non-responders at appropriate intervals, was used to maximize response rate. The questionnaire was also included in the distribution of a number of farming magazines such as *Farmers Weekly*, *Farmers Guardian*, the *Country Land and Business Association (CLA)*'s *Land and Business Magazine* and *National Farmers Union (NFU)* publications. The online version was held on the Qualtrics survey platform and promoted by a variety of agricultural stakeholders as well as via social media (Twitter).

Respondents completed the survey between 11 January and 26 April 2021 April 26, 2021. This time period was amid the COVID-19 pandemic and overlapped with national lockdowns in England (6 January to 8 March 2021 March 8, 2021) and Wales (26 December 2020 December 26, 2020 to 26 April 2021 April 26, 2021). Given the widely acknowledged impact of the pandemic on mental health (including that of farmers; see<sup>54</sup>), the survey findings must be considered carefully within this context. We believe, however, that the fundamental conclusions from the study do have wider applicability (i.e., beyond the specific time context of the pandemic), for reasons that we cover in the discussion section below. Further details about survey design and distribution can be found in the full survey report<sup>52</sup>.

### **Data analysis**

Survey data were collated in the statistical software program IBM SPSS Statistics and analyzed using a variety of descriptive statistics and parametric and non-parametric statistical tests, as appropriate. For the GAD-7, summary scores were calculated and an additional variable was created that categorized the scores according to whether they indicated no, mild, moderate or severe anxiety (using the cut-off points detailed above). Since the data had a positively skewed distribution, non-parametric statistical techniques – specifically the Mann-Whitney U-test and Kruskal-Wallis Test –

were then used to test for significant differences between mean and median GAD-7 scores according to various respondent characteristics (e.g., age, gender). In addition, The Chi-Square Test for Independence (appropriate for categorical and ordinal data) was used to explore relationships between the categorized levels of anxiety and both respondent characteristics and responses to other questions of interest (e.g. stress factors, loneliness).

Results relating to the whole sample were weighted by the proportions of age and gender in national data for England and Wales<sup>55</sup> to account for the non-randomized nature of the sample. However, the analysis below primarily uses unweighted data to avoid inadvertently introducing any additional biases. All results presented here thus use unweighted data unless otherwise specified.

## **Results**

### **Sample characteristics**

A total of 15,296 survey responses were received. Of the 15,084 respondents who answered the question about gender, 3487 (23.1%) were female (75.3% were male, 0.1% were other and 0.5% preferred not to say). Unless otherwise stated (e.g., where comparative figures for males are provided), the findings presented and discussed in this paper are based on the filtered sub-sample of 3,487 females. Respondent characteristics for the female sample are provided in the supplementary information (Table S1). Descriptive statistics relating to the questions discussed in this paper are detailed in [Table 1](#) below.

### **GAD-7 results**

Before focusing on the female sub-sample, it is worth noting that among the full sample (weighted for age and gender), 55.1% of all respondents had some level of anxiety according to their GAD-7 scores, with 22.2% meeting the criteria for generalized anxiety (moderate/severe anxiety, scores of 10 or more). Women were significantly more likely to suffer from anxiety than men, with 24.7% meeting the criteria for generalized anxiety compared to

**Table 1.** Descriptive statistics (female sub-sample).

	N	%
<b>Anxiety levels based on GAD-7 scores</b>		
No anxiety (0–4)	1369	42.1
Mild anxiety (5–9)	1127	34.6
Moderate anxiety (10–14)	454	14.0
Severe anxiety (15–21)	303	9.3
Total	3253	100.0
<b>Factors causing stress quite a lot/to a large extent*</b>		
Concerns about the future of your farm/farming	1393	41.1
Financial pressures	1298	38.3
The COVID-19 pandemic	1688	49.9
Regulation, compliance & inspection	1392	41.4
Bad/unpredictable weather	1536	45.2
Workload pressures/long working hours	1112	33.1
Not feeling valued by the public	1187	35.2
Loss of subsidies/future trade deals	1430	42.3
Public access issues	1317	38.8
Rural crime	1340	39.5
Feeling isolated/not seeing people off the farm	827	24.5
Volatile market prices	1150	34.2
Farm succession issues	947	28.1
Public & policy pressures around Net Zero & other env. issues	999	30.0
Poor internet connectivity	1151	34.2
Relationships with family	703	20.8
Impacts of dietary changes	838	24.9
Animal/crop pests & diseases	757	22.6
Risk of injury/accident on the farm	651	19.4
Shortage of labour	644	19.2
<b>How often feels lonely</b>		
Never	595	17.3
Hardly ever	874	25.4
Occasionally	1053	30.6
Some of the time	679	19.7
Often/always	238	6.9
Total	3439	100.0
<b>Consider business viable over next 5 years</b>		
Yes	1918	55.8
No	255	7.4
Not sure	1264	36.8
Total	3437	100.0

