# ORIGINAL INVESTIGATION

Melissa K. Andrew

# Social capital, health, and care home residence among older adults: a secondary analysis of the Health Survey for England 2000

**Abstract** This secondary analysis of the Health Survey for England 2000 aimed to investigate whether individual-level social capital is associated with care home residence and with function, mental health, and self-assessed health in older adults. Older adults in both care home and community residential settings were included. Two indicators of social capital, perceived social support and group participation, were considered for both care home and community-dwelling respondents. Amongst community dwellers, trust in others was considered as a third indicator. Functional impairment, psychiatric morbidity, and self-assessed health were used as indicators of health. Multivariable modelling was undertaken using logistic or ordinal logistic regression. The results show that severe lack of social support was associated with over twice the odds of care home residence, with increased odds of psychiatric morbidity in both care home and community settings, and with more severe functional impairment and worse self-assessed health in the community but not in care homes. Participation in more groups was associated with lower odds of functional impairment in both settings, and with lower odds of psychiatric morbidity and better self-assessed health among community but not among care home respondents. High levels of trust were associated with lower severity of functional impairment, reduced odds of psychiatric morbidity, and better self-assessed health. It is concluded that individual-level social capital was associated with care home residence and with indicators of physical, mental and self-assessed health. These associations differed between community and care home settings, and were generally stronger in the community.

**Keywords** Social capital · Social support (MeSH) · Social engagement · Homes for the aged (MeSH)

M. K. Andrew
Department of Public Health Policy,
London School of Hygiene and Tropical Medicine,
London, UK

*Present address*: M. K. Andrew
Division of Geriatric Medicine, Dalhousie University,
Camp Hill Veterans' Memorial Building, Halifax,
Nova Scotia, B3H 2E1, Canada
E-mail: mandrew@dal.ca
Tel.: +1-902-4738687
Fax: +1-902-4731050

## Introduction

Social capital has been variously conceptualised and defined (Baum and Ziersch 2003). A useful way to frame the debate is in terms of level of relevance of its tenure and measurement: is social capital most relevant at an individual (Bourdieu 1985; Portes 1998; Veenstra 2000; Dayton-Johnston 2003; Pevalin 2003) or collective level (Lochner et al. 1999; Kawachi and Berkman 2000; McKenzie et al. 2002; Szreter and Woolcock 2004), or both (Putnam 2000)?

The French sociologist Pierre Bourdieu defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships" (Bourdieu 1985, p. 248). His conceptualisation of social capital as a network of relationships accessed by an individual is consistent with the idea that social capital is a resource which can be measured at an individual level, and he states that "the volume of social capital possessed by a given agent thus depends on the size of the network of connections he can effectively mobilize and the volume of the capital ... possessed by each of those to whom he is connected" (Bourdieu 1985, p. 249).

Others have argued that social capital has collective properties. Although Robert Putnam sees social capital as having relevance on an individual level (having properties of a 'private good'; Putnam 2000), he defines it as "the features in our community life that make us more productive—a high level of engagement, trust, and reciprocity" (Putnam 1996, p. 4), thus adding a 'public good' dimension (Putnam 2000). In other conceptualisations, social capital is considered in purely collective

terms. For example, Kawachi and Berkman argue: "social capital inheres in the structure of social relationships; in other words it is an ecological characteristic," which "should be properly considered a feature of the collective (neighbourhood, community, society) to which an individual belongs" (Kawachi 2000, p. 176–177).

The theoretical debate surrounding definition and measurement has meant that the term social capital has not enjoyed standardized usage; it has been used to denote various concepts, sometimes overlapping with different terms already in use by other authors, such as social support, social networks, and social cohesion. For example, social engagement (e.g. socialization with family and friends and participation in community groups and roles) is seen by some to fall into the domain (distinct from social capital) of social networks (Berkman and Glass 2000). However, it can also be seen to fall under the umbrella of social capital if it is conceptualised to have individual-level relevance, as argued by Bourdieu and Putnam. There is also empirical evidence to support the assertion that social participation has contextual, or collective-level, properties and thus fits in with the social capital construct (Lindstrom et al. 2002). A similar debate applies to the concept of social support, which some see as distinct from social networks and social capital (Berkman and Glass 2000). However, under a definition (such as Bourdieu's) in which social capital is accrued through an individual's networks of relationships, social support—in its relationship with networks of support—could be seen as contributing to an individually defined 'network' view of social capital.

