

Article

Characteristics of adults experiencing energy and food insecurity in Great Britain: 22 November to 18 December 2022

Understanding the characteristics associated with experiencing energy and food insecurity; logistic regression analysis using data from the Winter Survey.

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1 . Main points

- Adults who rent their homes had higher odds of experiencing some form of energy (2.9 higher odds) and food insecurity (3.2 higher odds) than those who own their property outright.
- Adults with an annual personal income below £30,000 had between 2.1 and 2.6 higher odds of experiencing some form of energy insecurity than adults earning £40,000 or more; while those with a personal income below £40,000 had between 1.7 and 3.1 higher odds of experiencing some form of food insecurity than adults earning £40,000 or more.
- Adults who reported moderate-to-severe depressive symptoms had higher odds of experiencing some form of energy (2.3 higher odds) and food insecurity (3.1 higher odds) than those with no-to-mild depressive symptoms.
- Adults aged 30 to 64 years had between 1.5 and 1.8 higher odds of experiencing some form of energy insecurity than those aged 65 years and over; while adults aged 16 to 64 years had between 2.0 and 4.6 higher odds of experiencing some form of food insecurity than those aged 65 years and over.
- There was no difference between adults reporting some form of energy insecurity by region; however, adults living in the North East, East or North West of England had higher odds of experiencing some form of food insecurity (2.6, 2.0 and 1.8 higher odds, respectively) than adults living in London.

This release shows the likelihood of different population groups having experienced some form of energy and food insecurity. Because of differences in definitions, energy insecurity and food insecurity odds ratio estimates should not be directly compared.

2 . Overview of analysis

Our [Impact of winter pressures on different population groups in Great Britain: 22 November to 18 December 2022 article](#) highlighted how different groups are affected by increases in the cost of living, or are having difficulty accessing NHS services.

Using the same dataset, we carried out logistic regression analyses to identify which characteristics are associated with experiencing some form of energy or food insecurity this winter, and to determine the magnitude and significance of this association.

Logistic regression allowed us to understand whether adults with certain characteristics had higher or lower odds of experiencing some form of energy or food insecurity when compared with a specific reference group, after taking into account a broad range of personal characteristics that could be associated with energy or food insecurity.

If a particular group has an odds ratio of more than 1, they are more likely to report having experienced some form of energy or food insecurity than the reference group. If a particular group has an odds ratio of less than 1, they are less likely to report having experienced some form of energy or food insecurity than the reference group.

3 . Characteristics associated with experiencing energy insecurity

Energy insecurity refers to the inability of a household to meet its basic energy needs, such as heating their homes and having a warm bath. Energy insecurity is multifaceted, so we have produced a combined measure to identify adults who are finding it difficult to meet their energy needs in different ways.

In this release, adults experiencing one or more of the following were considered to experience some form of energy insecurity (for brevity, from now on “energy insecurity”):

- falling behind on payments for their gas or electricity bills
- finding it very difficult to afford energy bills
- never, or hardly ever, able to keep warm in their home

See [Section 8: Measuring the data](#) for a description of how the combined energy insecurity measure was developed.

After controlling for a range of characteristics, we found that experiencing energy insecurity was associated with:

- tenure: renters were almost three times (odds ratio equals 2.9) more likely to experience energy insecurity than those who own their property outright
- income: adults with an annual personal income below £30,000 were more likely (odds ratio between 2.1 and 2.6 higher odds) to report experiencing energy insecurity than adults with an annual personal income of £40,000 or more
- depressive symptoms: adults reporting moderate-to-severe depressive symptoms were over two times more likely (odds ratio equals 2.3) to report experiencing energy insecurity than adults with no-to-mild symptoms
- age: adults aged 30 to 64 years were more likely to experience some degree of energy insecurity (odds ratio between 1.5 to 1.8) when compared with adults aged 65 years and over

Other characteristics significantly associated with experiencing energy insecurity were ethnicity, having a dependent child, and disability status (see Figure 1).

Figure 1: Characteristics associated with experiencing energy insecurity

Adults in Great Britain, 22 November to 18 December 2022

Notes:

1. An [odds ratio](#) indicates the likelihood of experiencing some form of energy insecurity, given a particular characteristic compared with the reference group.
2. Figure 1 shows statistically significant results from the model. All model results can be found in the [Characteristics of adults experiencing energy and food insecurity in Great Britain dataset](#).