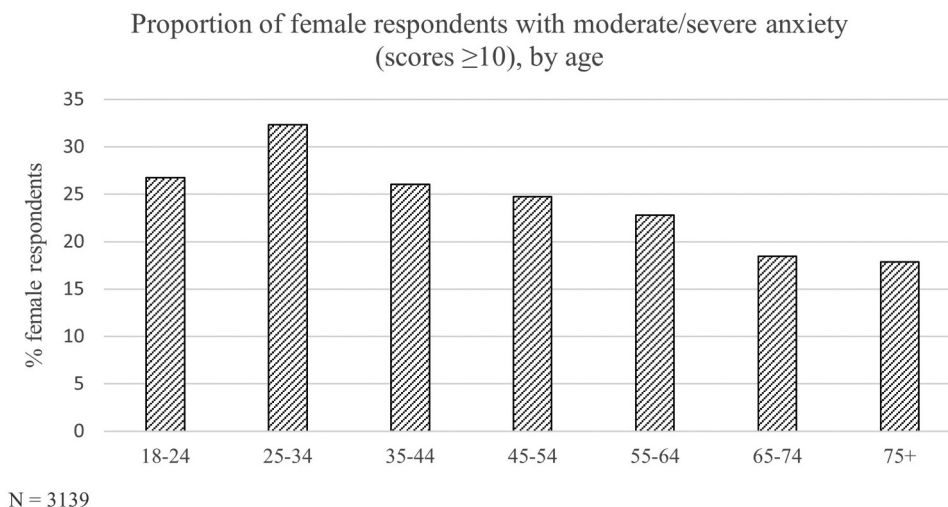
\*Cannot be summed as rows are not mutually exclusive.

19.7% of men ( $\chi^2(1, n = 13,715) = 49.448, p < .001$ , Cramer's  $V = .06$ ). The mean (median) GAD-7 scores were 6.64(6.64 (6.00)) for women and 5.58 (5.58 (4.00)) for men. This broadly reflects results from another instrument used in the survey, the EQ5D3L, which found that women were more likely to self-report problems with anxiety or depression than men.<sup>5</sup>

Unweighted GAD-7 scores for the female sub-sample indicate that 42.1% were not suffering from any anxiety at the time of completing the survey (scores of 0–4), 34.6% had mild anxiety (scores of 5–9) and almost a quarter (23.3%) met the criteria for clinically relevant generalized anxiety (14.0% had “moderate” scores of 10–14, and 9.3% had “severe” scores of 15–21). When

weighted to reflect the age structure of the national population, these figures were: no anxiety = 39.8%; mild anxiety = 35.5%; moderate anxiety = 14.8%; severe anxiety = 9.9%. Unweighted and weighted mean and median GAD-7 scores for the female sub-sample, stratified by age and responses to the other questions discussed here, can be found in the supplementary information (Table S.2).

There was a significant association between GAD-7 scores and age. Statistical tests showed age groups over 65 (65–74 Md = 5; 75+ Md = 3) had significantly lower median scores than those younger than 55 (all Md = 6 except age 25–34, Md = 7). The 25–34 age group recorded the highest median score (Md = 7), which was statistically



**Figure 1.** Proportion of female respondents with moderate/severe anxiety (scores  $\geq 10$ ), by age.

different to all age groups over 45 ( $\chi^2$  (6,  $n = 3139$ ) = 93.086,  $p < .001$ ). Notably, almost a third (32.3%) of women in this age group met the criteria for generalized anxiety disorder (Figure 1).

