**Online Supplemental Materials**

**Methods**

We followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies.[1]

Study population

UKHLS covers a range of subjects, including health, work, family, and social life. The main questionnaire is completed by everyone in the household aged 16+ face-to-face or online. UKHLS data are accessible via UK Data Service. We excluded data from wave 11 onward due to the impact of the Covid-19 pandemic on our outcomes of interest and on UKHLS fieldwork. Fieldwork for each wave of UKHLS spans a 24-month period that overlaps with previous and/or subsequent waves (i.e. Wave 1 fieldwork was conducted Dec 2008 – Mar 2011, Wave 2 fieldwork was conducted Jan 2010 – Mar 2012); individual participants are interviewed approximately annually.

The relationship to care recipient(s) was captured via the following question *"Who is the person that you look after or help?"* The options were "Parent/parent-in-law," "Grandparent," "Aunt/uncle," "Other relative," "Friend or neighbour," "Client(s) of voluntary organisation," and "Other." Anyone selecting "Client(s) of voluntary organisation" was excluded from our sample.

UKHLS' ethnic minority boost was performed via sampling postal sectors with high proportions of ethnic minority groups based on the 2001 census.[2] Invited households were asked a screening question used to select final included participants:[3] *"Does*

*anyone living at this address come from or have parents or grandparents from any of the following ethnic groups?"*

Outcomes

The SF-36 is extensively validated as a reliable measure across populations,[4] and was adapted to SF-12 for participant ease while maintaining accuracy including for longitudinal research.[5] PCS-12 components relate to physical functioning (limitations in moderate activities/ climbing stairs), physical role limitations (accomplishing less than you would like/ limitations in activities you can do), bodily pain (interfering with normal work), and general health (excellent to poor). MCS-12 components relate to mental health functioning - vitality (energy level), social functioning (health interfering with social activities), emotional role limitations (accomplishing less than you would like/ unable to do activities as carefully), and mental health (feeling calm/ peaceful or downhearted/ blue).[6]

Care characteristics

Residence of recipient (inside or outside household or both) was determined based on the caring questions above. For number of recipients, we calculated a sum of recipients inside and outside household. Weekly hours caring was asked on categorical scale from 0-4 hours to 100+ hours per week/ continuous care. Based on small cell sizes, we combined upper categories (20-34, 35-49, 50-99, 100+ hours) into '20+ hours per week' category. Carers reporting caring inside household were asked which members they cared for, which we used to determine relationship to recipients. For recipients outside household, relationship was asked for the first two. Based on existing literature, three key relationships were considered especially

important: caring for parent, partner, and child. We created three binary variables (given potential for multiple recipients with different relationships) capturing whether participant cared for parent (Y/N), partner (Y/N), child (Y/N), or other (Y/N).

Ethnicity

Ethnicity is captured via the question *"What is your ethnic group?"*, offering single selection among 17 ethnic groups. While we combined several smaller groups into the 'Other' category, we were able to keep the five from the ethnic minority boost separate. The following groups were combined into 'Other:' 'Arab', 'Chinese', 'Gypsy or Irish Traveller', 'Irish', 'Any other Asian background', 'Any other Black background', 'Any other White background', 'White and Asian', 'White and Black African', 'White and Black Caribbean', 'Any other mixed background', and, 'Any other ethnic group'.

Potential confounders

Age, Sex (Male or Female), Marital status (Single/ never married, Married/ civil partnership, Living as a couple, Separated/ divorced, Widowed), Number of children (number of own children in the household under the age of 16 including natural children, adopted children and step children), Highest educational attainment (No qualification, GCSE or equivalent secondary school qualification, A-level or equivalent tertiary school qualification, Other higher education, Degree qualification, or Other qualification), Employment status (Employed (self-employed, paid employment, maternity leave), Unemployed, Retired, Providing family/ home care, Student/ training (full-time student, government training scheme, on apprenticeship), Long-term sick/ disabled, Other (unpaid family business, doing something else)),

Occupational class (National Statistics Socio-Economic Classification (NS-SEC) 3-class version: Management/ professional, Intermediate, Routine, or Not employed), Net monthly equivalised household income (calculated using monthly household income divided by OECD-modified equivalence scale for each household), and baseline Limiting longstanding illness (LLI) (following the approach in existing literature,[7] participants with long-standing illness with difficulties on a limiting area were coded as having LLI; participants without long-standing illness or with long-standing illness but no limiting areas were coded as having no LLI). Two covariates were continuous (age and household income); they were used in continuous form in regression models.

Statistical analysis

Following recommendations in growth curve literature, we applied maximum likelihood estimation, which minimises impact of missing data across waves by using all participants with non-missing outcome in a given wave.[8,9] We included random intercept and random slope to account for the fact that health trajectories may differ at baseline and in rate of change. We used unstructured covariance to allow intercept and slope of health trajectories to correlate. We allowed conditional growth curves by including an interaction term between W1 caring and wave given intercept and slope may vary by W1 caring. We used likelihood ratio tests to assess inclusion of random slopes, addition of quadratic term for wave, and interaction terms between W1 caring and linear and quadratic wave and included items that improved model fit.

Weighting

UKHLS has a complex sample design with multiple boost samples, clustering, and stratification; weights are provided by UKHLS.[10] We used the survey weight at baseline, which takes account of sampling design. We were unable to include weighting for the stratified growth curve models because the models did not converge, possibly as they are not designed for subgroup analysis. We explored this using sensitivity analysis by running unweighted unstratified model to compare vs weighted model to examine magnitude of differences and did not find noteworthy differences (eTable 7).

