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Employment status and the prevalence of poor self-rated health. Findings from UK individual-level repeated cross-sectional data from 1978 to 2004

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ABSTRACT

Objectives: To assess, using individual level data, how the proportion of people in different employment statuses may have played a role in the prevalence of poor self-rated health from 1978 to 2004 as there have been major changes in employment patterns in advanced market democracies and employment is an important correlate of health.

Design: Individual-level analysis of repeated cross-sectional surveys.

Setting: UK.

Participants: 125 125 men and 139 535 women of working age (25–59).

Outcome measure: Self-rated general health.

Results: Compared to 1978 there was evidence of higher levels of poor health in the subsequent years. For example, in 2004, the prevalence of poor health was 2.8 (95% CI 1.7 to 3.9) and 1.3 (0.1 to 2.5) percentage points higher than 1978 for men and women, respectively, after adjusting for age. After additional adjustment for socio-economic characteristics, annual differences compared to 1978 increased (5.4 (4.2 to 6.5) and 4.4 (3.2 to 5.6) for men and women in 2004). Further adjustment for employment status, however, attenuated the annual differences in poor health (0.7 (−0.3 to 1.7) for men and 1.5 (0.3 to 2.6) for women in 2004).

Conclusions: These results suggest that the proportion of people in different employment statuses, particularly the proportion in sickness- or disability-related economic inactivity, could play an important role in the prevalence of poor self-rated health in the UK. Whether decreasing economic inactivity would enhance population health is an open question that needs further investigation.

Trial registration: This observational study was not registered.

ARTICLE SUMMARY

Article focus

- There have been major changes in employment (particularly the growth of those out of work sick or disabled) since the 1970s in many Organisation for Economic Co-operation and Development countries.
- Given that self-rated health is associated strongly with employment status the changes in employment may potentially be important for the level of poor health in the population.

Key messages

- Accounting for population increases in socio-economic characteristics associated with good health suggests that self-rated health may have worsened since 1978 for both working age men and women.
- Much of this deterioration disappeared when controlling for employment status.
- There seems to be an association between rising levels of detachment from the labour market for both men and women (even given the rise in women's employment) and the level of poor self-rated health in the population.

Strengths and limitations of this study

- The study uses consistent individual-level data from a long-term survey covering a period of socio-economic change.
- Further work is needed to understand whether decreasing economic inactivity would necessarily lead to improved population health.

INTRODUCTION

Since the late 1970s, there have been substantial social, political and economic changes in the UK and in other advanced market democracies. On the one hand, average levels of education and material wealth have increased in the UK since the 1970s[1] and there have been improvements to overall mortality levels and life expectancy. On the other hand, there have been increases in inequalities in wealth and health.[1 2] Welfare provision has decreased[3] at the same time as there have been large reductions in male employment levels and a related rise in male and female (excluding keeping house) economic inactivity rates.[4]

The rise of economic inactivity has been linked to the de-industrialisation experienced by the labour markets of advanced market democracies and the associated loss of full-time, permanent, well-paid and skilled industrial jobs.[5]

Being out of work has consistently been associated with a heightened risk of mortality,[6] mental ill-health and suicide,[7 8] unhappiness,[9] poor general health[10] and limiting long-term illness.[11 12] This heightened risk of ill-health applies not just to those unemployed (out of work and actively seeking work) but also to those economically inactive (out of work and not actively seeking work).[9 10 13] Indeed, previous work suggested that the distribution of economic inactivity was a potentially important factor behind the social gradient in health and in regional differences in health inequalities.[10 14]

While there has been a wealth of research into the association between unemployment and adverse health, there has been much less which examines economic inactivity. Arguably, it is the latter which is of increasing importance in public health terms as while unemployment is generally cyclical—rising and falling in line with economic contraction and expansion—economic inactivity has increasingly become a structural labour market problem.[4] For example in the UK, according to the 1966 census 94.4% of non-student working age men were in employment and only 3% were economically inactive while in the 2001 census, the figures were 80.2 and 14.5%, respectively.[15] This paper examines the potential impact of the changing pattern of employment status on the prevalence of poor self-rated health from 1978 to 2004 using individual-level data from a repeated cross-sectional survey.

METHODS

The General Household Survey (GHS) is a UK government repeated cross-sectional household survey that started in 1971 (with gaps in 1997 and 1999). It aimed to interview all adults in selected households. The exact sampling procedures to select households have changed over time but it has employed a stratified (by regional geography and area socio-economic characteristics) clustered sample method with the primary sample units being small (as a rough guide 5000 people) geographical areas (electoral wards until 1983 and postcode sectors thereafter). Households were then randomly selected from within these primary sampling units. It covers Britain rather than the whole of the UK (so excludes Northern Ireland). Its long-running nature means that it is highly suitable for assessing change over time. The UK's Office for National Statistics (ONS) has produced a consistent (in terms of making variables as comparable as possible over time) time-series of the surveys 1972–2004 and it is this individual-level dataset—available from the UK Data Archive—that was used in this analysis.[16] Analysis was limited to men and women aged 25–59. The lower age limit was chosen to limit the likelihood of people still being in higher education. Although state retirement age in the UK for the study period was 65 for men and 60 for women, it is common practice to restrict analysis to age 59 and below to limit the number of people who have taken voluntary early retirement straight from paid employment.