Analysis revealed associations between anxiety levels and various farm “structural” factors (see Table S3 in the supplementary information for further details). For example, women based on Dairy and LFA<sup>2</sup> Grazing Livestock farms were significantly more likely than statistically expected to have moderate/severe anxiety, although the effect size was very small: 27.9% and 26.0% respectively scored 10 or more on the GAD-7, compared to 23.3% of all women. Meanwhile, women from Cereal and General Cropping farms were significantly less likely to have moderate/severe anxiety, with 18.1% and 12.9% respectively meeting the criteria ( $\chi^2$  (9,  $n = 3239$ ) = 21.232,  $p = .012$ , Cramer’s  $V = .081$ ). The proportions of women from LFA Grazing Livestock, Specialist Pig and Specialist Poultry farms with moderate/severe anxiety were also higher than average (26.0%, 30.4% and 25.7% respectively) but these figures were not statistically significant.

There was no significant association between farm size (based on area) and moderate/severe anxiety ( $\chi^2$  (5,  $n = 3131$ ) = 7.093,  $p = .214$ , Cramer’s  $V = .048$ ).

Women from wholly/mostly tenanted farms were significantly more likely, and those from wholly/mostly owned farm less likely, than statistically expected to suffer from moderate/severe

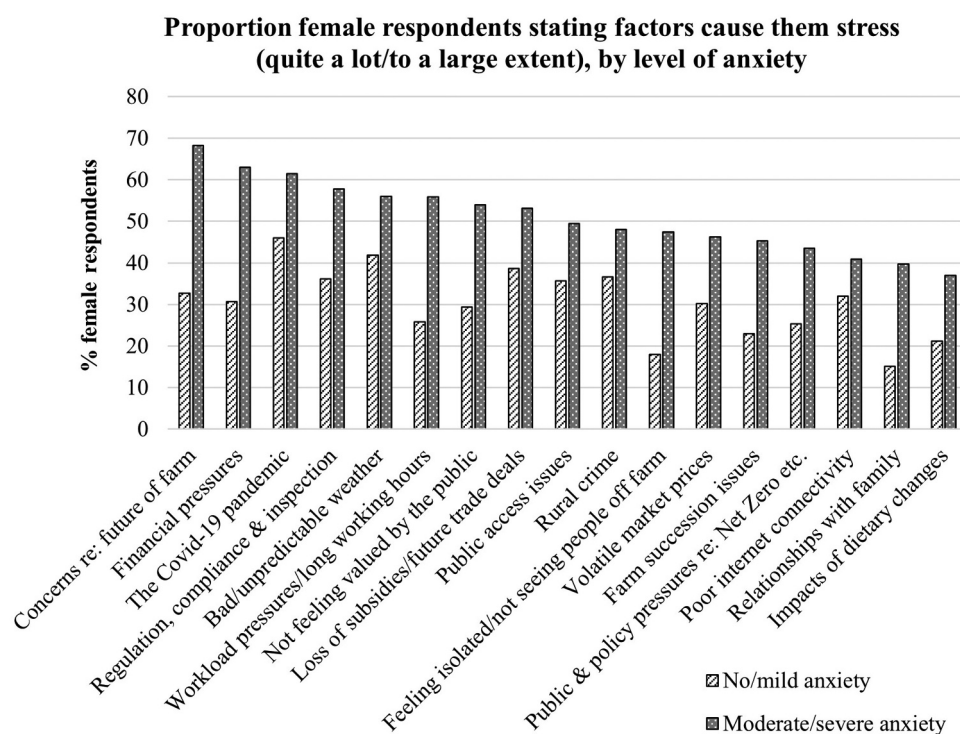
anxiety, with 27.2% and 22.1% respectively scoring over the threshold compared of 23.2% of all farms, but again the effect size was very small ( $\chi^2$  (3,  $n = 3153$ ) = 9.134,  $p = .028$ , Cramer’s  $V = .053$ ).