**Results**

Mental health trajectory: Pooled (unstratified)

Figure 2 shows pooled conditional growth curves, with carers starting at slightly lower MCS vs non-carers and the two groups converging over time as carers' MCS declines less steeply Waves 2-10. Table of results is shown in eTable 4. After adjusting for covariates, caring is associated with worse mental health at baseline by -1.11 points (-1.33, -0.90). While there is a decline in MCS each wave for all (-0.39; -0.43, -0.35), this decline is reduced among carers vs non-carers (0.09; 0.06, 0.13).

Physical health trajectory: Pooled (unstratified)

Figure 2 also shows pooled conditional growth curves, with carers and non-carers starting at similar PCS and carers declining more steeply Waves 2-10. Table of results is shown in eTable 4. After adjusting for covariates, caring is slightly associated with higher baseline PCS (0.21; -0.03, -0.45). While there is a decline in PCS each wave for all (-0.19; -0.23, -0.15), the decline is steeper among carers vs non-carers (-0.13; -0.17, -0.10).

Comparison of stratified crude model and stratified adjusted model

Given some proposed confounders may mediate the causal pathway for effect modification by ethnicity (e.g. education, employment, occupational class, income), we included the stratified crude model (eFigure 1) in addition to the stratified adjusted model that is shown in the main results (Figure 3). Overall, the shape of results is similar in each ethnic group appear largely similar in the two specifications.

**eTable 1.** Full sample by wave

| | Sample size |
|---|---|
| Wave 1 (Dec 2008 – Mar 2011) | 47,015 |
| Wave 2 (Jan 2010 – Mar 2012) | 35,946 |
| Wave 3 (Jan 2011 – Jul 2013) | 31,388 |
| Wave 4 (Jan 2012 – Jun 2014) | 28,721 |
| Wave 5 (Jan 2013 – Jun 2015) | 26,619 |
| Wave 6 (Jan 2014 – May 2016) | 23,495 |
| Wave 7 (Jan 2015 – May 2017) | 22,059 |
| Wave 8 (Jan 2016 – May 2018) | 20,533 |
| Wave 9 (Jan 2017 – May 2019) | 18,716 |
| Wave 10 (Dec 2017 – May 2020) | 17,737 |

Source: UK Household Longitudinal Study, Waves 1-10.