The debate surrounding the definition and conceptualisation of social capital has implications for its operationalisation in empiric research. Beyond considerations of what social capital is, there is also the challenge of how it should be measured. Different studies and surveys have tended to use different instruments to measure social capital. This adds another layer of complexity to attempts to compare results between studies. Development of more standardized measurement instruments has been identified as a priority for further research (Lochner et al. 1999; Putnam 2004; Kawachi et al. 2004). Level of measurement is also relevant. Several studies have utilized individual responses to survey questions, and analysed their relationship to health or other indicators of interest on an individual level. Others have done analyses on collective levels based on indicators of social capital which are aggregates of individual survey responses. An alternative method, which has yet to come into common use, is to use collective indicators which do not hinge on individual responses at all (Kawachi and Berkman 2000).

Social capital and its association with health have been investigated at both individual and ecological levels. Higher individual-level social capital was linked to better self-assessed health among Swedish speakers in a bilingual region of Finland (Hyyppa and Maki 2001). Ecological analyses have shown higher social capital to be associated with lower mortality at state (Kawachi et al. 1997) and neighbourhood (Lochner et al. 2003) levels in the United States. Wilkinson (1996) has proposed social cohesion as an explanation for the link between inequalities (e.g. income inequalities) within societies and poor health, and Marmot (2004) has raised similar arguments relating to inequalities in social status.

However, the story on social capital and health is far from complete, particularly for older adults. Research findings have not been uniform—some studies have shown neutral or negative health effects at both individual (Kunitz 2001) and collective (Kennelly et al. 2003) levels of analysis. Relatively few studies have focused on the older adult population. Increased social ties, defined as a composite of marital status, contact with friends/relatives, church and group attendance, were associated with reduced mortality in some cohorts of older adults (Seeman et al. 1987, 1993). Social support has also been associated with decreased 5-year mortality among community-dwelling older adults (Blazer 1982), and social disengagement has been linked to increased odds of incident cognitive decline (Bassuk et al. 1999). However, most studies have been done in community settings, and thus residents of care homes have not been widely studied.

This study aimed to investigate whether social capital is associated with living situation and with health among older adult (≥65 years of age) residents of England in both community and care home settings. An individual-level conceptualisation of social capital was used, based on individual respondents' answers to survey questions. Three indicators were used, each of which may be seen, depending on the operational definition used, to fall within the realm of social capital: *perceived social support* and *group participation* both relate to a 'network' definition of social capital, such as that espoused by Bourdieu (1985). *Trust and reciprocity*, though measured on an individual level, pertains to ideas of social capital such as community efficacy (Putnam 2000).

## Methods

### Sample

The Health Survey for England (HSE) is an annual national survey designed to measure and monitor various indicators relating to the health of English residents of all ages. In the 2000 round, separate community and care home samples were assembled using clustered, stratified and multistage sampling methods. Face-to-face interviews were conducted in respondents' places of residence. Respondents also completed a self-administered questionnaire. Details of the survey design have been published elsewhere (Prior et al. 2000).

Assessment of whether care home residents required proxy respondents or were capable of responding for themselves was based on the results of a cognitive function screen (including tests of orientation, concen-

tration and memory) which was administered to respondents aged 65 and over, and/or on information provided by care home staff. Because proxy respondents could not be expected to know intimate details of the subject's past, information on a number of variables (e.g. education level attained, social class, and subjective experiences) is missing for the proxy subjects. Cognitive function, as indicated by the results of the 11-question screen, was considered as a potential confounder in some of the analyses.

A total of 4,190 older adults ≥65 years of age participated in the HSE 2000: 1,677 community dwellers and 2,493 care home residents. Data for 1,271 of the care home respondents came from proxy interviews.

### Definition of social capital variables

Three indicators of social capital were used in the current study: *group participation* as an indicator of an individual's social engagement and integration, *perceived social support* as measured by the social support index (SSI), and *trust and reciprocity*. SSI and group participation were available for both community and care home samples, whereas questions relating to trust and reciprocity were included only in the community setting.

The SSI is a measure of perceived social support on a scale of 0 to 21, originally developed for the Health and Lifestyle Survey. According to usual practice in the literature, responses were grouped as follows: score 21 = no lack of social support, scores 18–20 = some lack of social support, scores < 18 = severe lack of social support (Blaxter 1990; Prior et al. 2000).