### Stress factors

Respondents identified a large number of factors as causing them stress quite a lot or to a large extent. Women with no/mild anxiety identified an average of 5.7 stressors each, while those with moderate/severe anxiety identified an average of 9.6 stressors each. Women with moderate/severe anxiety were more likely than women with no/mild anxiety to identify each of the given factors as causing them stress but, as Figure 2 shows, the most common stress factors did differ between the two groups. For those women with moderate/severe anxiety, the five most common stress factors were:

- Concerns about the future of the farm/farming
- Financial pressures
- The COVID-19 pandemic
- Regulation, compliance and inspection
- Bad/unpredictable weather

Chi-square tests for independence together with Cramer’s  $V$  tests for effect size indicated that, as might be expected, there were significant associations between anxiety levels and all stress factors.



**Figure 2.** Proportion female respondents stating factors cause them stress (quite a lot/to a large extent), by level of anxiety.

However, the strength of this association varied notably (see Table S4 in the supplementary information for full details) and the factors found to have the strongest relationship with moderate/severe anxiety were:

- Concerns about the future of the farm/farming
- Financial pressures
- Workload pressure/long working hours
- Feeling isolated/not seeing people off the farm
- Relationships with family

Some of these factors (i.e., workload, feeling isolated and family relationships) might not be among the most *common* stress factors for women, but this analysis suggests that women who are stressed by them are particularly likely to also be feeling anxious.

Further analysis of the stress factors most strongly related to anxiety reveals significant associations between these and age (see Figure 3). Of particular note, women in age groups between 25 and 54 were significantly more likely than statistically expected to be stressed by three of the five

factors: financial pressures, workload and relationships with family. Women aged 18–24 were significantly more likely than statistically expected to be stressed by feeling isolated. Older women (aged 65–74 and 75+), on the other hand, were significantly less likely than expected to be stressed by each of the five factors.

Chi-squared results: Concerns about the future  $\chi^2$  (6,  $n = 3268$ ) = 15.784,  $p = .015$ , Cramer's  $V = .069$ ; Financial pressures  $\chi^2$  (6,  $n = 3268$ ) = 124.611,  $p < .001$ , Cramer's  $V = .195$ ; Workload  $\chi^2$  (6,  $n = 3245$ ) = 145.687,  $p < .001$ , Cramer's  $V = .212$ ; Feeling isolated  $\chi^2$  (6,  $n = 3255$ ) = 18.611,  $p = .005$ , Cramer's  $V = .076$ ; Relationships with family  $\chi^2$  (6,  $n = 3254$ ) = 113.431,  $p < .001$ , Cramer's  $V = .187$ .

### Loneliness

There was a statistically significant association between anxiety levels and how often respondents said they felt lonely. Median GAD-7 scores significantly increased with each “level” of loneliness, from 2.00 for respondents who were never lonely to 13.00 for respondents who were often/always lonely ( $\chi^2$  (4,  $n = 3234$ ) = 797.904,  $p < .001$ ).