**eTable 2.** Comparison of analytical sample with cases excluded due to missingness

| | Analytical sample | | Excluded due to missingness | | Total | p-value for diff |
|---|---|---|---|---|---|---|
| | N | % / Mean (SE) | N | % / Mean (SE) | N | |
| **Caring status** | | | | | | <0.001 |
| Not carer | 39217 | 83.4% | 3558 | 93.7% | 42,775 | |
| Carer | 7798 | 16.6% | 240 | 6.3% | 8,038 | |
| Total | 47015 | 100.0% | 3798 | 100.0% | 50,813 | |
| **SF-12 PCS** | 47,015 | 49.48 (0.05) | 281 | 51.51 (0.59) | 47,296 | 0.003 |
| **SF-12 MCS** | 47,015 | 50.48 (0.05) | 281 | 50.45 (0.61) | 47,296 | 0.97 |
| **Ethnicity** | | | | | | <0.001 |
| African | 1391 | 3.0% | 143 | 3.7% | 1,534 | |
| Bangladeshi | 1104 | 2.3% | 179 | 4.7% | 1,283 | |
| Caribbean | 1109 | 2.4% | 119 | 3.1% | 1,228 | |
| Indian | 1868 | 4.0% | 202 | 5.3% | 2,070 | |
| Pakistani | 1407 | 3.0% | 202 | 5.3% | 1,609 | |
| White | 35484 | 75.5% | 2617 | 68.4% | 38,101 | |
| Other | 4652 | 9.9% | 364 | 9.5% | 5,016 | |
| Total | 47015 | 100.0% | 3826 | 100.0% | 50,841 | |
| **Age (deciles)** | | | | | | <0.001 |
| 16-19 | 2955 | 6.3% | 432 | 11.1% | 3,387 | |
| 20-29 | 7374 | 15.7% | 774 | 20.0% | 8,148 | |
| 30-39 | 8641 | 18.4% | 664 | 17.1% | 9,305 | |
| 40-49 | 8951 | 19.0% | 736 | 19.0% | 9,687 | |
| 50-59 | 7115 | 15.1% | 549 | 14.2% | 7,664 | |
| 60-69 | 6302 | 13.4% | 364 | 9.4% | 6,666 | |
| 70-79 | 3941 | 8.4% | 214 | 5.5% | 4,155 | |
| 80+ | 1736 | 3.7% | 142 | 3.7% | 1,878 | |
| Total | 47015 | 100.0% | 3875 | 100.0% | 50,890 | |
| **Sex** | | | | | | <0.001 |
| Male | 20699 | 44.0% | 2469 | 63.7% | 23,168 | |
| Female | 26316 | 56.0% | 1404 | 36.3% | 27,720 | |
| Total | 47015 | 100.0% | 3873 | 100.0% | 50,888 | |
| **Marital status** | | | | | | <0.001 |
| Married/ civil partner | 23871 | 50.8% | 2042 | 53.0% | 25,913 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Living as couple | 5324 | 11.3% | 398 | 10.3% | 5,722 | |
| Widowed | 2832 | 6.0% | 158 | 4.1% | 2,990 | |
| Separated/ divorced | 4178 | 8.9% | 106 | 2.7% | 4,284 | |
| Never married | 10810 | 23.0% | 1151 | 29.9% | 11,961 | |
| Total | 47015 | 100.0% | 3855 | 100.0% | 50,870 | |
| **Number of own children under 16 in household** | | | | | | 0.02 |
| 0 | 33044 | 70.3% | 2796 | 72.2% | 35,840 | |
| 1 | 6188 | 13.2% | 444 | 11.5% | 6,632 | |
| 2 | 5283 | 11.2% | 433 | 11.2% | 5,716 | |
| 3+ | 2500 | 5.3% | 202 | 5.2% | 2,702 | |
| Total | 47015 | 100.0% | 3875 | 100.0% | 50,890 | |
| **Highest educational qualification** | | | | | | <0.001 |
| Degree | 10172 | 21.6% | 758 | 20.0% | 10,930 | |
| Other higher education | 5256 | 11.2% | 253 | 6.7% | 5,509 | |
| A-level or equivalent | 8824 | 18.8% | 753 | 19.9% | 9,577 | |
| GCSE or equivalent | 9691 | 20.6% | 811 | 21.4% | 10,502 | |
| Other qualification | 4866 | 10.3% | 348 | 9.2% | 5,214 | |
| No qualification | 8206 | 17.5% | 861 | 22.8% | 9,067 | |
| Total | 47015 | 100.0% | 3784 | 100.0% | 50,799 | |
| **Limiting longstanding illness** | | | | | | <0.001 |
| No | 35460 | 75.4% | 2729 | 94.9% | 38,189 | |
| Yes | 11555 | 24.6% | 146 | 5.1% | 11,701 | |
| Total | 47015 | 100.0% | 2875 | 100.0% | 49,890 | |
| **Employment status** | | | | | | <0.001 |
| Employed | 25143 | 53.5% | 2288 | 59.2% | 27,431 | |
| Unemployed | 3146 | 6.7% | 226 | 5.9% | 3,372 | |
| Retired | 9642 | 20.5% | 488 | 12.6% | 10,130 | |
| Family/ home care | 3501 | 7.4% | 185 | 4.8% | 3,686 | |
| Student/ training | 3463 | 7.4% | 436 | 11.3% | 3,899 | |
| LT sick/ disabled | 1789 | 3.8% | 195 | 5.0% | 1,984 | |
| Other | 331 | 0.7% | 45 | 1.2% | 376 | |
| Total | 47015 | 100.0% | 3863 | 100.0% | 50,878 | |
| **Occupational class** | | | | | | 0.001 |
| Management & professional | 10535 | 22.4% | 784 | 21.3% | 11,319 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Intermediate | 6137 | 13.1% | 501 | 13.6% | 6,638 | |
| Routine | 9300 | 19.8% | 817 | 22.2% | 10,117 | |
| Not employed | 21043 | 44.8% | 1575 | 42.8% | 22,618 | |
| Total | 47015 | 100.0% | 3677 | 100.0% | 50,692 | |
| **Net equivalized monthly household income (tertiles)** | | | | | | <0.001 |
| Low | 22732 | 48.4% | 1675 | 43.6% | 24,407 | |
| Middle | 13726 | 29.2% | 1154 | 30.1% | 14,880 | |
| High | 10557 | 22.5% | 1009 | 26.3% | 11,566 | |
| Total | 47,015 | 100.0% | 3838 | 100.0% | 50,853 | |

Source: UK Household Longitudinal Study, Wave 1.
Percentages and sample sizes unweighted