The health outcome was self-rated general health, with respondents asked 'Over the last 12 months, would you say your health has on the whole been: good; fairly good or not good?'. For this analysis, it was recoded as good and fairly good health (0) versus not good (1) and this latter category is referred to as poor health from now on. The question was first asked in 1977 but the introduction to the question was different in this year so 1978 is taken as the reference year. Individual-level employment status was coded as employed, unemployed (out of work but actively seeking work), and the following categories of economic inactivity: retired, in education, keeping house full-time, sick or disabled and other economically inactive. As the employment status variables in the time series file had only three categories (employed, unemployed and economic inactive) we returned to the original annual survey files to compile the more nuanced categories of individual-level economic inactivity. Given variations in question wording over time these more nuanced categories of employment status may be less consistent than the broader three category coding. As a check we reran our main analysis using the three broader categories (employed, unemployed and economic inactive) of employment status for men and for women four categories (splitting keeping house and all other forms of economic inactivity as these showed opposing trends in prevalence). Using these broader categories we obtained very similar results. Single year of age was used in the analysis. Three measures of socio-economic position were used with categories made consistent as possible over time by the ONS, whether the person had a university-level degree or not, whether they lived in owned outright housing, owned with mortgage housing, private rented housing or social (state or housing association) rented housing and finally, whether they lived in a household with car access. Across all years, a total of 10% of men and 4% of women in the sample had missing data for one or more of the variables. In sensitivity analysis we used multiple imputation (implemented using the ice command in Stata) to impute missing data. We did the imputation for men and women and for each year separately. Twenty imputed datasets were created for each year/gender combination. The imputed models were based on all variables already described plus country of residence (England, Wales, Scotland) and marital status. The main results using the imputed datasets are shown in the online supplement.

For the main analysis we pooled data from all the survey years. The prevalence of poor health among individual respondents in all other years (1979–2004) was compared to 1978 using a logistic regression model

containing year dummy variables with standard errors accounting for the household clustering in the survey (although this was minimal as men and women in the same household were analysed separately). The initial model (model A) controlled for age only. Model B additionally adjusted for the socio-economic variables as these are variables associated with self-rated health.[17] Model C then controlled additionally for employment status to assess its impact on the annual differences. In sensitivity analysis we checked the pattern of results using multilevel models where we treated year as a random intercept (individuals nested in years) and these results are shown in the online supplement. Non-response weights are included in the time series General Household Survey file from 2000 onwards (when weights were introduced) and these have been applied in the main analysis (weights are scaled to have a mean of 1 in each year) with each individual in the years prior to 2000 being weighted equally (at 1). As ORs across different logistic models are not directly comparable[18] we also present the main results as adjusted prevalence differences (that are comparable across models[18]) by using the postestimation 'margins' command in Stata. This shows yearly differences on an absolute scale.

Even though each annual GHS sample is relatively large, pooling the data had the advantage of increasing the sample for certain categories of the variables (economic inactivity for example) that in each year were relatively small. Pooling also provided a direct test of year-on-year differences. One disadvantage is that the coefficient for the variables is assumed to be the same over the years. We tested the possible impact of allowing coefficients to vary over the years in two ways. First, in our multilevel modelling we fitted a random coefficient model where we allowed the coefficients for employment status to vary over the years (models allowing all variables (age, socio-economic characteristics and employment status) to vary in the multilevel model unfortunately did not converge).

Second we used decomposition analysis to compare the observed difference in prevalence of poor health between the initial year (1978) and the final year (2004) using separate logistic regression models for each of these years. This means that the coefficients are allowed to be different between the years. This method allows the difference in prevalence of poor health to be separated into the part associated with changes in the characteristics of the population between 2004 and 1978 and that associated with changes in size of coefficients (including the intercept) between 2004 and 1978. For example, comparing an age-adjusted model would mean that the prevalence difference between the 2 years could be assigned to changes in the effect size of the coefficients (in this case the age coefficient and the constant) and that due to changes in the age composition of the population (eg, if the population had a higher average age in 2004 compared to 1978). We apply the same models (A, B and C) from the main analysis. We use the mvdcmp command in Stata to conduct the decomposition.[19] Stata 11.2 was used for the analysis apart from the multilevel modelling that was conducted in MLwiN.

RESULTS

The total sample sizes across all years were 138 932 men and 145 300 women and these were reduced to 125 125 and 139 535, respectively, in the complete case analysis when cases with missing data were excluded. Table 1 includes the response rates and individual year sample sizes for the complete cases.