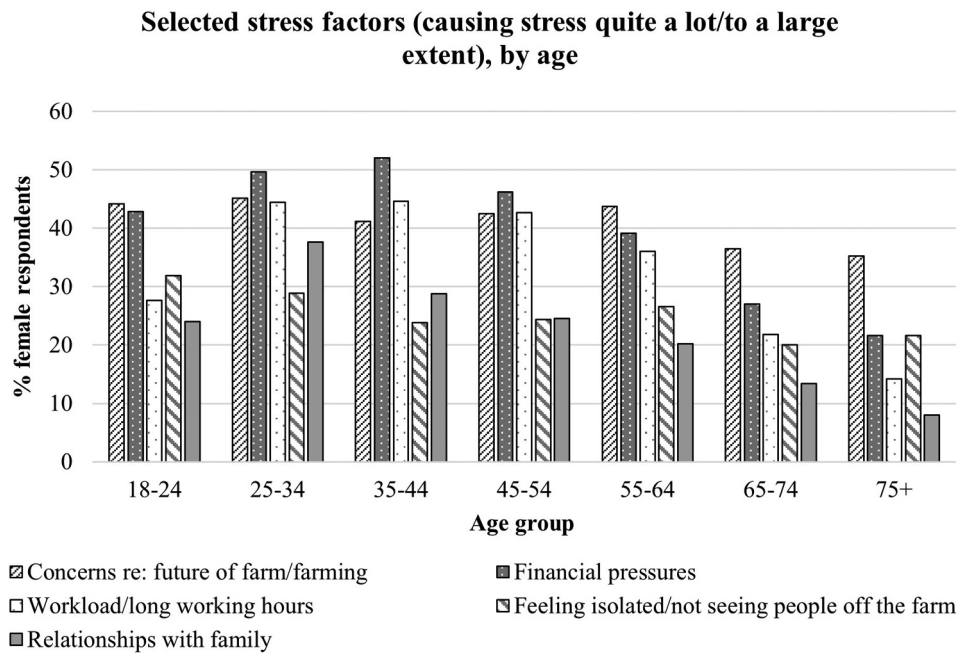


Figure 3. Selected stress factors (causing stress quite a lot/to a large extent), by age.

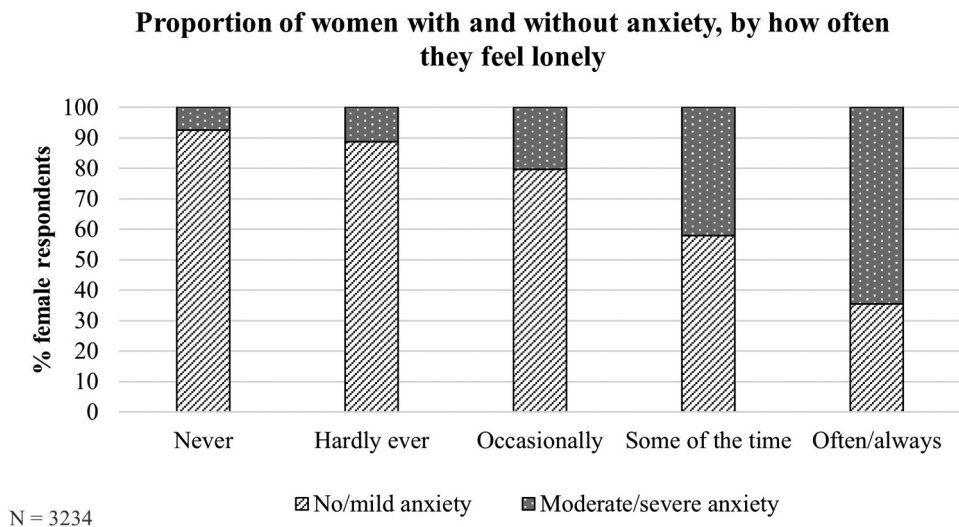


Figure 4. Proportion of women with and without anxiety, by how often they feel lonely.

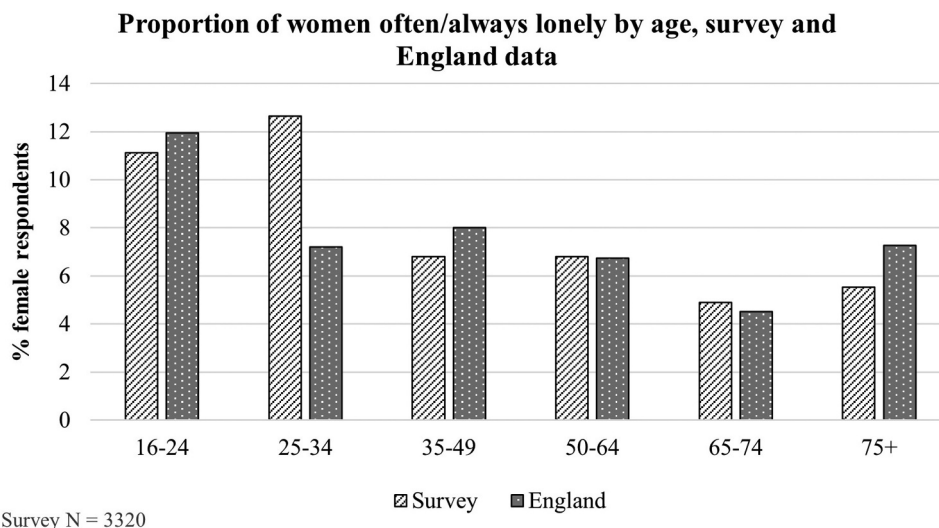
Concurrently, 64.5% of those who were often or always lonely were classified as having moderate/severe anxiety, compared to just 7.4% of those who were never lonely ( $\chi^2(4, n = 3234) = 494.778, p < .001$ , Cramer’s  $V = .391$ ): see Figure 4.