**eTable 3.** Covariates and caring status by ethnicity

| | **African (n=1,391)** % / Mean (SE) | **Bangladeshi (n=1,104)** % / Mean (SE) | **Caribbean (n=1,109)** % / Mean (SE) | **Indian (n=1,868)** % / Mean (SE) | **Pakistani (n=1,407)** % / Mean (SE) | **White (n=35,484)** % / Mean (SE) | **Other (n=4,652)** % / Mean (SE) | **Total (n=47,015)** % / Mean (SE) | N | **p-value for % diff** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Age** | | | | | | | | | | <0.001 |
| 16-19 | 9.5% | 9.6% | 6.1% | 6.3% | 11.3% | 6.4% | 5.7% | 6.5% | 2,955 | |
| 20-29 | 24.8% | 31.0% | 15.4% | 25.7% | 29.0% | 15.5% | 27.0% | 16.9% | 7,374 | |
| 30-39 | 30.9% | 29.7% | 16.3% | 26.5% | 25.6% | 14.8% | 26.5% | 16.4% | 8,641 | |
| 40-49 | 22.9% | 13.8% | 27.3% | 17.3% | 16.5% | 18.2% | 18.5% | 18.3% | 8,951 | |
| 50-59 | 7.2% | 7.8% | 15.6% | 11.9% | 9.7% | 15.7% | 10.0% | 15.0% | 7,115 | |
| 60-69 | 3.2% | 4.4% | 7.2% | 7.5% | 4.6% | 14.1% | 6.5% | 13.0% | 6,302 | |
| 70-79 | 1.3% | 3.4% | 8.3% | 3.6% | 2.8% | 9.4% | 4.1% | 8.7% | 3,941 | |
| 80+ | 0.3% | 0.2% | 3.7% | 1.2% | 0.5% | 5.8% | 1.6% | 5.2% | 1,736 | |
| Continuous | 35.44 (0.38) | 35.30 (0.75) | 45.05 (0.68) | 39.04 (0.54) | 35.76 (0.49) | 47.67 (0.15) | 39.01 (0.29) | 46.45 (0.14) | 47,015 | <0.001 |
| **Sex** | | | | | | | | | | <0.001 |
| Male | 47.1% | 57.5% | 45.5% | 54.7% | 51.3% | 48.8% | 47.0% | 48.8% | 20,699 | |
| Female | 52.9% | 42.5% | 54.5% | 45.3% | 48.7% | 51.2% | 53.0% | 51.2% | 26,316 | |
| **Marital status** | | | | | | | | | | <0.001 |
| Married/ civil partner | 43.2% | 62.9% | 30.9% | 63.4% | 62.4% | 49.5% | 46.6% | 49.6% | 23,871 | |
| Living as couple | 6.4% | 1.2% | 11.2% | 1.7% | 1.5% | 13.0% | 13.3% | 12.4% | 5,324 | |
| Widowed | 2.4% | 3.0% | 4.6% | 3.0% | 2.5% | 7.3% | 3.5% | 6.7% | 2,832 | |
| Separated/ divorced | 8.9% | 3.6% | 11.6% | 2.6% | 5.6% | 7.8% | 6.6% | 7.6% | 4,178 | |
| Never married | 39.0% | 29.2% | 41.7% | 29.3% | 28.0% | 22.4% | 30.0% | 23.6% | 10,810 | |
| **# own children <16 in household** | | | | | | | | | | <0.001 |
| 0 | 53.3% | 53.3% | 70.1% | 65.9% | 52.5% | 74.5% | 67.1% | 73.1% | 33,044 | |
| 1 | 16.1% | 17.2% | 15.1% | 15.4% | 14.6% | 11.8% | 16.3% | 12.4% | 6,188 | |
| 2 | 18.3% | 13.0% | 11.3% | 13.6% | 15.6% | 9.9% | 12.0% | 10.3% | 5,283 | |
| 3+ | 12.3% | 16.5% | 3.5% | 5.1% | 17.3% | 3.8% | 4.6% | 4.2% | 2,500 | |
| **Highest qualification** | | | | | | | | | | <0.001 |
| Degree | 34.0% | 22.3% | 18.3% | 42.4% | 27.9% | 18.6% | 37.0% | 20.8% | 10,172 | |
| Other higher education | 15.2% | 5.9% | 13.8% | 9.9% | 7.9% | 11.2% | 12.0% | 11.2% | 5,256 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A-level/ equiv | 19.9% | 22.6% | 20.1% | 16.8% | 17.8% | 20.1% | 16.7% | 19.7% | 8,824 | |
| GCSE/ equiv | 14.9% | 19.0% | 22.1% | 13.2% | 18.1% | 22.1% | 11.2% | 21.0% | 9,691 | |
| Other qual | 6.3% | 7.8% | 10.1% | 6.2% | 8.2% | 10.8% | 10.3% | 10.5% | 4,866 | |
| No qual | 9.7% | 22.4% | 15.5% | 11.4% | 20.2% | 17.2% | 12.8% | 16.7% | 8,206 | |
| **LLI** | | | | | | | | | | <0.001 |
| No | 89.1% | 81.9% | 78.9% | 84.8% | 81.2% | 73.8% | 83.9% | 75.2% | 35,460 | |
| Yes | 10.9% | 18.1% | 21.1% | 15.2% | 18.8% | 26.2% | 16.1% | 24.8% | 11,555 | |
| **Employment status** | | | | | | | | | | <0.001 |
| Employed | 50.2% | 45.0% | 51.3% | 60.1% | 43.6% | 55.6% | 60.4% | 55.8% | 25,143 | |
| Unemployed | 13.0% | 10.4% | 13.9% | 7.8% | 10.2% | 5.6% | 7.3% | 6.0% | 3,146 | |
| Retired | 3.3% | 6.0% | 16.8% | 8.4% | 5.1% | 23.9% | 9.1% | 21.9% | 9,642 | |
| Family/ home care | 9.5% | 18.2% | 4.2% | 9.2% | 21.7% | 4.9% | 8.1% | 5.5% | 3,501 | |
| Student/ training | 21.1% | 17.0% | 8.9% | 11.6% | 14.7% | 5.8% | 11.8% | 6.8% | 3,463 | |
| LT sick/ disabled | 2.3% | 2.8% | 4.3% | 2.5% | 3.5% | 3.5% | 2.6% | 3.4% | 1,789 | |
| Other | 0.6% | 0.6% | 0.6% | 0.4% | 1.2% | 0.6% | 0.8% | 0.7% | 331 | |
| **Occupational class** | | | | | | | | | | <0.001 |
| Management/ professional | 21.1% | 13.2% | 21.5% | 28.9% | 13.6% | 23.0% | 27.5% | 23.3% | 10,535 | |
| Intermediate | 8.8% | 14.2% | 12.1% | 14.2% | 13.2% | 13.7% | 12.6% | 13.6% | 6,137 | |
| Routine | 21.4% | 21.1% | 18.4% | 20.4% | 17.7% | 20.8% | 22.2% | 20.8% | 9,300 | |
| Not employed | 48.7% | 51.6% | 48.0% | 36.4% | 55.5% | 42.5% | 37.6% | 42.3% | 21,043 | |
| **Net equivalized monthly household income (tertiles)** | | | | | | | | | | <0.001 |
| Low | 61.3% | 71.6% | 49.1% | 42.8% | 74.7% | 43.7% | 45.3% | 44.5% | 22,732 | |
| Middle | 25.2% | 19.9% | 32.4% | 32.9% | 18.0% | 31.3% | 26.6% | 30.7% | 13,726 | |
| High | 13.5% | 8.5% | 18.4% | 24.2% | 7.2% | 25.0% | 28.1% | 24.7% | 10,557 | |
| Continuous | 1126.31 (30.52) | 1058.65 (62.64) | 1307.41 (42.31) | 1512.54 (46.68) | 977.08 (39.24) | 1528.27 (9.10) | 1575.41 (32.09) | 1515.65 (8.68) | 47,015 | <0.001 |
| **Caring status** | | | | | | | | | | <0.001 |
| Carer | 5.6% | 17.6% | 15.6% | 11.8% | 16.4% | 17.3% | 9.5% | 16.4% | 7,798 | |
| Not carer | 94.4% | 82.4% | 84.4% | 88.2% | 83.6% | 82.7% | 90.5% | 83.6% | 39,217 | |