Table 1 shows that for men the prevalence of poor health was low in 1978 (it was lowest in 1982) and then increased to 10.7% in 2004 a rise of 3.3 percentage points over the period. The rate of poor health was lowest for women in 1984 having declined slightly from 1978, although in the 1990s the rate rose and was just over one percentage point higher at the end of period compared to the start. The rate of poor health was always higher in the case of women than in the case of men over the period.

There was clear change in the socio-economic characteristics of the population over the period with declines in the proportion living in social rented housing and increases in the proportion living in owner occupied housing, living in households with car access and the proportion with degrees (figure 1).

Taking these developments in the socio-economic characteristics of the population into account by controlling for the socio-economic variables in model B (table 2) generally increased annual differences compared to 1978 when model B is compared to model A which controlled only for age differences.

Overall male employment had fallen from 93% to 85% at the end of the period. Figure 2 illustrates the changes in the proportion of people in the various non-employment statuses over time with male unemployment (left panel) being cyclical, peaking in the mid-1980s and the early 1990s recession then falling away and being over taken by those sick or disabled in the late 1990s with this group now being the largest. Other forms of economic inactivity for men showed some increases but remained relatively small. For women, figure 2 (right panel) shows (reading the right hand axis) that there had been a 20 percentage point decline in those keeping home but, as for men, cyclical unemployment, a rise in those sick or disabled overtaking those unemployed and a rise in those retired or in education. However, unlike in the case of men, female employment rose by 13 percentage points over the period from 61% to 74%.

All forms of non-employment were associated with an elevated probability of poor health but those sick or disabled had a particularly strong association (table 2, model C). Controlling for individual-level employment status (model C in table 2) attenuated the ORs for poor

Table 1 Response rates, sample sizes and prevalence of poor health for men and women by year

Year	Response rate* (%)	Number of men	% of men in poor health	Number of women	% of women in poor health
1978	82	6258	7.4	6777	11.3
1979	83	6097	8.0	6557	11.1
1980	82	6129	8.7	6659	12.2
1981	84	6348	7.7	6860	11.4
1982	84	5299	6.9	5784	10.1
1983	82	5030	7.6	5618	11.6
1984	81	4855	7.6	5375	9.5
1985	82	5041	7.3	5542	10.4
1986	84	5175	7.4	5645	10.2
1987	85	5295	7.3	5739	10.5
1988	85	5082	8.0	5578	10.2
1989	84	5205	7.4	5677	10.0
1990	81	4833	7.8	5322	11.0
1991	84	5110	7.8	5614	10.3
1992	83	5070	8.1	5690	9.8
1993	82	4890	7.9	5434	10.8
1994	80	4734	9.6	5398	11.2
1995	80	4705	10.6	5488	11.4
1996	76	4326	8.0	5111	11.4
1998	72	4044	11.3	4740	12.3
2000	67	4008	10.1	4548	12.2
2001	72	4358	10.3	5058	12.1
2002	69	4183	11.1	4818	12.0
2003	70	4885	10.1	5651	12.5
2004	69	4165	10.7	4852	12.8

*Response rates are from http://www.esds.ac.uk/doc/5640/mrdoc/pdf/5640ghs05appendixb.pdf (p. 10).