Analysis of loneliness by age (Figure 5.) indicates particularly high levels of loneliness among women aged 25–34 years old, the group which also had the highest anxiety levels. This group of women had the highest levels of loneliness in our sample, but also appear to have notably higher levels of loneliness than women of the same age

within the wider population (based on data for England collected between April 2020 and March 2021<sup>51</sup>). More positively, some age groups (16–24, 35–49 and 75+) had slightly lower levels of loneliness their equivalents in the England data.

### Perceptions of business viability

There were significant associations between anxiety levels and respondents’ perceptions of whether they considered their business to be viable over the next 5 years. Respondents who either believed



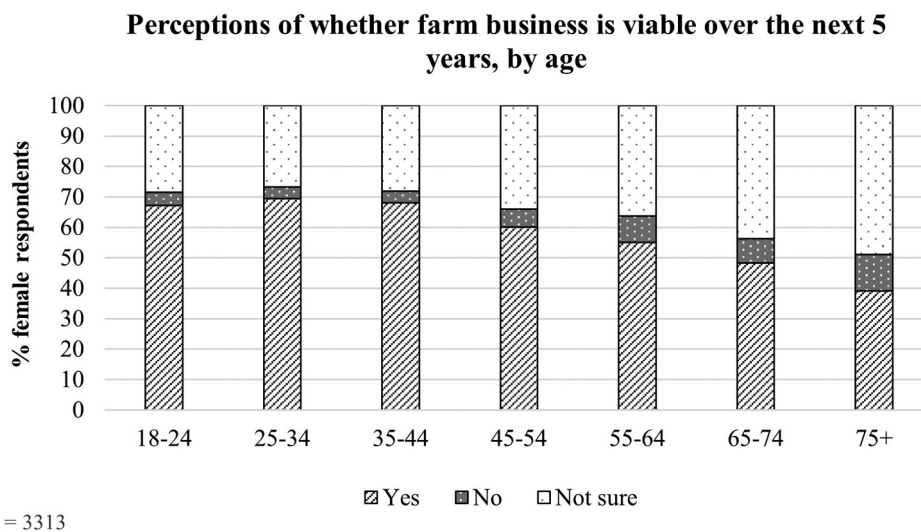
**Figure 5.** Proportion of women often/always lonely by age, survey and England data. England data source: Community Life Survey 2020/21<sup>51</sup>

their business would not be viable over the next 5 years (Md GAD-7 score = 7), or who were not sure (Md = 7), had significantly higher median GAD-7 scores than those who were confident it would be viable (Md = 5) ( $\chi^2 (5, n = 3218) = 123.111, p < .001$ ). Those with negative perceptions were thus significantly more likely to be meet the threshold for generalized anxiety: 39.9% of those who did not consider their business to be viable, and 29.6% of those who weren't sure, had moderate/severe anxiety compared to 17.3% who believed it would be ( $\chi^2 (2, n = 3218) = 98.702, p < .001, \text{Cramer's } V = .175$ ).

Perceptions of business viability were generally more positive among women of working age compared to those 65 or over, as shown in Figure 6. Women in age groups below 55 were significantly more likely than statistically expected, and those aged 65 and over less likely, to say they considered the business to be viable over the next 5 years ( $\chi^2 (12, n = 3313) = 111.516, p < .001, \text{Cramer's } V = .130$ ).

**Discussion**

Our findings indicate that concerning numbers of farming women were suffering from anxiety at the



**Figure 6.** Proportion of women who consider the farm business to be viable over the next 5 years, by age.

time of completing our survey, with almost a quarter (23.3%) of female respondents' GAD-7 scores reaching the threshold for generalized anxiety disorder (medium or severe anxiety, scores  $\geq 10$ ). Medium/severe anxiety was identified as being associated with a number of stress factors, loneliness and pessimistic perceptions of farm business viability.