Source: UK Household Longitudinal Study, Wave 1.
Sample size unweighted, percentage weighted

**eTable 4.** Multi-level linear regression with SF-12 MCS and SF-12 PCS trajectory waves 1-10

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | **Coefficient** | **95% CI** | **Coefficient** | **95% CI** |
| **SF-12 MCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | -1.07 | -1.29- -0.85 | -1.11 | -1.33- -0.90 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | 0.09 | 0.06- 0.13 | 0.09 | 0.06- 0.13 |
| **Wave** | -0.38 | -0.42- -0.34 | -0.39 | -0.43- -0.35 |
| **Wave-squared** | 0.02 | 0.01- 0.02 | 0.02 | 0.01- 0.02 |
| **Constant** | 48.18 | 47.97- 48.39 | 49.93 | 49.50- 50.37 |
| **Random Effects:** | | | | |
| Var(Wave) | 4.52 | 4.24- 4.81 | 4.54 | 4.26- 4.83 |
| Var(Wave-squared) | 0.05 | 0.04- 0.05 | 0.05 | 0.04- 0.05 |
| Var(Cons) | 49.76 | 48.38- 51.17 | 45.18 | 43.88- 46.51 |
| Cov(Wave, Wave-squared) | -0.43 | -0.46- -0.40 | -0.43 | -0.46- -0.40 |
| Cov(Wave, Cons) | -5.01 | -5.52- -4.49 | -4.78 | -5.29- -4.38 |
| Cov(Wave-squared, Cons) | 0.35 | 0.29- 0.40 | 0.33 | 0.28- 0.38 |
| Var(Residual) | 40.54 | 40.00- 41.09 | 40.50 | 39.96- 41.05 |
| **SF-12 PCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | 0.42 | 0.16- 0.68 | 0.21 | -0.03- 0.45 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | -0.14 | -0.17- -0.10 | -0.13 | -0.17- -0.10 |
| **Wave** | -0.17 | -0.21- -0.13 | -0.19 | -0.23- -0.15 |
| **Wave-squared** | -0.01 | -0.01- -0.01 | -0.01 | -0.01- -0.00 |
| **Constant** | 62.45 | 62.22- 62.67 | 61.33 | 60.88- 61.79 |
| **Random Effects:** | | | | |
| Var(Wave) | 4.04 | 3.81- 4.28 | 4.05 | 3.82- 4.30 |
| Var(Wave-squared) | 0.04 | 0.04- 0.04 | 0.04 | 0.04- 0.04 |
| Var(Cons) | 78.65 | 76.98- 80.35 | 59.94 | 58.52- 61.39 |
| Cov(Wave, Wave-squared) | -0.36 | -0.39- -0.34 | -0.37 | -0.39- -0.34 |
| Cov(Wave, Cons) | -3.52 | -3.97- -3.08 | -3.25 | -3.67- -2.83 |
| Cov(Wave-squared, Cons) | 0.15 | 0.10- 0.20 | 0.14 | 0.09- 0.18 |
| Var(Residual) | 30.54 | 30.11- 30.98 | 30.48 | 30.05- 30.92 |

Source: UK Household Longitudinal Study, Waves 1-10.
Weighted using survey weight at baseline.
Model 1 adjusted for baseline age, sex
Model 2 additionally adjusted for baseline marital status, # own children under 16 in household, highest educational qualification, LLI (for MCS), employment status, occupational class, net equivalized monthly household income

**eTable 5.** Multi-level linear regression with SF-12 MCS and SF-12 PCS trajectory waves 1-10, with ethnicity interaction