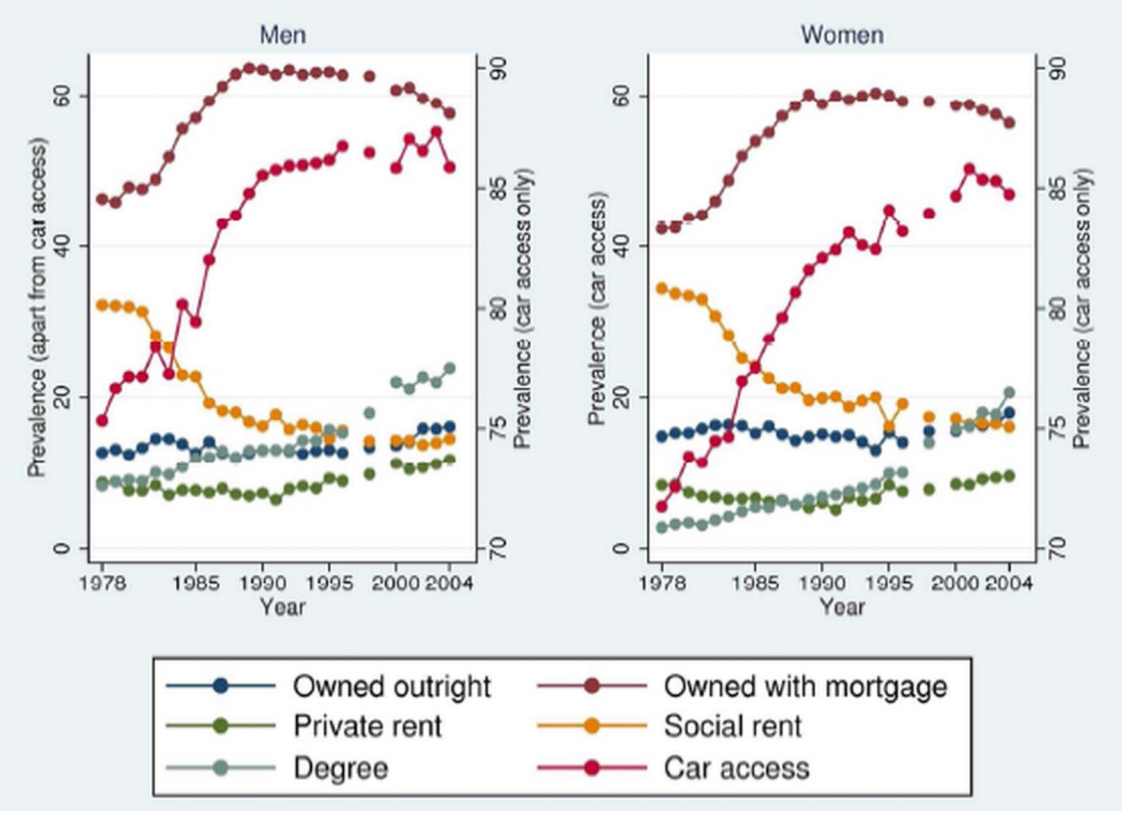

Figure 1 Prevalence of housing tenure types, car access and degree attainment 1978–2004 for men and women aged 25–59.

Table 2 Logistic regression results for rate of poor health for men and women controlling for age (Model A), additionally the listed socio-economic characteristics (model B) and additionally employment status (Model C)