We should note that although we have chosen to focus on the results of the GAD-7 in this paper, results from the anxiety/depression dimension of the EQ-5D-3 L (see<sup>5</sup>) and the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) (see<sup>52</sup>), which were also used in the survey, elicited concordant findings, increasing our confidence in the validity of the results. For instance, women scored more poorly than men on all three measures, and there were high correlations between high anxiety (as assessed by the GAD-7) and both poor well-being (as assessed by the WEMWBS) and self-reported anxiety/depression (as assessed by the EQ-5D-3 L).

The analysis presented in this paper suggests that age is an important demographic characteristic to consider in understanding and addressing anxiety and related issues among farming women. It is notable that levels of loneliness were highest among younger women (and markedly higher than equivalent levels in the wider population for those aged 25–34), who were also the most likely to be anxious. Furthermore, women aged 18–24 appear more likely to be stressed by feeling isolated/not seeing people off the farm than older women, whilst those between 25 and 44 years old were also the most likely to be stressed by both family relationships and workload/long working hours – all factors that were identified as most strongly associated with moderate/severe anxiety. These factors can all be described as social factors, and it is easy to imagine how any confluence of strained family relationships, long working hours, and/or feeling isolated might be associated with a person also feeling lonely and/or anxious. Indeed, they are all aspects previously identified through qualitative research as contributing to feelings of loneliness (and associated mental health problems) within the farming community.<sup>3</sup> The addition of numerous other common farming stressors – many of which concern factors lying

outside the control of individual farmers and farming families – can only add to this burden.

It is encouraging that the younger generations are more confident about their farm business viability than the oldest ones. This finding suggests that, whilst negative perceptions of business viability are strongly associated with anxiety (and are thus an important factor to consider when addressing poor mental health in this community), they do not necessarily explain why younger women have significantly higher anxiety levels than older women. However, other economic factors vary differently by age and may play a role in influencing anxiety levels across the life-course (although we stress that the direction of causality cannot be ascertained). Younger women were more stressed by financial pressures (and to a lesser extent concerns about the future of the farm/farming) than older women. For instance, only 4% of women aged 25–34 thought the business would not be viable (and 27% were unsure), yet 50% were stressed quite a lot/to a large extent by financial pressures. This analysis points to a more nuanced picture of financial challenges beyond the survival of the farm per se. These might include the balancing of different income sources, household finances, and personal plans not necessarily tied to the farm itself.

There is a lack of consensus in the international literature about whether farmers are disproportionately affected by mental health problems,<sup>56</sup> with some finding higher<sup>1,13,37,57</sup> and others lower<sup>58–60</sup> rates of anxiety and/or depression than in general populations. There are likely to be a number of reasons for these differences, including variations in study sampling, methodology, timeframes, and national contexts. Although we are unable to provide direct evidence of whether or not farm women are disproportionately affected by anxiety, comparison of our findings with available data from a similar time period indicate that there is likely to be some disparity in anxiety levels between women in the farming and wider population. The UCL COVID-19 Social Study (which had a large analytic sample of 36,530 weighted by gender, age, ethnicity, and education to reflect the national population) undertook repeat surveys using the GAD-7 at regular intervals throughout the first 2 years of the pandemic in the UK,

thereby encompassing the period of our study in January–April 2021. This study found that anxiety levels were relatively high and fluctuated considerably throughout this period (GAD-7 scores peaked at a mean of 7.2 for women in March 2020 before dropping over the summer then rising again over Autumn and Winter 2020/21), but between January and April 2021 mean scores for women varied from around 5 to 5.5.<sup>61</sup> The mean GAD-7 score for women in our survey was 6.64 (weighted for age). Although these figures are not directly comparable due to differences in sampling and methodology (e.g., the UCL figures are for the UK, whereas ours are only for England and Wales), the apparent disparity suggests that farming women may be particularly vulnerable to suffering from generalized anxiety.

