Subjective financial well-being, income and health inequalities in mid and later life in Britain

By Sara Arber[1]*, Kirsty Fenn[2] and Robert Meadows[1]

Affiliations:

[1] Department of Sociology, University of Surrey, Guildford, Surrey, UK

[2] No institutional affiliation.

* *Corresponding author:*
Professor Sara Arber
Co-Director, Centre for Research on Ageing and Gender (CRAG),
Department of Sociology,
University of Surrey,
Guildford GU2 7XH, Surrey, UK
Tel: 00-44-(0)1483-686973; Fax: 00-44-(0)-1483-689551
Email: S.Arber@surrey.ac.uk

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Research Highlights

- Both low income and financial problems are associated with poor health in mid-life. In old age, subjective financial wellbeing rather than income is linked to health.
- The poor health of divorced people is mediated by subjective financial wellbeing.
- Both economic strain and perceived material deprivation may adversely affect health.

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Abstract

The relationship between health and income is well established, but the link between subjective financial wellbeing and self-assessed health has been relatively ignored. This study investigates the relationship between health, subjective financial wellbeing and income in mid-life and later life in Britain. Analysis of the General Household Survey for 2006 examined these relationships at ages 45-64 (n=4639) and 65 and over (n=3104). Logistic regression analysis was used to adjust for income and other socioeconomic factors linked to self-assessed health. Both income and subjective financial wellbeing are independently associated with health in mid-life; those with lower incomes and greater subjective financial difficulties had higher risk of reporting 'less than good' health. In contrast in later life, subjective financial wellbeing was associated with health, but the effect of income on health was mediated entirely through subjective financial wellbeing. The poorer health of the divorced/separated was also mediated entirely by differences in subjective financial wellbeing. Research on health inequalities should pay greater attention to the link between subjective financial hardship and ill-health, especially during periods of greater economic difficulties and financial austerity.

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Introduction

Since the Black Report (DHSS, 1980) demonstrated social class inequalities in health in Britain there has been a plethora of research on the relationships between different measures of socio-economic status and health, especially social class and education (Bartley, 2004; Scambler, 2012). Research has also established a positive and fairly linear relationship between income and health (Ettner, 1996; Benzeval, Judge, & Shouls, 2001; Wilkinson, 1996). However, the relationship between subjective financial well-being (SFW) and health has been relatively ignored, particularly in the UK.

Subjective financial well-being (SFW) refers to the individual's self rating of their income adequacy to meet their general needs. It is thought to be associated with perceptions of financial strain and stress. The lack of research in this area is surprising given that Angel, Frisco, Angel and Chiriboga (2003) argued the importance for both researchers and policy makers of differentiating whether it is income and poverty alone, or an individual's perception of their financial situation (SFW) that impacts on health. This paper examines the relationship between SFW and health while adjusting for income. As both health inequalities and economic activity vary over the life course and levels of ill-health increase with age, we compare this relationship in mid and later life.

Health and income

Numerous studies have reported an income gradient with poor health (Ettner, 1996; Mackenbach, Kunst, Cavelaars, Groenhof, & Geurts, 1997; Mackenbach, Meerding, & Kunst, 2007; Blane, Bartley, & Smith, 1997; Hart, Smith, & Blane, 1998). The material explanation is largely used to account for the relationship between income and poor health, arguing that income affects housing, neighbourhood environments, diet and access to facilities for exercise and health care, which in turn all affect health (DHSS, 1980; Bartley, 2004; Link and Phelan, 2005). Income and earning potential are also related to power which can influence health (Bartley, 2004). Wilkinson (1996; Wilkinson and Pickett, 2010) show the importance of relative income and position in the income

hierarchy for health, arguing that those with lower incomes are more likely to experience stress, social and psychological deprivation that have a detrimental impact on health. The relationship between income and health is argued to be bi-directional, since health can impact on the ability to work and level of earnings. However, longitudinal research in the US (Muennig, 2008) and UK (Beckett, 2000) suggests that income has a greater impact on health, than health on income.

The relationship between income and health varies with age. In European samples, income and health are more strongly associated in mid-life (45-64 years old) than in younger age groups and in later life (65+) (Mackenbach et al., 2007). A US longitudinal study also found income was a strong predictor of health, particularly below age 65 (McDonough, Duncan, Williams, & House, 1997). These age differences may be due to reverse causation, as individuals in mid-life are more likely to depend on income from paid work, whilst in later life income primarily comes from pensions. Since health can impact on the ability to work, health is more likely to influence income in mid than later life, leading to a stronger relationship between income and health in mid-life (Muennig, 2008).

US research finds that income is a more important determinant of health than other measures of socio-economic status (SES), such as education and social class (Duncan, Daly, McDonough, & Williams, 2002). Given changes in the structure of labour markets and the possibility that social class may be less central for health now than in the past (Scambler, 2012), it is pertinent to examine the relative importance of social class, education and employment status, as well as income, in patterning health. Health inequalities research has paid less attention to *subjective* measures of status, such as subjective financial well-being, although 'people's sense of their social positioning is salient for their health' (Scambler, 2012: 133).