	Men (model A) ORs (95% CIs)	Men (model B) ORs (95% CIs)	Men (model C) ORs (95% CIs)	Women (model A) ORs (95% CIs)	Women (model B) ORs (95% CIs)	Women (model C) ORs (95% CIs)
Age	1.06 (1.05 to 1.06)	1.05 (1.05 to 1.06)	1.04 (1.04 to 1.04)	1.04 (1.03 to 1.04)	1.03 (1.03 to 1.04)	1.03 (1.02 to 1.03)
Year						
1978	1	1	1	1	1	1
1979	1.08 (0.94 to 1.24)	1.09 (0.95 to 1.25)	1.02 (0.89 to 1.18)	0.98 (0.88 to 1.09)	0.98 (0.88 to 1.1)	0.98 (0.88 to 1.1)
1980	1.2 (1.05 to 1.37)	1.24 (1.08 to 1.42)	1.14 (0.99 to 1.31)	1.09 (0.98 to 1.21)	1.11 (1 to 1.24)	1.13 (1.01 to 1.26)
1981	1.05 (0.92 to 1.21)	1.09 (0.95 to 1.25)	0.95 (0.83 to 1.1)	1.01 (0.91 to 1.13)	1.04 (0.93 to 1.16)	1.02 (0.91 to 1.14)
1982	0.93 (0.81 to 1.08)	0.99 (0.85 to 1.15)	0.8 (0.68 to 0.93)	0.89 (0.79 to 1)	0.93 (0.83 to 1.04)	0.9 (0.8 to 1.01)
1983	1.03 (0.89 to 1.19)	1.12 (0.96 to 1.29)	0.83 (0.71 to 0.97)	1.04 (0.93 to 1.16)	1.12 (1 to 1.26)	1.03 (0.91 to 1.16)
1984	1.07 (0.92 to 1.23)	1.24 (1.07 to 1.44)	0.91 (0.78 to 1.06)	0.84 (0.74 to 0.95)	0.94 (0.83 to 1.06)	0.85 (0.75 to 0.96)
1985	1.01 (0.88 to 1.17)	1.17 (1.01 to 1.36)	0.81 (0.69 to 0.95)	0.94 (0.83 to 1.05)	1.06 (0.94 to 1.19)	0.94 (0.84 to 1.06)
1986	1.03 (0.89 to 1.19)	1.27 (1.09 to 1.47)	0.89 (0.76 to 1.04)	0.92 (0.82 to 1.03)	1.06 (0.95 to 1.2)	0.96 (0.85 to 1.08)
1987	1.01 (0.88 to 1.17)	1.3 (1.12 to 1.5)	0.88 (0.76 to 1.03)	0.95 (0.85 to 1.06)	1.13 (1 to 1.27)	0.98 (0.87 to 1.11)
1988	1.11 (0.96 to 1.27)	1.43 (1.24 to 1.65)	0.99 (0.85 to 1.15)	0.91 (0.81 to 1.02)	1.09 (0.97 to 1.23)	0.98 (0.87 to 1.1)
1989	1.01 (0.87 to 1.16)	1.33 (1.15 to 1.54)	0.84 (0.72 to 0.99)	0.9 (0.8 to 1.01)	1.1 (0.97 to 1.23)	0.95 (0.84 to 1.07)
1990	1.1 (0.95 to 1.26)	1.47 (1.27 to 1.7)	0.91 (0.77 to 1.06)	1 (0.89 to 1.12)	1.22 (1.09 to 1.38)	1.06 (0.93 to 1.19)
1991	1.08 (0.94 to 1.24)	1.43 (1.23 to 1.65)	0.86 (0.74 to 1.01)	0.93 (0.83 to 1.04)	1.15 (1.02 to 1.29)	0.93 (0.82 to 1.05)
1992	1.11 (0.97 to 1.28)	1.51 (1.31 to 1.75)	0.85 (0.73 to 0.99)	0.87 (0.77 to 0.98)	1.09 (0.97 to 1.23)	0.85 (0.75 to 0.97)
1993	1.11 (0.96 to 1.28)	1.52 (1.31 to 1.76)	0.79 (0.67 to 0.92)	0.98 (0.88 to 1.1)	1.23 (1.09 to 1.38)	0.95 (0.84 to 1.08)
1994	1.35 (1.17 to 1.55)	1.85 (1.61 to 2.13)	0.97 (0.83 to 1.13)	1.02 (0.91 to 1.15)	1.28 (1.13 to 1.43)	1.01 (0.89 to 1.14)
1995	1.5 (1.31 to 1.71)	2.11 (1.84 to 2.43)	1.1 (0.94 to 1.27)	1.03 (0.92 to 1.15)	1.34 (1.19 to 1.5)	1.02 (0.91 to 1.16)
1996	1.11 (0.96 to 1.29)	1.53 (1.32 to 1.78)	0.71 (0.6 to 0.84)	1.03 (0.92 to 1.16)	1.31 (1.16 to 1.47)	0.94 (0.83 to 1.06)
1998	1.61 (1.4 to 1.85)	2.31 (2 to 2.66)	1.22 (1.05 to 1.43)	1.11 (0.99 to 1.25)	1.47 (1.3 to 1.65)	1.07 (0.94 to 1.21)
2000	1.43 (1.24 to 1.65)	2.06 (1.78 to 2.39)	1.04 (0.88 to 1.23)	1.1 (0.98 to 1.24)	1.47 (1.3 to 1.66)	1.1 (0.97 to 1.25)
2001	1.47 (1.27 to 1.69)	2.13 (1.85 to 2.46)	1.13 (0.97 to 1.32)	1.08 (0.96 to 1.21)	1.46 (1.3 to 1.64)	1.05 (0.93 to 1.2)
2002	1.53 (1.33 to 1.76)	2.25 (1.95 to 2.59)	1.3 (1.11 to 1.52)	1.07 (0.95 to 1.2)	1.45 (1.28 to 1.63)	1.09 (0.96 to 1.24)
2003	1.38 (1.2 to 1.58)	2.03 (1.76 to 2.34)	1.08 (0.93 to 1.27)	1.11 (0.99 to 1.24)	1.5 (1.34 to 1.69)	1.12 (0.99 to 1.27)
2004	1.44 (1.25 to 1.66)	2.09 (1.81 to 2.41)	1.11 (0.95 to 1.31)	1.14 (1.01 to 1.27)	1.56 (1.38 to 1.75)	1.18 (1.04 to 1.33)
No degree		1	1		1	1
Degree		0.49 (0.45 to 0.54)	0.59 (0.54 to 0.65)		0.56 (0.51 to 0.61)	0.66 (0.6 to 0.72)
Owned outright		1	1		1	1
Owned with mortgage		0.75 (0.7 to 0.8)	0.95 (0.89 to 1.02)		0.97 (0.92 to 1.03)	1.1 (1.03 to 1.16)
Private rent		1.15 (1.05 to 1.26)	1.2 (1.08 to 1.33)		1.31 (1.21 to 1.42)	1.31 (1.2 to 1.42)
Social rent		1.88 (1.76 to 2.01)	1.46 (1.35 to 1.58)		1.98 (1.87 to 2.1)	1.72 (1.62 to 1.83)
No car		1	1		1	1
Car		0.54 (0.51 to 0.57)	0.85 (0.8 to 0.91)		0.6 (0.58 to 0.63)	0.73 (0.69 to 0.76)
Employed			1			1
Unemployed			2.01 (1.86 to 2.18)			1.81 (1.65 to 1.98)
Keeping house			2.64 (2.16 to 3.23)			1.81 (1.74 to 1.89)
Sick or disabled			28.07 (26.11 to 30.19)			20.05 (18.68 to 21.52)

