



Birth-cohort trends in older-age functional disability and their relationship with socio-economic status: Evidence from a pooling of repeated cross-sectional population-based studies for the UK



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ABSTRACT

We examine birth-cohort trends behind recent changes in the prevalence of functional disability in the older population living in private households in the United Kingdom (UK). By using three different socio-economic indicators available in the nationally representative cross-sectional data on older individuals interviewed between 2002 and 2012 in the Family Resource Survey (FRS) (96,733 respondents), we investigate the extent to which the overall trends have been more favourable among more advantaged than disadvantaged socioeconomic groups.

Compared to the cohort of people born in 1924, successive cohorts of older men have lower odds of having at least one functional difficulty (FD), whereas no significant trend was found for women. Among people with at least one FD, however, the number of disabilities increases for each successive cohort of older women (incidence rate ratio 1.027, 95% confidence interval 1.023 to 1.031, $P < 0.001$) and men (incidence rate ratio 1.028, 95% confidence interval 1.024 to 1.033, $P < 0.001$). By allowing interactions between birth cohort and SES indicators, a significant increasing cohort trend in the number of reported FDs was found among older men and women at lower SES, whereas an almost stable pattern was observed at high SES. Our results suggest that the overall slightly increasing birth-cohort trend in functional difficulties observed among current cohorts of older people in the UK hides underlying increases among low SES individuals and a relative small reduction among high SES individuals. Further studies are needed to understand the causes of such trends and to propose appropriate interventions. However, if the SES differentials in trends in FDs observed in the past continue, this could have important implications for the future costs of the public system of care and support for people with care needs.

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1. Introduction

Increasing life expectancy and the ageing of the baby-boomer generation mean that the size of the over-65 population is projected to rise significantly in many developed countries. Older people are heavy users of care services (Colombo et al., 2011; Karlsson et al., 2006) and the increase in their number is likely to affect the future sustainability of public programmes of care and support (Comas-Herrera et al., 2010; Gleckman and Fund, 2010; Office for Budget Responsibility, 2013; Wittenberg et al., 2011). Although the size of the older population influences future social care costs, it is the difficulties in undertaking basic activities for

self-care that are the major drivers of the need for support. A crucial question for researchers and policymakers is therefore whether projected gains in longevity will be accompanied by an expansion or a contraction in disability-free life expectancy and hence in the number of disabled older people and the demand for care services (Crimmins, 2004; Martin et al., 2010; Robine et al., 2003).

The concept of disability is complex and there is no single agreed definition which suits all purposes (Altman, 2001; Lawton and Lawrence, 1994; Murray and Chen, 1992; WHO, 2002). The presence of difficulties in performing everyday activities is often used to operationalise the concept of disability where the purpose is to determine the need for care services. In the US, a substantial decline among older people with such disability was documented from the mid-1980s to the late 1990s (Freedman et al., 2004), despite evidence of increases in chronic conditions (Freedman and

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Martin, 2000). More recently, while the 85+ population still displays a declining trend in disability, the overall trend for those aged 65–84 was flat during 2000–2008, with a modest increase in rates of disability for the new cohorts approaching later life (Freedman et al., 2013; Martin et al., 2010). There are several reasons why disability may differ across successive cohorts, controlling for age and other relevant characteristics. Advances in medicine, technology and access to public health programmes, increased safety at work and a lower proportion of the workforce in manual jobs could reduce disability, whereas increasing exposure to risk factors such as obesity might increase it (Martin et al., 2010; WHO, 2011). The observed prevalence of disability can also increase if the life-expectancy of successive cohorts of people disabled earlier in life increases, even if the age of onset of disability is stable (Crimmins et al., 2009; Jarvis and Tinker, 1999).

Disparities in health and disability among older people have been widely documented in relation to various measures of socio-economic status (SES) (for reviews see Feinstein, 1993; WHO, 2014). Where the objective is to draw conclusions for policy aimed at reducing SES-related inequities, the choice of SES measure may be crucial (Deaton, 2002). A widely used indicator of SES in assessing trends in disability and SES inequalities is educational attainment (Martin et al., 2012; Schoeni et al., 2006; Sulander et al., 2006; Zaninotto et al., 2010). A causal relation with disability is hypothesised in which more-educated people adopt better life-styles and health behaviours (Grundy and Holt, 2001), which are not observed in most nationally representative surveys (Freedman and Martin, 1999). Since individuals' education levels typically change little after a certain age, education is well suited for projection purposes (Mazzaferro et al., 2012) and is linked with many life-course determinants of later life SES such as occupation, income and wealth accumulation (Duncan, 1961). However, the distribution of educational attainment among today's older people is likely to be highly skewed since the majority left school at the minimum permitted age (Martelin, 1994). Educational attainment may therefore discriminate only between the most advantaged and the rest of the older population. There are also reasons to supplement educational attainment with measures which capture a more "materialistic" theoretical pathway (Alwan et al., 2007; Grundy and Holt, 2001) in which older people's disability depends on their economic circumstances measured by indicators such as income and wealth. In developed countries like the UK, public assistance to disabled people is partly determined by their income and wealth. Therefore, the financial circumstance of disabled people is a determinant of future public social care costs.