Health and subjective financial well-being

Despite the established relationships between SES and health, and between income and health, few studies have explored the relationship between subjective financial well-being (SFW) and health. Angel et al. (2003) argue that it is important to distinguish between SFW and income due to their distinct meanings and potentially individual consequences for health. Objective measures of income do not capture the meaning of income adequacy to individuals (Hazelrigg & Hardy, 1997; Mirowsky & Ross, 1999) with people on low incomes not always reporting financial strain, which indicates that these two measures are different and therefore may differentially impact on health

(Angel et al., 2003). Kahn and Fazio (2005) highlight that income and financial strain (a form of SFW) are not the same; a level of income that may be sufficient to meet one individual's needs may be insufficient for another individual (Zimmerman & Katon, 2005). Social comparison and expectation may lead to differences in the perception of the adequacy of income (Angel et al., 2003). Perceptions of income adequacy are likely to be related to comparisons with an individual's reference groups, with these perceptions varying across different local and societal contexts (Whelan, Layte, Maitre & Nolan, 2001; Whelan & Maitre, 2013).

The expected association between subjective financial well-being and health can be theorised through two main mechanisms. Firstly, in terms of feelings of 'relative material deprivation' (Pantazis, Gordon & Levitas, 2006), and to what extent individuals feel they have insufficient income to participate in ways seen as customary within their community or peer group, such as being able to afford a week's annual holiday. This mechanism relates to reference group theory (Whelan and Maitre, 2013) and the role of social comparisons as a potential mediating factor between SFW and health. Secondly, subjective financial well-being may be linked to health through perceptions of 'financial strain/economic stress' because of inability to manage on their income, which involves psycho-social processes associated with stress, anxiety and helplessness (Bartley, 2004: Kahn & Fazio, 2005). Both of these mechanisms are likely to have longer-term negative impacts on health and well-being due to feelings of lack of a sense of control, hopelessness, demoralisation, and reductions in self-worth and self-confidence (Angel et al. 2003; Pearlin, Menaghan, Lieberman & Mullan, 1981).

Previous studies have not distinguished these two conceptual approaches to the link between subjective financial well-being and health. This is despite Whelan et al. (2001) showing that 'perceived material deprivation' and 'economic stress' represent two distinct dimensions of subjective financial well-being, which are both independently related to income. However, Whelan et al. (2001) do not examine the relationship of each of these two indicators of subjective financial well-being with health.

Most studies of SFW and health have focused only on older people. These have found that older people who experienced periods of financial inadequacy throughout the life course report poorer health (Kahn & Pearlin, 2006) and older people reporting current financial strain or subjective financial inadequacy had worse subjective health (Cheng, Chi, Boey, Ko, & Chou, 2002; Nummela, Sulander, Heinonen & Uutela, 2007; Angel et al., 2003). However, these studies did not

adjust for level of income. US research on women aged 70-79 found that those who reported subjective financial strain were 60% more likely to die within five years when absolute income and socio-economic status were adjusted (Szanton et al., 2008). Some studies have researched SFW and health in other age groups, but not using nationally representative samples. For example, Tucker-Seeley and colleagues (2013) report a positive association between perceived financial hardship and self-reported health in a US study of low income housing residents, when socio-economic factors and psychological distress were controlled; and Szanton and colleagues (2010) found that African American twins aged 25-89 years who reported financial strain in adulthood were more likely to have a physical disability and report depressive symptoms, but neither study adjusted for income.

Previous studies have not examined the relationship between SFW and health at different stages of the life course. It is important to contrast this relationship in mid and later life, because economic position and income sources vary at these two life stages, with income generally becoming more fixed after retirement (Muennig, 2008), and health inequalities are at their greatest in mid-life (House, Kessler, Herzog, Mero, Kinney, & Breslow, 1990; House, Lepkowski, Kinneyt, Mero, Kessler, & Herzog, 1994). Most previous research on SFW has not adjusted for income, therefore the independent relationship between SFW, income and health has not been well characterised in nationally representative samples. In addition, previous research has focused on a single measure of SFW and has not examined the independent effects of subjective 'material deprivation' and of 'economic/financial strain' on health.

The aims of this paper are to examine the relationship between subjective financial well-being (SFW) and health in mid and later life using nationally representative British data whilst adjusting for income. The research questions are: (i) How are two distinct measures of SFW associated with health in Britain; (ii) What role does income play in these relationships; and (iii) Do these relationships differ in mid and later life.

Methodology

This study used data from the General Household Survey (GHS) for 2006 (Office for National Statistics, 2008), which is representative of private households in England, Scotland and Wales. A stratified, two-stage probability sample selected 576 postal sectors and addresses from the Postcode Address File. The selected sample consisted of 12,562 eligible households, with interviews achieved in 9,731 households. Interviews were conducted with all household members aged 16 and

over. The survey was administered using face-to-face computer-assisted personal interviewing (CAPI) and achieved a 76% response rate (ONS, 2008). Interviews (excluding proxies) were undertaken with 5654 adults aged 45-64 and 3813 aged 65+. The analysed data set was fully anonymised and supplied by the UK Data Archive.

Measuring self-rated health

The analysed self-report measure of general health has been extensively used in health research. Studies have found that an individual's subjective assessment of their health is related to objective measures of health and mortality (Farmer & Ferraro, 1997; Mackenbach et al., 2002). Self-reported health was measured by the question 'How is your health in general? Would you say it is.... very good, good, fair, bad, or very bad?' Responses were dichotomised: 'very good/good health' recoded as *'good';* and 'fair', 'bad' and 'very bad health' recoded as *'less than good'* health', as in previous studies (Kunst et al., 2005; Mackenbach et al., 2002, 2007)**.**

Measuring subjective financial well-being

Subjective financial well-being (SFW) was analysed using two self-report variables measured at the household level which indicate perception of their household's SFW.