Continued

Table 2 Continued

	Men (model A) ORs (95% CIs)	Men (model B) ORs (95% CIs)	Men (model C) ORs (95% CIs)	Women (model A) ORs (95% CIs)	Women (model B) ORs (95% CIs)	Women (model C) ORs (95% CIs)
In education			1.85 (1.33 to 2.58)			1.26 (0.96 to 1.65)
Retired			2.59 (2.2 to 3.04)			2.12 (1.88 to 2.4)
Other inactive			6.28 (5.46 to 7.21)			4.04 (3.44 to 4.75)

health for the years subsequent to 1978 for men and women. Pseudo-r2 statistics indicated that model fit improved from model A (age only—0.04 and 0.02 for men and women, respectively) to model B (plus socio-economic characteristics—0.09 and 0.05) to model C (plus employment—0.22 and 0.13) for men and women, respectively. Absolute prevalence differences compared to 1978 from each model are illustrated for men and women in figures 3 and 4 respectively. These highlight the possible linear increase in poor health year-on-year after controlling for socio-economic characteristics (model B) and the attenuating impact of controlling for employment status (model C). For men controlling for employment status led to yearly differences from 1978 being lower than for the age only model whereas for women it led to differences being very similar to the age only model. In the online supplement results from the multiple imputation are shown and are very similar to those in figures 3, 4. Results (shown in the online supplement) from the multilevel modelling where year was treated as a random intercept rather than a fixed covariate showed a very similar pattern in that a clearer year-on-year increase in poor health from 1978 is apparent in model B compared to model A and that adjustment for employment status (model C) attenuated these differences even when the effect of employment status was allowed to vary over the years (model D).

The results from the decomposition analysis comparing—using separate logistic regression for each year—the unadjusted observed prevalence differences between 2004 and 1978 are presented in table 3. For men, the prevalence was 3.3 percentage points higher in 2004 (as shown in table 1). When adding age only to the model (model A) most of the observed difference was not due to changes in the population characteristics (the population in 2004 was slightly older hence a small part (0.4 percentage points) of the increase was due to this). Socio-economic characteristics of the population had changed in 2004 (figure 1) and model B shows that health in 2004 could have been considerably better (−4.2 percentage points lower) given the socio-economic characteristics in 2004 compared to 1978. Instead, it was the changes in the coefficients that were associated with the actual increase in poor health from 1978 to 2004. However, when employment status is added in model C most of the increase in poor health is now explained by the change in population characteristics from 1978 to 2004. For women, the pattern of results is similar to men for the smaller 1.5 percentage point increase in poor health in 2004 although in model C most of the change is due to changes in coefficients. These results reflect those of the main analysis where controlling for both our socio-economic and employment status variables suggested that for men the difference between 2004 and 1978 would have been slightly lower than the age-adjusted difference and for women it would have been very similar.