Moreover the current financial circumstances of older people generally reflect lifetime access to economic resources and are more important correlates of physical disability than position in earlier adulthood (education, occupation or social class (Costa-Font, 2008; Gjonca et al., 2009; Knesebeck et al., 2003)). However, indicators of current financial circumstances are relatively limited in health surveys, difficult to collect and may be influenced by, as well as influencing, health or disability (Adda et al., 2003; Goldman, 2001; Grundy and Holt, 2001; Smith and Kingston, 1997). To date, only two studies have used income to document trends in disability or health, both with repeated cross-sectional data. A US study (Schoeni et al., 2005) found that, during the 1990s, those who benefited most from reductions in disability were individuals in the highest quintile of the income distribution whereas no improvements were found for those who belonged to the lowest quintile. In Europe (Kunst et al., 2005), the relationship between self-rated health and SES measured by educational attainment by cohort of birth was almost stable in the 1980s and 1990s. However, when household equivalent income was used as the measure of SES, inequalities in self-rated health increased.

Our study examines birth-cohort trends in functional difficulties (FDs) among older people in the UK, assessed from self-reported difficulties in eight domains of FD, using a repeated large-scale population survey over a 10 year period. By exploiting the range of SES indicators in the data (measures of educational attainment, income components, and home-ownership), we can quantify the relative strength of the association of each with functional disability and investigate whether the overall trends observed among women and men born between 1924 and 1945 have favoured more advantaged socioeconomic groups. We aim to assess whether there are cohort trends differing by SES, which would have implication for future social care costs.

2. Methodology

2.1. Study population

We used pooled annual samples from the UK Family Resource Survey (FRS) covering 2002/3 to 2011/12. The FRS is a large-cross sectional survey, sponsored by the Department for Work and Pensions (DWP) and used to derive official statistics on income, poverty and welfare and disability programme targeting (Department for Work and Pensions, 2013; Kasparova et al., 2007). Each cross-section survey uses the Postcode Address File (PAF) as a sampling frame, and data are collected mainly by face-to-face interviews, performed by trained interviewers, from a large representative sample of individuals (on average about 45 thousand individuals aged 16+ per year) living in private households in the UK. The FRS has an overall response rate of around 60 percent (Department for Work and Pensions, various years) and data were adjusted for possible differential non-response using weights constructed by DWP. Analysis was conducted for respondents aged over 65 and born before 1945. To protect confidentiality, age was top-coded at the age of 80, necessitating exclusion of those born before 1924. After deleting a few cases with relevant information missing, a sample of 96,733 was selected. We split the analysis by gender and control for within-UK country of residence.

2.2. Functional disability

FRS respondents were asked the following question: 'Do you have any long-standing illness, disability or infirmity? By 'long-standing' I mean anything that has troubled you over a period of at least 12 months or that is likely to affect you over a period of at least 12 months'. Those who answered 'yes' were then asked if 'these health problem(s) or disability(ies) mean that you have substantial difficulties with any of these areas of your life': mobility (moving about); lifting, carrying or moving objects; manual dexterity (using your hands to carry out everyday tasks); continence (bladder and bowel control); memory or ability to concentrate, learn or understand; recognising when you are in physical danger; physical co-ordination (e.g.: balance); other health problem or disability. We defined respondents as disabled if they reported functional difficulty (FD) in at least one domain of life due to long-standing illness, disability or infirmity, and as not disabled if they reported no FDs or did not report having a long-standing illness, disability or infirmity (LSI). The number of reported FDs was used as an index of the severity of disability among those defined as disabled.

The use of a screen to precede a disability question raises the possibility of misclassifying some people with FDs who do not see themselves as having a 'condition'. There is evidence on this from a randomized experiment in the *Understanding Society* survey (Al-Baghal, 2014; Jäckle and Pudney, 2015), where the screening question was found to reduce measured disability prevalence by up to 20% (6 percentage points) in the whole adult sample. However,

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