(i) Households' *'ability to make ends meet'* provides a subjective measure of 'economic/financial strain'. Respondents were asked 'Thinking of your household's total monthly or weekly income, is your household able to make ends meet, that is pay your usual expenses…. with great difficulty, with difficulty, with some difficulty, fairly easily, easily, or very easily'. We combine 'great difficulty'/'difficulty' and 'easily'/'very easily' to yield four categories. This is similar to the measure used by Angel et al. (2003).

(ii) '*Number of problems with household expenditure'* provides an indicator of SFW linked to 'perceived material deprivation' (Whelan et al., 2001; Whelan and Maitre, 2013). The question asked 'Looking at this card, can I check whether your household could afford the following?:

To pay for a week's annual holiday away from home?

To eat meat, chicken or fish (or vegetarian equivalent) every second day?

To pay an unexpected, but necessary, expense of £500?

To keep your home adequately warm?'

Principal Components Analysis found these four dichotomous 'Yes/No' items loaded onto a single factor and were internally consistent (Cronbach's alpha=0.654). We use a three category scale:- reporting 'no problems' with any of the four items; one problem; and reporting 2-4 problems.

Measuring income

Income was based on the GHS derived variable 'equivalised gross household income', which summed the following self-reported income from each household member: 'their usual gross weekly pay, weekly income from state benefits, gross weekly income from other sources, gross bonus weekly rate, gross weekly income from other jobs, self employed gross weekly earnings and other regular payments'. Household income was equivalised to adjust for differences in size and composition of households, using the McClements Scale (McClements, 1977). This equivalisation takes into account that a large family needs a higher income than a single person household in order for households of different size and composition to have a similar standard of living. Household members were weighted with the following equivalised values; head of household with a partner=0.50, partner=0.50, first additional adult in couple household=0.42, each additional adult=0.36, head of household without partner=0.61, first additional adult in household=0.46, second additional adult=0.42, each additional adult=0.36, child aged 16-17=0.36, child aged 13-15=0.27, child aged 11-12=0.25, child aged 8-10=0.23, child aged 5-7=0.21, child aged 2-4=0.18, child aged 0-1=0.09. These values were summed and total household income was divided by this weighted measure of household composition to produce equivalised gross household income.

Equivalised weekly household income quartiles were determined separately for the two age groups. Income quartiles for the 45-64 age group are: <£301, £301<£531, £531<£804, >£804.01, and for the 65+ age group are: <£205, £205<£290, £290<£435, >£435.01.

Covariates

Covariates were analysed as potential confounders or mediators of the relationship between income, SFW and health. The following covariates were included in the models: *Gender* (male/female); *Marital status* comprised 'never married', 'divorced/separated', 'widowed', and 'married' (including legal civil partnerships); *Age* coded into five year age groups, with the highest group aged '85 and over'; *Ethnicity* coded as 'White' and 'Non-White'; *Education* measured by highest reported level of education attainment and classified as 'no qualifications', 'intermediate qualifications' and 'higher education' (degree level and above); *Social class* based on the individual's current or last occupation and coded 'higher', 'middle' and 'lower' social class;

Employment status coded 'Employed' (including self-employed) and 'Not Employed'; and *Smoking behaviour* categorised as 'current smoker', 'ex-smoker' and 'never smoked'.

Statistical analyses

First, bivariate analysis examines the proportions rating their health as 'less than good' for each covariate, income and the two measures of SFW, using chi-squared (two tailed) significance levels for age groups 45-64 (n=5651) and 65+ (n=3807) (Table 1). Second, logistic regression modelling is used to analyse the relationship between SFW and health after adjusting for income and the covariates. Separate models are presented for the 45-64 and 65+ age groups in order to compare how SFW and income are associated with health in mid and later life. The sample size for all logistic models is 4639 (age 45-64) and 3104 (age 65+).

To understand the relative contribution of SFW with health the analysis used models with three steps (Tables 2 and 3). Model 1 analysed subjective health according to gender, age, marital status, ethnicity, employment status, education level, social class and smoking. Model 2 added income quartiles. Model 3 (final model) introduced the two SFW measures: 'ability to make ends meet' and 'number of problems with household expenditure'. By including SFW in the final step of the model the relationship between SFW and health can be explored independently of income and other factors known to influence health. Table 4 presents the two SFW measures separately when introduced into the final model in order to assess their independent contribution. Analysis was conducted using the SPSS programme, version 16. Results are presented as odds ratios (ORs) with 95% confidence intervals.

Regression diagnostics were performed on all models. Analysis of residuals identified no cases with a studentized residual >2.5. Multicollinearity returned VIF and tolerance figures within an acceptable range, and the pearson correlation of the two SFW measures was 0.532 in the 45-64 age group and 0.426 for ages 65+. The Hosmer-Lemeshaw test for both age groups was significant, but since the sample size is very large, even very small divergencies would lead to significance. We therefore report Nagelkerke R^2 and the AUC to provide an indication of predictive power. Missing value analysis was conducted using SPSS. Results indicate that missing data is spread evenly across categories and that it is missing at random.