A limitation of our study is that, because it primarily sought to establish the current health and wellbeing status of the farming population, it was only able to touch on some of the factors potentially associated with poor/good mental health rather than explore potential explanations for this status in significant depth. Further research is thus needed to more fully explore the multiple social, cultural, and economic (as well as biological) factors that might help explain the processes underlying mental health problems within this community. A consideration of factors that might be especially relevant to farm women is particularly called for to understand why they appear to have higher anxiety levels than both farm men and non-farm women.

There are some clues within the wider literature on farm women about other issues that may conceivably be linked to mental health problems in this group, but which we did not investigate in this study. For instance, persistent gender inequalities and the implications for women of a strong culture of patriarchy within agriculture have long been discussed.<sup>62</sup> Women are arguably beginning to receive greater recognition for their agricultural work and are more visible and active in the labor market than in the past,<sup>24</sup> but they continue to experience occupational closure through the predominantly male inheritance of land and perceptions of farming as a male activity.<sup>63</sup> Structural inequalities in agricultural policy and related statistics may add to this issue<sup>32,33</sup>. Women are less likely to

inherit land<sup>33</sup> and to be identified as a potential successor<sup>64</sup> than men, and traditional gendered divisions of labor can serve to silence the role of women within family farm businesses.<sup>65</sup> Furthermore, the positioning of motherhood as “a central (if not *the* central) facet of women’s identities in rural areas”<sup>[66, p.1]</sup> places the onus of childcare on women, yet they are frequently compelled to juggle this role with off-farm employment, the management of diversified enterprises, and/or other roles such as the care of other family members. This not only increases the workload and related pressures for farm women, but can also create tensions within the family through challenging traditional male identities that center the man as the primary breadwinner.<sup>24</sup> Issues such as domestic violence and women’s experiences of fear and crime in rural areas<sup>67,68</sup> are also likely to be pertinent to understanding the myriad of factors affecting farm women’s mental health.

## Conclusion

Despite finding that a large proportion (42%) of women in our survey were not considered to be experiencing anxiety at the time of completing the questionnaire, our findings broadly reflect those of wider population studies<sup>39</sup> in terms of identifying demographic groups that are particularly likely to suffer from GAD, with women and younger people appearing to be more at risk. The identification of associations between anxiety and a variety of social and economic stress factors, including feelings of loneliness and poor perceptions of business viability, provide statistical affirmation of intuitive expectations about related issues and reiterate challenges that have been discussed elsewhere in the agricultural social sciences. In some respects, our findings are, therefore, not particularly surprising, but this does not detract from their importance, particularly since farming women have not received the attention they deserve when it comes to research on mental health. The study has provided unparalleled quantitative evidence of concerning levels of anxiety among farming women, and this should be seen as a call to action both within and outside of the agricultural community, particularly since we have pointed to potential disparities between farming and non-farming

females. Although our study was confined to farms in England and Wales, women living and/or working in agriculture elsewhere in the world face comparable challenges and may be similarly vulnerable to suffering from anxiety and other mental health problems. Further research and action focusing on the health and wellbeing of this cohort internationally is thus also important.

The factors contributing to anxiety and related mental health problems are multiple and complex, and we have only been able to scratch the surface of a few of them in this paper, but our findings indicate that addressing only the symptoms of mental health problems will be insufficient, and there is a need to reduce some of the stressors commonly affecting farm women by, for instance, providing greater business-related support and seeking opportunities to help farm women build and maintain stronger social relationships. We are, however, unable to explain at this juncture why anxiety is affecting a higher proportion of farm women than farm men. We suspect that women may be facing a number of additional and/or varying challenges in the course of their farming lives that have implications for their mental health, but this is clearly a question that deserves much greater research attention in the future.

## Notes

- 1 These included other validated survey instruments such as the EQ-5D-3 L and EQ-VAS (to assess health-related quality of life) and the Warwick-Edinburgh Mental Wellbeing Scale, as well as bespoke questions designed by the research team.
- 2 LFA is the acronym for Less Favoured Area, which is a term used within the UK and European Union to refer to areas, such as uplands, where natural conditions (e.g. soil and climate) are less favourable for agricultural production.

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## Data availability statement

The datasets generated and/or analysed during the current study are not publicly available due to restrictions imposed by the funder but are available via the corresponding author on reasonable request.

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