Download the data

[.xlsx](#)

4 . Characteristics associated with experiencing food insecurity

Food insecurity refers to the inability of households to acquire enough food to lead a healthy life. Food insecurity is also a multifaceted problem. Therefore, as with energy insecurity, we have produced a combined measure to capture adults who are experiencing different dimensions of food insecurity.

In this release, adults experiencing one or more of the following were considered to experience some form of food insecurity (for brevity, from now on “food insecurity”):

- being very, or somewhat, worried in the past two weeks that their food would run out before they have got money to buy more
- running out of food and being unable to afford to buy more in the past two weeks
- definitely, or tending to, disagree that they or their household can afford to eat a balanced diet

After controlling for a range of characteristics, we found that experiencing food insecurity was associated with:

- age: adults aged 16 to 64 years were more likely (between 2.0 and 4.6 higher odds) to experience food insecurity when compared with adults aged 65 years and over
- tenure: renters were over three times (odds ratio equals 3.2) more likely to report experiencing food insecurity than those who own their property outright
- depressive symptoms: adults reporting moderate-to-severe depressive symptoms were over three times (odds ratio equals 3.1) more likely to report experiencing food insecurity than adults with no-to-mild symptoms
- income: adults with an annual personal income below £40,000 were more likely (between 1.7 and 3.1 higher odds) to experience food insecurity than adults earning £40,000 or more
- region: adults in the North East (odds ratio equals 2.6), the East of England (odds ratio equals 2.0) and the North West (odds ratio equals 1.8) were all more likely to report experiencing food insecurity than adults living in London

Other significant characteristics included ethnicity, employment status, disability status, having a dependent child, and education (see Figure 2).

Figure 2: Characteristics associated with experiencing food insecurity

Adults in Great Britain, 22 November to 18 December 2022

Notes:

1. An [odds ratio](#) indicates the likelihood of experiencing food insecurity, given a particular characteristic compared with the reference group.
2. Figure 2 shows statistically significant results from the model. All model results can be found in the [Characteristics of adults experiencing energy and food insecurity in Great Britain dataset](#).

Download the data

[.xlsx](#)

5 . Controlling for socioeconomic characteristics

To better understand the effect of adults' socioeconomic circumstances on energy and food insecurity, our main model controlled for the following socioeconomic factors alongside a range of other characteristics:

- highest education level
- employment status
- annual personal income
- housing tenure

We found that being at risk of cold-related illness, being single, divorced or separated, aged 16 to 29 years, or living in the North West of England were initially associated with experiencing energy insecurity. However, this relationship disappeared when we included socioeconomic factors.

We also found that having diabetes, being single, divorced or separated and living in the South West of England, Yorkshire and The Humber, or Scotland were initially associated with experiencing food insecurity. However, this relationship disappeared when we included socioeconomic factors.

This suggests that these characteristics, while associated with energy or food insecurity, were no longer significant when controlling for socioeconomic factors.

The results from these additional models can be found in our [Characteristics of adults experiencing energy and food insecurity in Great Britain dataset](#).

6 . Characteristics of adults experiencing energy and food insecurity in Great Britain data

[Characteristics of adults experiencing energy and food insecurity in Great Britain](#)

Dataset | Released 13 February 2023

Logistic regression results showing the characteristics associated with experiencing some form of energy and food insecurity.

7 . Glossary

Food insecurity measures

Our Winter Survey adapted three questions from the “Household stage 1 module” of the [United States Department of Agriculture’s \(USDA\) food security survey \(PDF, 214KB\)](#) to identify the proportion of adults who are finding it difficult to afford enough food or a balanced diet.

Annual personal income

Personal annual gross income is self-reported and therefore should be treated with caution. A respondent’s income information does not represent equivalised household income, which takes into account all income from all household members, adjusting for the fact that households with more people will need a higher income to achieve the same standard of living as households with fewer members.

Personal annual gross income includes all income received from a range of sources, including earnings from employment and self-employment, pension, benefits and interest from savings, investments, and property.