The GHS interviews all household members over age 16, resulting in some clustering of respondents within households. Within our analysis sample, 1263 households include two

respondents in the 45-64 age group (out of 4639 cases) and 687 households include two respondents in the 65+ age group (out of 3104 cases). Multilevel models were run on the final models to examine clustering and whether results alter if the higher (household) level is taken into account. Results from the multilevel and single level logistic models were comparable, so we only report the single-level logistic regression analysis.

Results

The proportions in mid and later life reporting 'less than good' health are shown in Table 1. No significant association is found between gender and self-reported health. In both age groups, the 'not employed' report poorer health than the 'employed'. In mid-life, there is a gender/employment status interaction with employed women reporting the best health and non-employed men reporting the poorest health. Therefore, the Models for Mid-life (Table 2) include a four category gender/employment status variable. Married individuals are least likely to report poor health in both age groups. Respondents categorised as 'White' report better health than the 'Non-white'. Statistically significant associations were found between each socio-economic measure and reporting 'less than good' health. In both age groups, fewer respondents with 'higher qualifications', in higher social classes and higher income groups report 'less than good' health. A higher proportion of current smokers report poor health than ex-smokers and people who had never smoked.

There are strong associations between the two measures of subjective financial well-being (SFW) and self-rated health in both age groups. A higher proportion who report 'difficulty making ends meet' report 'less than good' health than respondents who find it 'easy/very easy' to make ends meet. Respondents who report two or more problems with household expenditure are more likely to have poor health than those reporting no problems.

Overall the findings in Table 1 are in line with previous research, namely there is poorer health among respondents who are non-employed, divorced, non-white, with no educational qualifications, in the lowest social class, in low income quartiles, and who currently smoke. There are also strong associations between reporting 'less than good' health and having difficulties 'making ends meet' and reporting 'problems with household expenditure'. Since low income, low social class, and several other variables are associated with SFW, it is important to adjust for these variables when analysing the relationship between SFW and health. Logistic regression is

undertaken to examine the independent effects of SFW and income on health, after adjusting for other social variables known to be associated with health.

Multivariate analysis: Mid and later life models

Odds ratios for 'less than good' health are presented in three sequential logistic regression models for ages 45-64 (Table 2) and 65 and over (Table 3). Covariates known to be associated with self-reported health were introduced in Model 1 and income in Model 2.

In mid-life, the gender/employment status variable is highly significant with non-employed men having the highest odds of 'less than good' health (OR=5.88) compared with employed women (reference category). These odds are only reduced marginally across the models, falling for non employed men to OR=4.28 in Model 3. Above age 65, the non-employed have significantly higher odds of poor health, which remains largely unchanged across the models.

Ethnicity is a significant predictor of health in both age groups, with 'non-white' respondents having higher odds of 'less than good' health. In mid-life, this association becomes non-significant in the final model, suggesting that subjective financial well-being may mediate the relationship between ethnicity and poor health in mid-life but not in later life. Marital status is a significant predictor of poor health in both age groups in Models 1 and 2, with divorced/separated individuals reporting the highest odds of poor health. However, once SFW is adjusted in the final model, being divorced/separated is no longer a significant predictor of health. These findings suggest that SFW mediates the relationship between being divorced/separated and self-reported poor health in both age groups (Tables 2 and 3).

Education is a highly significant predictor of self-rated health at all stages in both age groups. The odds ratio for those with 'no qualifications' decreases at each stage, but remains significant in Model 3. The high odds of reporting poor health for those with no qualifications is similar in both mid and later life. Social class, for both age groups, is a significant predictor of 'less than good' health at Model 1, with reductions in significance when income is adjusted in Model 2 and further reductions when SFW is adjusted (Model 3). Although, those in the lower social class have the highest odds of poor health, in later life the intermediate class report better health than the higher class, but these differences are non-significant. In both age groups, current smoking is a significant predictor of poor health, with odds ratios only marginally reduced when SFW is adjusted in Model 3.

Equivalised household income is a significant and linear predictor of 'less than good' health in both Models 2 and 3 in mid-life. After adjusting for SFW, although there is a reduction in statistical significance, those in the lowest income quartile remain most likely to report poor health. In contrast in later life, income is a significant predictor of poor health *only* in Model 2 ($p<.05$), and is non-significant in the final model when SFW is adjusted. This indicates firstly, a weaker relationship between income and self-reported health in later life than in mid-life at Model 2, which is in line with past research. Secondly, that the whole relationship between low income and poor health appears to be mediated by SFW in later life, but this is not the case in mid-life.

In both age groups, 'ease of making ends meet' (economic/financial strain) is a highly significant predictor of 'less than good' health in Model 3. Number of problems with household expenditure (perceived material deprivation) is also a strong predictor of health in the final model. Individuals reporting two or more household expenditure problems are more likely to report poor health in mid-life (OR=1.87) and later life (OR=2.28) than those reporting no problems.

To compare the relative association of each SFW measure with self-rated health, Table 4 presents Model 3a which adds only 'ability to make ends meet' and Model 3b adds only 'number of household expenditure problems'. In mid-life, both SFW measures make a similar contribution to the model, as evidenced by the identical Nagelkerke R^2 of 0.235 and other model parameters. In contrast in later life, the 'material deprivation' measure makes a somewhat greater contribution to the model (R^2=.133) than the 'economic strain' measure (R^2=.124).