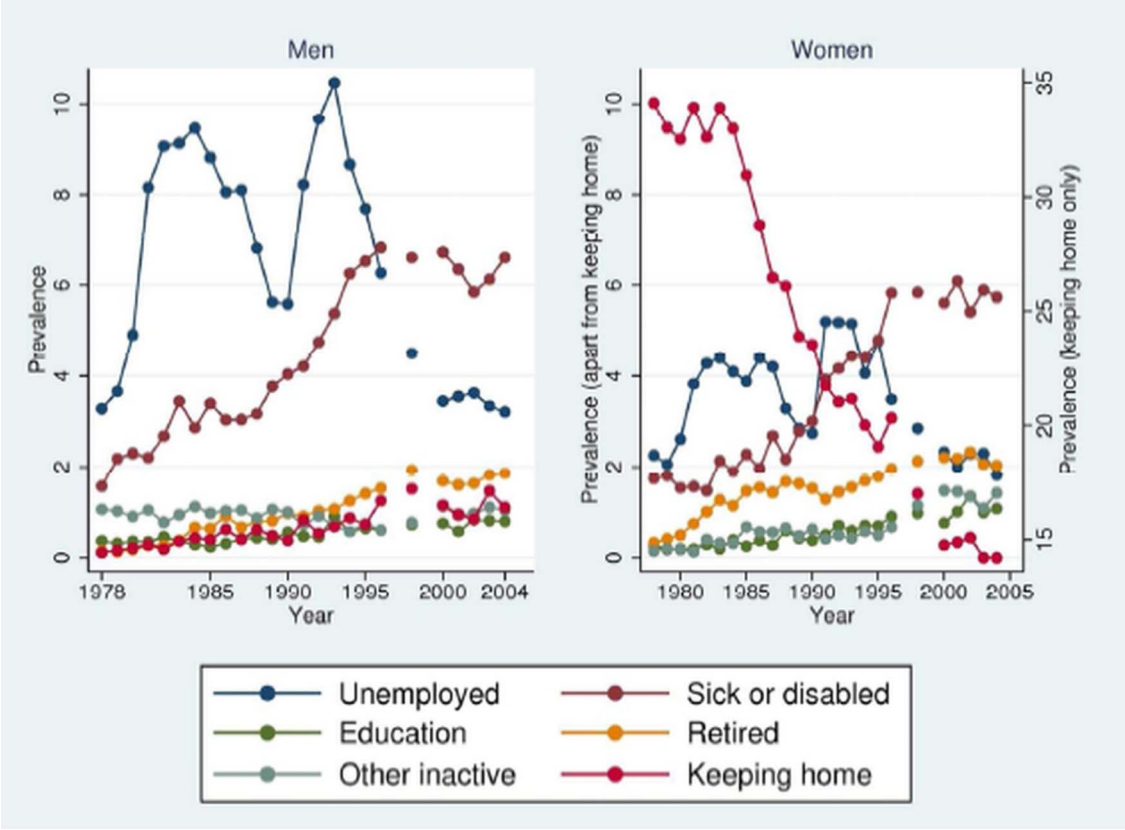

Figure 2 Prevalence of the different types of employment status 1978–2004 from men and women aged 25–59.

DISCUSSION

The individual-level analysis presented here shows that accounting for shifts in the proportion of the working age population in different employment statuses—most notably the rise of sickness- or disability-related economic inactivity—attenuated annual differences in the prevalence of poor self-rated health in the UK population since the late 1970s. This complements previous individual-level analysis into sickness- or disability-related economic inactivity which found that it was a possible major factor behind the social gradient in health[14] as well as a possible influential issue in regional differences in health.[10] The results suggest that a fuller understanding of why employment status is associated with self-rated health could be important for public health. The relationship between employment status and health is

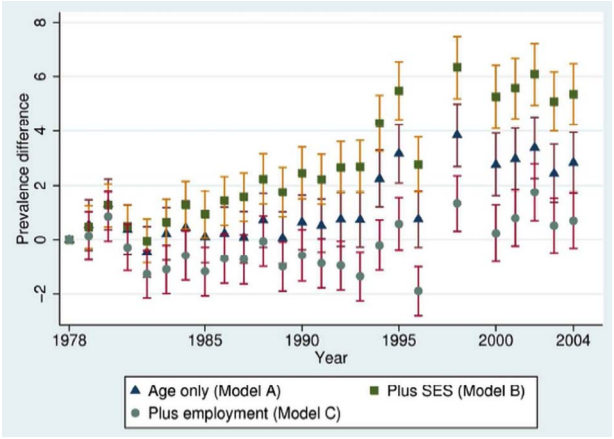

Figure 3 Prevalence difference in poor health from 1978 (reference) to 2004 for men from model A (age adjusted), model B (plus adjustment for socio-economic characteristics) and model C (plus adjustment for employment status).

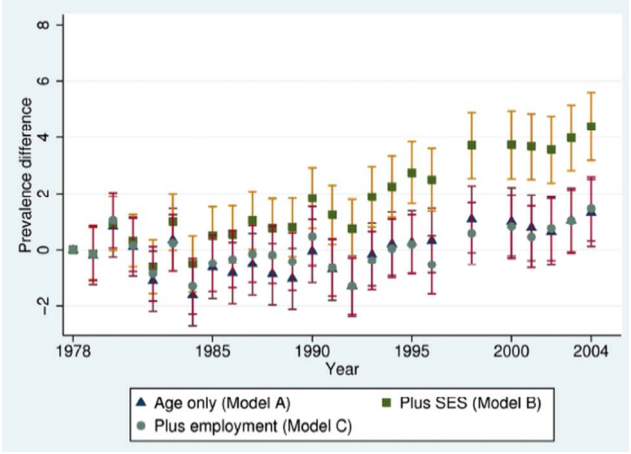

Figure 4 Prevalence difference in poor health from 1978 (reference) to 2004 for women from model A (age adjusted), model B (plus adjustment for socio-economic characteristics) and model C (plus adjustment for employment status).

Table 3 Results for the decomposition analysis for the prevalence difference in poor health in 2004 from 1978 for men and women—model A adjusts for age, model B additionally adjusts for housing tenure, car access and degree attainment, model C adjusts additionally for employment

	Model A—Prevalence difference and 95% CIs*	Model B	Model C
Men			
Due to population change	0.4 (0.4 to 0.5)	−4.2 (−5 to −3.5)	2.4 (1.7 to 3.2)
Due to coefficient change	2.8 (1.7 to 4.0)	7.5 (6.0 to 9.0)	0.8 (−0.5 to 2.1)
Overall difference	3.3 (2.1 to 4.4)	3.3 (2.2 to 4.4)	3.3 (2.3 to 4.3)
Women			
Due to population change	0.2 (0.2 to 0.3)	−4.4 (−5.2 to −3.7)	−0.1 (−0.9 to 0.8)
Due to coefficient change	1.3 (0.1 to 2.5)	5.9 (4.4 to 7.5)	1.6 (0.1 to 3.1)
Overall Difference	1.5 (0.3 to 2.7)	1.5 (0.3 to 2.7)	1.5 (0.4 to 2.6)