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | **Coefficient** | **95% CI** | **Coefficient** | **95% CI** |
| **SF-12 MCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | -0.88 | -3.07- 1.32 | -0.68 | -2.90- 1.55 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | -0.28 | -0.81- 0.25 | -0.29 | -0.81- 0.23 |
| **Wave** | -0.34 | -0.46- -0.21 | -0.34 | -0.46- -0.22 |
| **Wave-squared** | 0.02 | 0.01- 0.02 | 0.02 | 0.01- 0.02 |
| **Ethnicity#Care#Wave interaction** | | | | |
| African#Care#Wave | Ref * | - | Ref ** | - |
| Bangladeshi#Care#Wave | 0.34 | -0.34- 1.02 | 0.31 | -0.36- 0.98 |
| Caribbean#Care#Wave | 0.20 | -0.42- 0.83 | 0.23 | -0.39- 0.84 |
| Indian#Care#Wave | 0.32 | -0.27- 0.91 | 0.34 | -0.24- 0.92 |
| Pakistani#Care#Wave | 0.43 | -0.15- 1.01 | 0.42 | -0.15- 1.00 |
| White#Care#Wave | 0.38 | -0.15- 0.91 | 0.39 | -0.14- 0.91 |
| Other#Care#Wave | 0.36 | -0.20- 0.91 | 0.36 | -0.19- 0.91 |
| **Constant** | 48.56 | 48.00- 49.12 | 50.69 | 50.00- 51.38 |
| **Random Effects:** | | | | |
| Var(Wave) | 4.52 | 4.25- 4.82 | 4.54 | 4.26- 4.83 |
| Var(Wave-squared) | 0.05 | 0.04- 0.05 | 0.05 | 0.04- 0.05 |
| Var(Cons) | 49.67 | 48.29- 51.09 | 45.11 | 43.82- 46.45 |
| Cov(Wave, Wave-squared) | -0.43 | -0.46- -0.40 | -0.43 | -0.46- -0.40 |
| Cov(Wave, Cons) | -5.02 | -5.53- -4.50 | -4.79 | -5.29- -4.29 |
| Cov(Wave-squared, Cons) | 0.35 | 0.29- 0.40 | 0.33 | 0.28- 0.28 |
| Var(Residual) | 40.53 | 39.99- 41.08 | 40.49 | 39.95- 41.04 |
| **SF-12 PCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | -1.59 | -3.67- 0.50 | -1.83 | -3.83- 0.17 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | 0.17 | -0.30- 0.64 | 0.19 | -0.27- 0.65 |
| **Wave** | -0.22 | -0.33- -0.11 | -0.26 | -0.37- -0.15 |
| **Wave-squared** | -0.01 | -0.01- -0.01 | -0.01 | -0.01- -0.00 |
| **Ethnicity#Care#Wave interaction** | | | | |
| African#Care#Wave | Ref *** | - | Ref **** | - |
| Bangladeshi#Care#Wave | 0.14 | -0.42- 0.69 | 0.11 | -0.44- 0.65 |
| Caribbean#Care#Wave | -0.35 | -0.92- 0.22 | -0.34 | -0.90- 0.21 |
| Indian#Care#Wave | -0.14 | -0.65- 0.38 | -0.14 | -0.65- 0.36 |
| Pakistani#Care#Wave | -0.27 | -0.80- 0.26 | -0.29 | -0.81- 0.23 |
| White#Care#Wave | -0.31 | -0.78- 0.16 | -0.33 | -0.79- 0.13 |
| Other#Care#Wave | -0.32 | -0.81- 0.17 | -0.34 | -0.83- 0.14 |
| **Constant** | 62.67 | 62.14- 63.19 | 62.20 | 61.55- 62.85 |
| **Random Effects:** | | | | |
| Var(Wave) | 4.04 | 3.81- 4.29 | 4.05 | 3.82- 4.30 |
| Var(Wave-squared) | 0.04 | 0.04- 0.04 | 0.04 | 0.04- 0.04 |
| Var(Cons) | 78.29 | 76.61- 80.01 | 59.71 | 58.29- 61.17 |
| Cov(Wave, Wave-squared) | -0.37 | -0.39- -0.34 | -0.37 | -0.39- -0.34 |
| Cov(Wave, Cons) | -3.61 | -4.06- -3.16 | -3.31 | -3.74- -2.89 |
| Cov(Wave-squared, Cons) | 0.16 | 0.11- 0.21 | 0.14 | 0.10- 0.19 |
| Var(Residual) | 30.53 | 30.10- 30.97 | 30.47 | 30.04- 30.90 |

Source: UK Household Longitudinal Study, Waves 1-10.
Weighted using survey weight at baseline.
* Test for interaction (testparm): F=3.48 p=0.75

** Test for interaction (testparm): F=3.44 p=0.75
*** Test for interaction (testparm): F=13.43 p=0.037
**** Test for interaction (testparm): F=13.32 p=0.038
Model 1 adjusted for baseline age, sex, nativity, ethnicity, ethnicity*care interaction, ethnicity*wave interaction
Model 2 additionally adjusted for baseline marital status, # own children under 16 in household, highest educational qualification, LLI (for MCS), employment status, occupational class, net equivalized monthly household income