In Tables 2 and 3, the AUC for the final models is 0.76 in mid-life and 0.69 in later life. Comparison of the Nagelkerke R^2 suggests that Models 1 and 2 improve upon the null model *more* in mid-life than in later life. This would be expected given that employment status, education and income are stronger predictors of health in mid-life than in later life. In contrast, Model 3 shows a marginally *greater* change in R^2 in later life than mid-life, suggesting that SFW may be particularly salient for older people's health.

In summary, the main difference between the mid-life and later life models is that income is more strongly associated with self-reported health in mid-life than in later life. In mid-life, income and SFW are independently associated with health, while in later life the relationship between income and health is mediated by SFW. Measures of SFW, especially related to material deprivation,

appear to be more strongly associated with subjective health above age 65 than at ages 45-64. We also reanalysed our data using ordinal regression (self-reported health was measured as a Likert scale), and found the results for both the 45-64 and 65+ age groups were substantively similar. For example, in the final 'midlife' model both income and the two measures of SFW had statistically significant effects, whereas in the 'older' age group only the two measures of SFW had significant effects, but income was non-significant. In addition, multilevel logistic models produced comparable results as the reported final single-level logistic models, enhancing confidence in our findings.

Discussion

This study explored the relationship between subjective financial well-being (SFW) and self-rated health, while adjusting for income, based on nationally representative British data and compared this relationship in mid and later life. SFW and income were independently associated with health in mid-life; those with low incomes *and* difficulty coping on their incomes were more likely to report poor health. Whilst in later life, only SFW was directly associated with health; people who found it difficult to cope on their income regardless of its level had increased odds of 'less than good' health. In mid-life, income remained a significant predictor, the risk of poor health decreasing sequentially as income increased from the lowest to the highest income quartiles, even when SFW was adjusted. However, in later life income is no longer a significant predictor of health after adjusting for SFW. This suggests that the relationship between income and health is entirely mediated by perceptions of income adequacy in later life. The finding that income is positively related to health in mid-life is in line with previous research (Ettner, 1996; Blane, Bartley, & Smith, 1997; McDonough et al., 1997). Whereas, our finding that among older people, income is only related to health through the pathway of SFW has not previously been reported.

The paper also reports that divorced/separated individuals had the highest odds of 'less than good' health in Models 1 and 2 in both age groups, but this was mediated entirely following adjustment for SFW in Model 3. Although, past research suggests that widowhood may be a significant predictor of poor health (Hughes & Waite, 2009; Manzoli et al., 2007); this was not found in our study. Despite widows being more likely to experience low income than their married counterparts (Arber, 2004), this may not detrimentally affect their health, if they view their income as adequate for their needs.

Being outside the labour market and having no educational qualifications are robustly associated with poor health; these associations only marginally diminish following adjustment for income and SFW in both age groups. In contrast, social class has a weak association with poor health that is largely mediated by income and SFW, suggesting social class may be less centrally linked to health inequalities in Britain than in the past (DHSS, 1980; Barclay, 2004).

Our finding that income does not predict health when SFW is adjusted in later life supports the argument of Nummela et al. (2007: 39) that perception of the adequacy of income may be an 'even better predictor of self-rated health than income.' However, this is not the case in mid-life when *both* income and SFW have independent effects on health. The elevated odds of poor health for those who report struggling to cope on their income are broadly comparable for both age groups, but somewhat greater in later than middle life. This supports Cheng et al. (2002: 1416) who argued that the relationship between self-reported financial well-being and health is 'particularly true' in later life, and supports previous research in Finland and the US (Nummela et al., 2007; Angel et al., 2003; Szanton et al., 2008).

The two measures of SFW are both independently associated with health, after adjusting for income and other covariates. However, in later life, there is a suggestion that perceptions of 'material deprivation' may have a stronger association with health than 'economic/financial strain'. These findings reinforce the value of analysing more than one indicator of SFW.

The greater importance of income for health in mid-life compared to later life may be due to three factors. First, in later life levels of income vary less between individuals than in mid-life (Brown & Prus, 2006). This was confirmed in separate analyses that found the Gini coefficient for equivalised household income in mid-life was 0.42 and in later life was 0.33. Thus in mid-life income may have a stronger impact due to greater income inequalities at this life course stage. Second, more people in later life live on a fixed income whilst those in mid-life are more likely to experience income changes associated with changes in paid employment and periods out of the labour market. Third, the relationship between income and health is likely to be more bi-directional in mid-life than later life, since income is primarily derived from work, and ability to work may be affected by ill-health. Fewer respondents in later life are economically active, therefore income is less likely to be affected by health (Muennig, 2008). Due to the cross-sectional nature of this study the direction of causation cannot be determined and longitudinal research is needed.