*CIs do not account for household clustering as this option is not presently available for mvdcmp.

complicated. Systematic reviews have concluded that there is evidence that poor health can cause job loss and that job loss can cause poor health with the latter possibly being the stronger effect of the two.[6 7] For self-rated general health, there is also evidence of health selection[20] but also causation.[21] So it is possible that rising rates of poor general health have increased economic inactivity. The debate over the relative influence of employment on health versus health on employment is limited though because it tends to emphasise notions of people being in a state of health that either allows them to work or not: a zero-sum approach. Yet, it should be remembered that ill health for the majority is not an impediment to labour market participation[22] but that those in ill-health—particularly in lower socio-economic positions—are most vulnerable to non-employment and were increasingly so in the period under study.[22 23] So their job loss may not then be caused by their ill-health per se but by the prevailing labour market conditions and the policy response to these.[24 25]

Evidence suggests that the increases in the economically inactive population (particularly those claiming sickness related benefits) in the UK during this period were due to difficult labour market conditions (particularly in de-industrialised areas).[5 26] This resulted in those with health conditions (particularly if also from low socio-economic positions) finding themselves towards the back of the job queue and unlikely to find employment.[5] In this sense it is argued that many of those economically inactive because of sickness or disability are 'hidden unemployed' as they may be employed given different labour market conditions.[5] Indeed, in better labour market conditions it is argued that there is 'hidden sickness' among the active workforce.[5] This does not necessarily require any change in the individual level of ill-health in the population just change in the proportion of people who are employed. Recent theoretical work on how people self-rate their general health suggests a cognitive process where people take account of their individual health situation but do so in the wider context in which they live.[27] Hence, the assessment of one's health while being economically inactive may differ compared to when one is in or seeking work. For example, there is longitudinal evidence that the reporting of longstanding illness may depend on labour market status with employment reducing the likelihood of reporting poor health.[28] Coupled with the health-damaging psychological and material consequences of non-work[29] this may allow us to understand why economic inactivity may be associated with a higher risk of poor general health at the individual level.

Of course, confounding is a real possibility within this repeated cross-sectional study. For example, there could be other confounding or mediating trends that are associated with both general health and employment that could explain the impact of adjusting for changes in employment status. Examples include the apparent decline in job quality over time[30] and macroeconomic changes such as the rise in the level of income inequality.

Economic inactivity is also a potentially important influence on population health, not just because of the composition of the inactive population itself, but also because it is generally a longer-term state. For example, a recent cohort study of people out of work and in receipt of incapacity-related benefits in the UK found that the average length of economic inactivity among this group was 9 years.[31] Thus, the issues which are usually put forward to explain the association between unemployment and ill health—most notably poverty, social exclusion and low social status—are thus experienced for a much longer time period by those who are inactive than by those who are unemployed.

While our results suggest that decreasing the numbers of economically inactive could have health benefits, this is by no means an easy task and not just because of the current economic climate. Research into welfare to work interventions for those with a disability or chronic illness has found that even in times of solid economic growth it is very difficult to increase the employment rate of this group. For example, in the UK since the 1990s there have been increasing efforts to enhance the labour market participation of this group using various interventions

including education, training and work placement schemes; vocational advice and support services; vocational rehabilitation; in-work benefits; financial incentives for employers; employment rights legislation and accessibility interventions.[4] However, the evidence of effectiveness in terms of actually increasing employment is very limited.[4 32–34] This is partly attributed to the largely supply-side orientation of most of the interventions,[4] the focus on employment rather than health improvement[31 35] and the lack of demand from employers for workers with complicated and fluctuating health conditions.[31]

In addition to being only cross-sectional, another limitation of using the GHS is that response rate fell over time; weighting was introduced in 2000 and we have applied this in all analysis but the possibility remains that the survey became increasingly unrepresentative over time. It is impossible to assess the impact of this on our results as we do not have details of non-responders. However, evidence comparing a national census to a national health survey suggested that low socio-economic groups and the out of work were less well represented in the survey leading to a more conservative estimate of the social gradient in health in the survey.[36]

CONCLUSION

To summarise, this study shows that poor health may have worsened among both men and women from 1978 to 2004 when accounting for socio-economic changes. However, controlling for the employment status changes in the UK since 1978 attenuated the increase in poor general health. This research raises important public policy issues around the role of employment in overall public health which should be examined further.

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Contributors FP conceived the study idea which was developed with CB. FP acquired the data and is responsible for the design. LG provided advice on analysis and conducted the multilevel analysis and FP conducted the remainder of the analysis and produced the tables and graphs. FP drafted the manuscript with CB and LG providing critical revisions to successive versions.

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