**eTable 6.** Multi-level linear regression with SF-12 PCS trajectory waves 1-10, stratified by ethnic group

| | African | | Bangladeshi | | Caribbean | | Indian | | Pakistani | | White | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Coef** | **95% CI** | **Coef** | **95% CI** | **Coef** | **95% CI** | **Coef** | **95% CI** | **Coef** | **95% CI** | **Coef** | **95% CI** | **Coef** | **95% CI** |
| **Caring status W1** | | | | | | | | | | | | | | |
| Not carer | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Carer | -1.93 | -3.52- -0.34 | -2.01 | -3.25- -0.78 | -0.43 | -1.86-0.99 | -1.30 | -2.33- -0.27 | -1.16 | -2.25- -0.08 | 0.35 | 0.10-0.60 | -0.31 | -1.04-0.43 |
| **W1 Caring#Wave interaction** | | | | | | | | | | | | | | |
| Not carer#Wave | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Carer#Wave | 0.16 | -0.22-0.55 | 0.24 | -0.02-0.51 | -0.20 | -0.47-0.07 | 0.05 | -0.15-0.24 | -0.06 | -0.27-0.15 | -0.14 | -0.18- -0.10 | -0.17 | -0.31- -0.04 |
| **Wave** | -0.64 | -0.90- -0.39 | -0.96 | -1.25- -0.66 | -0.26 | -0.54-0.02 | -0.49 | -0.70- -0.29 | -0.80 | -1.04- -0.56 | -0.16 | -0.20- -0.12 | -0.35 | -0.47- -0.23 |
| **Wave-squared** | 0.04 | 0.01-0.07 | 0.08 | 0.05-0.12 | 0.00 | -0.03-0.03 | 0.03 | 0.01-0.05 | 0.07 | 0.04-0.09 | -0.01 | -0.02- -0.01 | 0.01 | 0.00-0.03 |
| **Constant** | 63.99 | 61.61-66.37 | 65.53 | 62.19-68.88 | 62.49 | 58.82-66.17 | 61.08 | 59.08-63.08 | 61.50 | 58.82-64.17 | 62.21 | 61.62-62.80 | 60.24 | 58.93-61.56 |
| **Random Effects:** | | | | | | | | | | | | | | |
| Var(Wave) | 2.91 | 1.80-4.70 | 1.33 | 0.37-4.76 | 4.83 | 3.43-6.79 | 3.69 | 2.76-4.93 | 2.57 | 1.52-4.34 | 3.46 | 3.27-3.66 | 3.15 | 2.59-3.83 |
| Var(Wave-squared) | 0.03 | 0.02-0.05 | 0.01 | 0.00-0.07 | 0.05 | 0.03-0.07 | 0.04 | 0.03-0.05 | 0.03 | 0.01-0.05 | 0.03 | 0.03-0.03 | 0.03 | 0.02-0.04 |
| Var(Cons) | 21.81 | 17.89-26.59 | 28.71 | 23.05-35.76 | 51.09 | 44.52-58.62 | 30.43 | 26.59-34.82 | 33.21 | 28.26-39.02 | 64.53 | 63.22-65.87 | 37.78 | 35.14-40.60 |
| Cov(Wave, Wave-squared) | -0.26 | -0.41- -0.11 | -0.11 | -0.29-0.076 | -0.45 | -0.63- -0.27 | -0.35 | -0.46- -0.23 | -0.23 | -0.38- -0.08 | -0.30 | -0.32- -0.28 | -0.28 | -0.35- -0.22 |
| Cov(Wave, Cons) | 0.07 | -2.01-2.14 | 0.29 | -2.48-3.07 | -2.61 | -5.40-0.18 | -2.24 | -3.95- -0.53 | -1.02 | -3.24-1.19 | -2.66 | -3.07- -2.25 | -1.94 | -3.01- -0.87 |
| Cov(Wave-squared, Cons) | -0.12 | -0.35-0.11 | -0.11 | -0.42-0.19 | 0.13 | -0.18-0.44 | 0.13 | -0.05-0.31 | -0.06 | -0.30-0.18 | 0.06 | 0.02-0.11 | 0.10 | -0.02-0.21 |
| Var(Residual) | 36.75 | 34.72-38.90 | 44.54 | 41.62-47.67 | 36.89 | 34.89-39.01 | 37.50 | 35.97-39.09 | 42.31 | 40.23-44.51 | 31.83 | 31.57-32.08 | 33.56 | 32.71-34.44 |

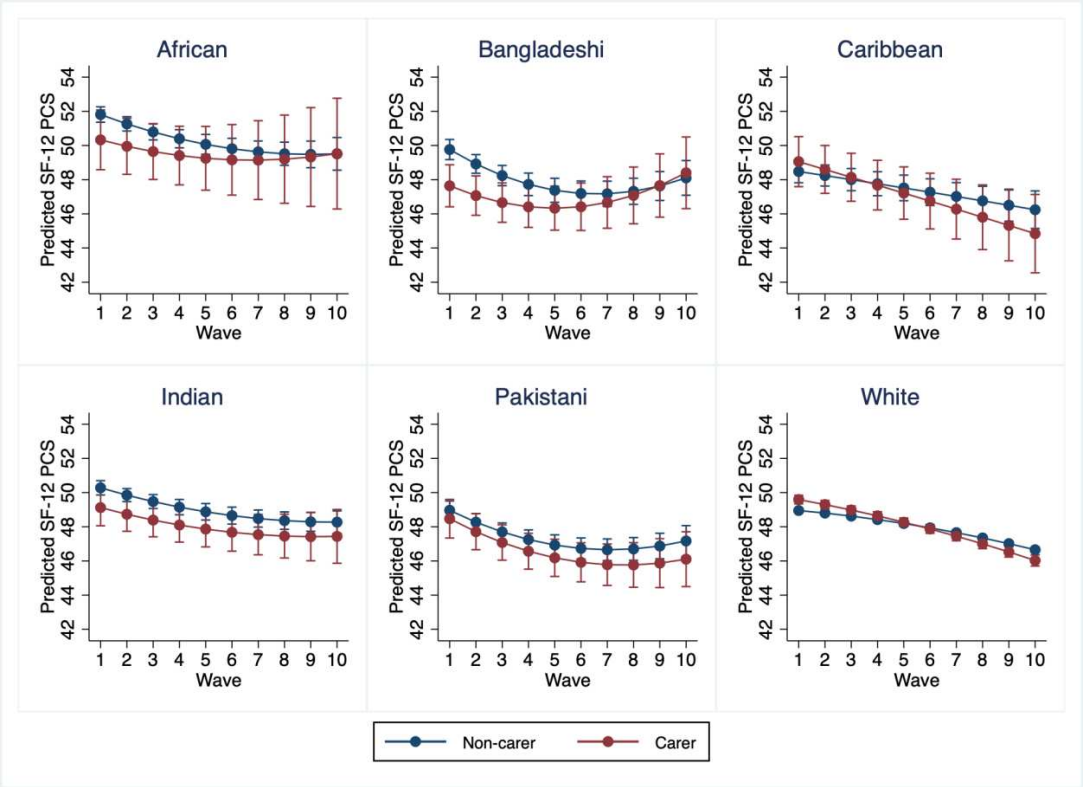
Source: UK Household Longitudinal Study, Waves 1-10.