Our analyses found strong associations between both measures of subjective financial well-being ('perceived material deprivation' and 'economic/financial strain') and self-reported health lending support to more than one potential mechanism linking SFW to health. First, 'perceived material deprivation' is associated with poor health pointing to the role of reference groups (Whelan et al., 2001; Whelan & Maitre, 2013) and ability to enjoy customary standards of living as critical for health. Second, subjective feelings of income inadequacy and 'financial strain' are likely to produce stress, anxiety and helplessness with negative consequences for health (Bartley, 2004; Kahn & Fazio, 2005). Both relative 'material deprivation' and 'financial strain' can impact on health through feelings of demoralisation, and reductions in self-confidence, self-worth and sense of control (Angel et al., 2003; Pearlin et al., 1981). Inadequate financial resources can also reduce social participation and increase the likelihood of social exclusion, representing a further source of stress (Bartley, 2004).

Research has shown that worry and anxiety associated with financial problems and debt are associated with sleep disturbances in the UK (Dregan & Armstrong, 2009; Kumari, Green, & Nazroo, 2010) and US (Hall et al., 2008). Therefore poor sleep may be implicated in the link between SFW and health. Strong associations have also been found between diverse indicators of low socio-economic status and poor sleep (Arber, Bote, & Meadows, 2009; Arber & Meadows, 2011), and between disturbed sleep and poor self-reported health (Kumari et al., 2010; Arber & Meadows, 2011). We suggest that poor sleep may represent a potential mechanism linking SFW with health, since pathways between subjective financial problems and poor health are likely to include worry and anxiety resulting in disrupted sleep. Future health researchers should examine the relationships between measures of socio-economic status (including income), subjective financial well-being, sleep and health in order to clarify these mechanisms. As Dregan and Armstrong (2009) showed that sleep loss through worry was greater during periods of economic downturn, researchers should also consider the health implications of changes in welfare policies that may be creating greater financial difficulties for families.

Methodological Considerations

A strength of this study is that it analysed high quality data from the large nationally representative General Household Survey (ONS, 2008). However, the GHS represents a sample of private households and excludes people who live in institutions, such as nursing homes. Therefore findings can be generalised to all adults aged over 45 living in private households in Britain. The study was restricted to Britain, which Whelan and colleagues (2001) shows is in an intermediate position

across European countries regarding our measures of SFW (economic stress and perceived material deprivation) and level of income inequality. This 'average' positioning may enhance the generalisability of our findings to other European societies, but further research is required on SFW, income and self-rated health in other national contexts.

The study used a cross-sectional design, therefore causation cannot be determined. Longitudinal studies are required to clarify the direction of causation of identified relationships, for example, whether the poor health of the divorced/separated is because being married 'protects' against ill-health or ill-health 'selects' people out of marriage (Koball et al., 2010). We use a measure of income based on self-reports of all household members, which may lack reliability. Future studies should employ more objective income measures, such as based on registry data.

Conclusions

Since the early 1980s extensive research has documented the influence of social factors on health (Scambler, 2012). Within this corpus of research, a key overlooked issue is the relative contributions of subjective financial well-being and income for health. This paper examined the independent association of both income and SFW with self-rated health, comparing these relationships in mid and later life. Two indicators of SFW (economic strain and perceived material deprivation) were strongly associated with health, especially in later life. Income remained independently associated with health only in mid-life, while in later life the association of income with health was mediated entirely through SFW. By adopting an age-stratified approach this study has demonstrated that different factors are associated with health at these two life course stages. The study also suggests that the poor health of the divorced/separated is mediated entirely by SFW.

As one of the first studies to use two measures of SFW *and* adjust for income when examining the relationship between SFW and self-rated health, it has thrown light on the need to adopt an approach to understanding health that examines both measures of SFW and income and how these relationships vary at different points in the life course.

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Table 1. Percentage reporting 'less than good' health by covariates, income and subjective financial well-being (and base numbers) for age 45-64 and age 65+

	45-64		65+		Total	
	%	N	%	N	%	N
All	26.3%	5651	41.3%	3807	32.4%	9458
Gender						
Men	26.2%	2647	40.3%	1766	31.8%	4413
Women	26.4%	3004	42.2%	2041	32.8%	5045
p	0.878		0.217		0.316	
Employment Status						
Employed	16.3%	3829	25.8%	279	17.0%	4108
Not Employed	47.3%	1820	42.6%	3526	44.2%	5346
p	0.000		0.000		0.000	
Gender/Employment Status						
Women - Employed	15.8%	1839	27.6%	105	16.4%	1944
Men - Employed	16.9%	1990	24.7%	174	17.5%	2164
Women - Not Employed	43.2%	1163	43.0%	1936	43.1%	3099
Men - Not Employed	54.5%	657	42.0%	1590	45.7%	2247
p	0.000		0.000		0.000	
Ethnicity						
White	25.7%	5380	40.8%	3720	31.9%	9100
Non-White	37.7%	268	64.4%	87	44.2%	355
p	0.000		0.000		0.000	
Marital Status						
Married	23.5%	4039	38.1%	2202	28.7%	6241
Never Married	32.0%	485	43.8%	201	35.4%	686
Widowed	34.6%	191	45.3%	1112	43.7%	1303
Divorced/Separated	33.9%	936	48.3%	292	37.3%	1228
p	0.000		0.000		0.000	
Education level						
Higher Education	16.0%	1594	29.7%	589	19.7%	2183
Intermediate Qualifications	24.2%	2277	33.9%	855	26.9%	3132
No Qualifications	40.7%	1423	48.1%	2026	45.1%	3449
p	0.000		0.000		0.000	
Social Class						
Higher	17.4%	2113	34.3%	1106	23.2%	3219
Middle	28.1%	2325	40.7%	1686	33.4%	4011
Lower	37.5%	1056	50.9%	896	43.6%	1952
p	0.000		0.000		0.000	
Smoking						
Never Smoked	20.7%	2883	37.3%	1929	27.4%	4812
Ex-smoker	27.5%	1565	44.5%	1513	35.9%	3078
Current Smoker	38.5%	1202	49.0%	365	40.8%	1567
p	0.000		0.000		0.000	
Income quartiles[a]						
Highest quartile	12.4%	1275	29.6%	877		
50<75%	18.3%	1279	41.0%	882		
25<50%	28.1%	1275	47.3%	880		
Lowest quartile	46.9%	1275	46.8%	878		
P	0.000		0.000			
Ability to make ends meet						
Easily/Very Easily	15.1%	1715	31.2%	1107	21.4%	2822
Fairly Easily	23.3%	2159	40.4%	1714	30.9%	3873
Some Difficulty	35.9%	1173	50.0%	674	41.0%	1847
Difficulty/Great Difficulty	50.9%	593	63.8%	304	55.3%	897
P	0.000		0.000		0.000	