Moderate-to-severe depressive symptoms

We use the two-item version of the [Patient Health Questionnaire \(PHQ-2\) \(PDF, 131KB\)](#) to identify adults with depressive symptoms, to have a better understanding of the impact of winter pressures on these adults. Respondents were asked the following questions, and were presented with four response options ranging from 0 (not at all) to 3 (nearly every day):

- over the last two weeks, how often have you been bothered by having little interest or pleasure in doing things?
- over the last two weeks, how often have you been bothered by feeling down, depressed or hopeless?

A “depressive symptoms” score was then derived by summing both responses chosen, resulting in a score ranging from 0 to 6. A person’s PHQ-2 score sits in one of two categories:

- no-to-mild symptoms: this refers to a PHQ-2 score of between 0 and 2 (inclusive)
- moderate-to-severe symptoms: this refers to a PHQ-2 score of between 3 and 6 (inclusive)

If respondents answered “Don’t know” or “Prefer not to say” to either of the questions, they are excluded from this analysis.

Disabled adult

To define disability in this publication, we refer to the “core” definition set out in the [Government Statistical Service harmonisation guidance](#). This identifies a “disabled adult” as a person who has a physical or mental health condition or illness that has lasted, or is expected to last, 12 months or more, and that this reduces their ability to carry out day-to-day activities.

Dependent children

A dependent child is any person aged 0 to 15 years in a household (whether in a family or not), or a person aged 16 to 18 years in full-time education and living in a family with their parent(s) or grandparent(s). It does not include any people aged 16 to 18 years who have a spouse, partner or child living in the household.

Highest qualification

Highest education level, as defined in this [government page covering qualification levels](#), refers to the level of the highest qualification obtained by a respondent when they were initially surveyed by the Opinions and Lifestyle Survey (OPN). Qualifications have been grouped into the following groups for ease of analysis and communications, while producing robust estimates based on sample sizes:

- degree or equivalent: level 6 or higher qualification obtained anywhere
- below degree level (including GCSEs, A Levels or equivalent)
- other qualification obtained in the UK not included in the other categories, or any qualification obtained outside the UK, which is not a degree
- none: no formal qualifications

At risk of cold-related illness

Exposure to cold temperatures can have negative effects on people’s health. People who are particularly at risk of cold-related illnesses include those:

- aged 65 years or older
- who are pregnant
- with a cardiovascular condition
- with a lung condition
- with a rheumatic condition
- with a mental health condition diagnosed by a doctor
- who have attended hospital because of a fall in the past three months

Given the higher cost of energy this winter, adults who use electrical medical equipment at home (for example, ventilators or humidifiers) are also included in this group.

Economic activity

The “economically inactive – retired” and “economically inactive – other” categories represent people who are not in employment, but are not defined as unemployed because they have not been seeking work within the last four weeks, and/or they are unable to start work in the next two weeks. The “economically inactive – other” category may, for example, include people who are studying, have caring responsibilities or are disabled.

For simplicity, we refer to the category “economically inactive - retired” as “retired”. To ensure sample sizes were large enough to produce robust estimates, those who selected “economically inactive - other” or “unemployed” were combined into one category (“economically inactive or unemployed”). Please note that the “employed or self-employed” category includes unpaid family workers (find more information about this category in [Labour Force Survey – user guidance](#)).

Odds ratio

An odds ratio indicates the likelihood of reporting some form of energy or food insecurity, given a particular characteristic. When a characteristic has an odds ratio of one, this means there is neither an increase nor a decrease in the likelihood of experiencing some form of energy or food insecurity compared with the reference category. An odds ratio greater than one indicates an increased likelihood of experiencing some form of energy or food insecurity compared with the reference category. An odds ratio less than one indicates a decreased likelihood of experiencing some form of energy or food insecurity compared with the reference category.

Confidence intervals

Confidence intervals use the standard error to derive a range in which we think the true value is likely to lie. A confidence interval gives an indication of the degree of uncertainty of an estimate and helps to decide how precise a sample estimate is. It specifies a range of values likely to contain the unknown population value. These values are defined by lower and upper limits.