Model adjusted for baseline age, sex, marital status, # own children under 16 in household, highest educational qualification, employment status, occupational class, net equivalized monthly household income, and nativity.

**eTable 7.** Sensitivity analysis: Unweighted multi-level linear regression with SF-12 PCS trajectory waves 1-10

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | **Coefficient** | **95% CI** | **Coefficient** | **95% CI** |
| **SF-12 MCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | -1.07 | -1.28- -0.86 | -1.12 | -1.33- -0.92 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | 0.09 | 0.06- 0.13 | 0.09 | 0.06- 0.13 |
| **Wave** | -0.35 | -0.39- -0.31 | -0.36 | -0.40- -0.32 |
| **Wave-squared** | 0.01 | 0.01- 0.02 | 0.01 | 0.01- 0.02 |
| **Constant** | 48.06 | 47.85- 48.28 | 49.88 | 49.45- 50.31 |
| **Random Effects:** | | | | |
| Var(Wave) | 3.69 | 3.47- 3.92 | 3.68 | 3.47- 3.92 |
| Var(Wave-squared) | 0.04 | 0.03- 0.04 | 0.04 | 0.03- 0.04 |
| Var(Cons) | 49.69 | 48.60- 50.81 | 44.49 | 43.46- 45.54 |
| Cov(Wave, Wave-squared) | -0.34 | -0.36- -0.31 | -0.34 | -0.36- -0.31 |
| Cov(Wave, Cons) | -4.13 | -4.55- -3.72 | -3.77 | -4.17- -3.37 |
| Cov(Wave-squared, Cons) | 0.26 | 0.21- 0.30 | 0.23 | 0.19- 0.27 |
| Var(Residual) | 43.70 | 43.38- 44.02 | 43.71 | 43.39- 44.03 |
| **SF-12 PCS** | | | | |
| **Caring status W1** | | | | |
| Not carer | Ref | - | Ref | - |
| Carer | 0.37 | 0.13- 0.61 | 0.15 | -0.06- 0.37 |
| **W1 Caring#Wave interaction** | | | | |
| Not carer#Wave | Ref | - | Ref | - |
| Carer#Wave | -0.13 | -0.16- -0.09 | -0.13 | -0.16- -0.09 |
| **Wave** | -0.20 | -0.23- -0.16 | -0.22 | -0.26- -0.18 |
| **Wave-squared** | -0.01 | -0.01- -0.00 | -0.00 | -0.01- -0.00 |
| **Constant** | 62.38 | 62.13- 62.64 | 61.20 | 60.72- 61.68 |
| **Random Effects:** | | | | |
| Var(Wave) | 3.45 | 3.27- 3.63 | 3.44 | 3.27- 3.62 |
| Var(Wave-squared) | 0.03 | 0.03- 0.03 | 0.03 | 0.03- 0.03 |
| Var(Cons) | 78.46 | 77.13- 79.82 | 58.81 | 57.72- 59.91 |
| Cov(Wave, Wave-squared) | -0.30 | -0.32- -0.28 | -0.30 | -0.32- -0.28 |
| Cov(Wave, Cons) | -2.69 | -3.08- -2.29 | -2.33 | -2.69- -1.98 |
| Cov(Wave-squared, Cons) | 0.06 | 0.02- 0.11 | 0.05 | 0.01- 0.08 |
| Var(Residual) | 32.67 | 32.43- 32.91 | 32.66 | 32.43- 32.90 |

Source: UK Household Longitudinal Study, Waves 1-10.
Model 1 adjusted for baseline age, sex
Model 2 additionally adjusted for baseline marital status, # own children under 16 in household, highest educational qualification, LLI (for MCS), employment status, occupational class, net equivalized monthly household income




**eFigure 1.** Predicted SF-12 PCS Waves 1-10 by ethnicity, crude
Source: UK Household Longitudinal Study, Waves 1-10.
Model adjusted for baseline age, sex, and nativity. Model includes linear and quadratic term for wave.

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