No. of problems with household expenditure						
None	19.5%	4325	35.4%	2924	25.9%	7249
One	39.3%	560	56.3%	444	46.8%	1004
Two to four	55.3%	761	65.3%	435	58.9%	1196
p	0.000		0.000		0.000	

[a] Equivalised household income quartiles were determined separately for the two age group (45-64 and 65+), therefore percentages reporting 'less than good' health for each income quartile cannot be calculated for the Total sample.

Table 2. Odds ratios of 'less than good' health in mid-life (age 45-64) (n=4639)

	Model 1		Model 2		Model 3	
	OR	**CI 95%**	**OR**	**CI 95%**	**OR**	**CI 95%**
Gender/Employment Status	***		***		***	
Women - Employed (reference)	1.00		1.00		1.00	
Men – Employed	1.22	(1.00[a]-1.48)	1.22*	(1.00-1.49)	1.22	(1.00[a]-1.49)
Women - Not Employed	3.75***	(3.06-4.60)	3.10***	(2.51-3.84)	3.06***	(2.46-3.81)
Men – Not Employed	5.88***	(4.63-7.48)	4.58***	(3.55-5.90)	4.28***	(3.30-5.54)
Ethnicity	**		*		ns	
White (reference)	1.00		1.00		1.00	
Non-white	1.66**	(1.17-2.36)	1.52*	(1.06-2.16)	1.24	(0.87-1.78)
Marital status	***		**		Ns	
Married (reference)	1.00		1.00		1.00	
Never Married	1.22	(0.95-1.58)	1.16	(0.89-1.50)	1.12	(0.86-1.46)
Widowed	1.04	(0.71-1.52)	0.96	(0.65-1.40)	0.94	(0.64-1.39)
Divorced/Separated	1.55***	(1.28-1.88)	1.44***	(1.19-1.74)	1.20	(0.98-1.47)
Education level	***		***		*	
Higher Education (reference)	1.00		1.00		1.00	
Intermediate Qualifications	1.30*	(1.06-1.59)	1.19	(0.97-1.47)	1.15	(0.94-1.42)
No Qualifications	1.83***	(1.45-2.32)	1.58***	(1.24-2.00)	1.44**	(1.12-1.83)
Social class	**		Ns		ns	
Higher (reference)	1.00		1.00		1.00	
Middle	1.36**	(1.13-1.64)	1.23*	(1.01-1.48)	1.21	(0.99-1.46)
Lower	1.46**	(1.16-1.84)	1.27*	(1.01-1.60)	1.15	(0.91-1.46)
Smoking	***		***		***	
Never smoked (reference)	1.00		1.00		1.00	
Ex-Smoker	1.35**	(1.13-1.60)	1.34**	(1.12-1.59)	1.30**	(1.09-1.55)
Current Smoker	1.83***	(1.52-2.20)	1.77***	(1.47-2.13)	1.58***	(1.30-1.91)
Household Income Quartiles			***		*	
Highest (reference)			1.00		1.00	
50<75%			1.30*	(1.02-1.64)	1.15	(0.90-1.46)
25<50%			1.68***	(1.32-2.12)	1.32*	(1.03-1.69)
Lowest Quartile			2.22***	(1.73-2.85)	1.46**	(1.11-1.90)
Ability to make ends meet					***	
Easily/Very easily (reference)					1.00	
Fairly Easily					1.41**	(1.16-1.72)
Some Difficulty					1.73***	(1.36-2.19)
Difficulty/Great Difficulty					2.15***	(1.59-2.90)
No. household expenditure problems					***	
None (reference)					1.00	
One					1.60***	(1.26-2.03)
Two to four					1.87***	(1.46-2.41)
Omnibus χ^2 (Model)	689.5***		43.8***		104.5***	
-2 Log Likelihood	4599.6		4555.8		4451.3	
Nagelkerke R^2	0.203		0.215		0.243	

Source: General Household Survey 2006. All models adjusted for 5 year age groups. *p<0.05, **p<0.01, *** p<.001. [a] CI rounded from 0.999 to 1.00.