8 . Measuring the data

Data source, sampling and weighting

This analysis used a pooled dataset of two waves of the Winter Survey. In the first wave (period 22 November to 4 December 2022), we sampled 4,962 households. The responding sample for this period contained 2,524 individuals, representing a 51% response rate. In the second wave (period 7 to 18 December 2022), we sampled 4,935 households. The responding sample for this period contained 2,236 individuals, representing a 45% response rate. This sample was randomly selected from those who had previously completed the Labour Market Survey (LMS) or OPN.

Survey weights were applied to make estimates representative of the population (based on ONS population estimates). Further information on the survey design and quality can be found in our [Opinions and Lifestyle Survey QMI](#).

Selection of dependent variables

Energy insecurity

The combined measure for energy insecurity was created using responses from the following questions:

- Are you behind on payments for your gas or electricity bills?
- How easy or difficult is it to afford your energy bills?
- In the past two weeks, how often were you able to keep comfortably warm in your home?

Adults who did not have a valid answer to any of these questions were removed from the analysis. Of the remaining valid weighted sample, 25% of adults were classed as having experienced some form of energy insecurity.

Food insecurity

The combined measure for food insecurity was created using responses from the following questions:

- In the past two weeks, have you or your household run out of food and could not afford to buy more?
- In the past two weeks, how worried or unworried have you been that your food would run out before you had got money to buy more?
- To what extent do you agree or disagree you or your household can afford to eat a balanced diet?

Adults who did not have a valid answer to any of these questions were removed from the analysis. Of the remaining valid weighted sample, 20% of adults were classed as having experienced some form of food insecurity.

We looked at the distribution of responses across the sample to determine the response options used to classify adults as "experiencing some form of food or energy insecurity" (see response options in [Section 3: Characteristics associated with experiencing energy insecurity](#) and [Section 4: Characteristics associated with experiencing food insecurity](#)). This approach allowed us to identify a comparable proportion of adults who were affected by food or energy insecurity.

Selection of independent variables

The selection of independent variables included in the regression models was based on:

- data quality: selecting variables with accurate measurement and sufficient sample size
- assessment of suitability: excluding variables with multicollinearity (where two independent variables are highly correlated with each other)

Missing values were excluded from the regression analysis where a response was not provided for a question or variable included in the model. As a result, 4,710 adults were included in the regression model analysis for energy insecurity and 4,690 adults in the food insecurity model.

A full breakdown of sample sizes and population estimates for each of the characteristics included in the regression models are available in the [accompanying dataset](#).

9 . Related links

[The impact of winter pressures on different population groups in Great Britain: 22 November to 18 December 2022](#)

Article | Released 30 January 2023

In-depth analysis on how increases in the cost of living and difficulty accessing NHS services are impacting people's lives during the autumn and winter months.

[The impact of winter pressures on adults in Great Britain: December 2022](#)

Article | Released 15 December 2022

First insights from our new winter survey providing monthly updates on how increases in the cost of living and difficulty accessing NHS services are impacting people's lives during the autumn and winter months.

[Public opinions and social trends, Great Britain: 25 January to 5 February 2023](#)

Bulletin | Released 10 February 2023

Social insights on daily life and events, including the cost of living, working arrangements and well-being from the Opinions and Lifestyle Survey (OPN).

[Cost of living and depression in adults, Great Britain: 29 September to 23 October 2022](#)

Article | Released 6 December 2022

Analysis into the prevalence of depression among adults in Great Britain in autumn 2022. Exploring this in the context of the rising cost of living.

[Impact of increased cost of living on adults across Great Britain: June to September 2022](#)

Article | Released 25 October 2022

Analysis of the proportion of the population that is affected by an increase in their cost of living, and of the characteristics associated with having difficulty affording or being behind on energy, mortgage or rental payments, using data from the Opinions and Lifestyle Survey.

[Cost of living and higher education students, England: 24 October to 7 November 2022](#)

Bulletin | Released 23 November 2022

Experimental statistics on the behaviours, plans, opinions and well-being of higher education students related to the cost of living. From the Student Cost of Living Insights Study (SCoLIS).

[The cost of living, current and upcoming work: February 2023](#)

Article | Released 8 February 2023

A summary of the ONS's current and future analytical work related to the cost of living.

10 . Cite this article

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