Table 3. Odds ratios of 'less than good' health among older adults (age 65 and over) (n=3104)

	Model 1		Model 2		Model 3	
	OR	**CI 95%**	**OR**	**CI 95%**	**OR**	**CI 95%**
Gender	ns		ns		ns	
Men (reference)	1.00		1.00		1.00	
Women	1.04	(0.89-1.23)	1.04	(0.89-1.23)	1.05	(0.89-1.24)
Employment Status	***		***		***	
Employed (reference)	1.00		1.00		1.00	
Not Employed	2.01***	(1.45-2.78)	1.85***	(1.33-2.58)	1.93***	(1.38-2.70)
Ethnicity	**		**		**	
White (reference)	1.00		1.00		1.00	
Non-white	2.67**	(1.50-4.74)	2.58**	(1.46-4.59)	2.21**	(1.22-4.00)
Marital status	*		*		ns	
Married (reference)	1.00		1.00		1.00	
Never Married	1.30	(0.93-1.82)	1.28	(0.92-1.80)	1.30	(0.92-1.84)
Widowed	1.00	(0.83-1.20)	0.97	(0.80-1.17)	0.91	(0.75-1.10)
Divorced/Separated	1.43*	(1.07-1.90)	1.39*	(1.04-1.85)	1.12	(0.83-1.51)
Education level	***		***		***	
Higher Education (reference)	1.00		1.00		1.00	
Intermediate Qualifications	1.17	(0.90-1.52)	1.11	(0.85-1.45)	1.10	(0.84-1.44)
No Qualifications	1.82***	(1.42-2.34)	1.65***	(1.28-2.14)	1.58**	(1.21-2.05)
Social class	**		**		*	
Higher (reference)	1.00		1.00		1.00	
Middle	0.94	(0.77-1.15)	0.90	(0.74-1.10)	0.86	(0.70-1.06)
Lower	1.33*	(1.05-1.68)	1.26	(0.99-1.59)	1.13	(0.89-1.44)
Smoking	***		***		***	
Never smoked (reference)	1.00		1.00		1.00	
Ex Smoker	1.34***	(1.14-1.58)	1.34***	(1.14-1.57)	1.33**	(1.13-1.57)
Current Smoker	1.70***	(1.30-2.20)	1.68***	(1.29-2.18)	1.51**	(1.15-1.98)
Household Income Quartiles			*		ns	
Highest (reference)			1.00		1.00	
50<75%			1.21	(0.97-1.52)	1.11	(0.88-1.40)
25<50%			1.42**	(1.12-1.79)	1.10	(0.86-1.41)
Lowest Quartile			1.30*	(1.02-1.65)	0.92	(0.71-1.18)
Ability to make ends meet					***	
Easily/Very easily (reference)					1.00	
Fairly Easily					1.39**	(1.15-1.68)
Some Difficulty					1.67***	(1.30-2.14)
Difficulty/Great Difficulty					2.36***	(1.68-3.32)
No. household expenditure probs					***	
None (reference)					1.00	
One					2.00***	(1.57-2.56)
Two to four					2.28***	(1.74-3.00)
Omnibus χ^2 (Model)	207.5***		8.8*		136.5***	
-2 Log Likelihood	4001.9		3993.1		3856.6	
Nagelkerke R^2	0.087		0.091		0.145	

Source: General Household Survey 2006 All models are adjusted for 5 year age groups. *p<0.05, **p<0.01, *** p<.001.

Table 4. Odds Ratios of 'less than good' health for income and two Subjective Financial Well-being indicators entered separately in final models

	Midlife (age 45-64) (n=4639)				Older (65+) (n=3104)			
	Model 3a		Model 3b		Model 3a		Model 3b	
	OR	CI 95%	OR	CI 95%	OR	CI 95%	OR	CI 95%
Household Income Quartiles	**		**		ns		ns	
Highest (reference)	1.00		1.00		1.00		1.00	
50<75%	1.14	(0.90-1.46)	1.25	(0.99-1.59)	1.10	(0.87-1.38)	1.19	(0.95-1.50)
25<50%	1.35*	(1.06-1.72)	1.51**	(1.19-1.92)	1.14	(0.89-1.45)	1.25	(0.99-1.59)
Lowest Quartile	1.58**	(1.21-2.06)	1.72***	(1.32-2.27)	0.99	(0.77-1.28)	1.06	(0.82-1.36)
Ability to make ends meet	***				***			
Easily/Very easily (reference)	1.00				1.00			
Fairly Easily	1.44***	(1.18-1.76)			1.45***	(1.20-1.75)		
Some Difficulty	2.08***	(1.67-2.61)			2.18***	(1.72-2.76)		
Difficulty/Great Difficulty	2.99***	(2.28-3.92)			3.63***	(2.65-4.97)		
No. household expenditure probs			***				***	
None (reference)			1.00				1.00	
One			1.88***	(1.50-2.37)			2.32***	(1.84-2.94)
Two to four			2.47***	(1.98-3.08)			2.96***	(2.31-3.80)
Omnibus χ^2 (Model)	75.6***		74.4***		83.2***		106.5***	
-2 Log Likelihood	4480.2		4481.3		3909.9		3886.6	
Nagelkerke R^2	0.235		0.235		0.124		0.133	

Source: General Household Survey 2006. *p<0.05, **p<0.01, *** p<.001.

All models adjusted for 5 year age groups, gender, marital status, ethnicity, employment status, education level, social class and smoking.