Subjects (or proxy respondents) were asked which of a given list of groups/clubs they participated in. As the types of groups available would be expected to differ between community and care homes, two different lists, suited to the setting, were included in the community and care home versions of the survey questionnaire (Appendix). For the purposes of this study, the number of groups participated in was tallied for each respondent.

Three questions were asked relating to individuals' levels of trust and feelings of reciprocity towards others; these were consistent with questions used by previous studies to assess these concepts (Kawachi et al. 1997, 1999; Lochner et al. 1999). A 'trust/reciprocity' score was created by combining the individuals' responses to the three questions to form a single three-level variable: low, intermediate and high trust/reciprocity.

### Health variables

Three health indicators were chosen to represent different 'domains' of health status: functional impairment, mental health, and self-assessed health (SAH).

Assessment of a subject's level of function was based on responses to a series of questions relating to func-

tionality in three different domains: *mobility* (difficulty walking, climbing stairs, rising from bed/chair), *personal care* (ability to dress, feed, and toilet oneself), and *communication* (problems communicating with others). A 'functional domains' variable (0–3) was constructed to indicate the number of impaired functional domains. Such a tally of impairment would be clinically relevant, as impairment in an increasing number of areas would be expected to correlate with increasing frailty (Rockwood et al. 2000). Among community dwellers, there were few respondents with three domains of impaired function (16 individuals, or 1% of the sample), so they were included in the two-domain category for the analyses in which community dwellers were considered separately from care home residents.

The General Health Questionnaire (GHQ), a 12-point instrument which has been validated to detect mild psychiatric morbidity, was used as an indicator of mental health. According to accepted practice, scores ≥4 were taken to define a 'case' of psychiatric morbidity, and scores < 4 a 'non-case' (Goldberg and Williams 1988).

Respondents were asked to rate their overall health compared with others their own age on a five-point scale (very good, good, fair, poor, very poor). For the analyses in this study, responses were collapsed into three groups (good, fair, poor). Self-assessed health has been shown to correlate well with objective measures of health and mortality (Idler and Benyamini 1997).

Assessment of socioeconomic status (SES) in older adults, especially those in care homes, presents challenges (Grundy and Holt 2001; Grundy and Sloggett 2003). The information is often missing when a proxy respondent has been used, and assigning SES based on occupation can be difficult when the older person is retired or has never worked outside the home. Education, measured in terms of age of school-leaving ( ≤ 15 vs. > 15 years old), was used as the primary SES indicator in this study. This cut-point was chosen because 15 would have been the minimum age of school-leaving for many of the participants in this survey (DFES 2005). Occupational social class, based on the Registrar General's classification (i = professional, ii = managerial and technical, iii-n = skilled non-manual, iii-m = skilled manual, iv = partly skilled, v = unskilled; Marmot 2004) was also considered.

### Statistical analysis

Weighting of the care home sample was taken into account in analysis methodology. As weighting precluded *t* testing, adjusted Wald tests were used to assess statistical significance of differences between means, and chi-square testing was used for categorical variables. Logistic regression modeling was used for binary outcomes (care home residence and GHQ case status); ordinal logistic regression (proportional odds model) was used for multilevel ordered outcomes (functional impairment

and SAH; Scott et al. 1997; Hosmer and Lemeshow 2000). Table 1 provides a summary of the models used in the analyses. For ordinal logistic regression models, the appropriateness of combining odds ratio (OR) estimates across cut-points was assessed graphically to confirm that the confidence intervals for logistic regression models at each cut-point overlapped (Scott et al. 1997).

The association between each indicator of social capital and health was studied separately for care home and community-dwelling respondents. For each outcome, univariate modeling was conducted. A multivariable model was then forward-fitted by adding variables to the model one at a time in the order of their strength of confounding. Analyses in which SAH and functional impairment were considered the 'outcome' were adjusted for age, sex, education and social class. In these cases, adjusting for functional impairment and cognition would not be appropriate because they form a relevant part of the outcome in question. However, GHQ analyses did adjust for functional impairment and cognition. To avoid possible over-adjustment due to strong associations between functional impairment and mental health (particularly depression) (Cronin-Stubbs et al. 2000; Geerlings et al. 2001), a second set of GHQ models did not include adjustment for functional impairment. One care home model (group participation and functional impairment) included both proxy and self respondents. The effect of adjusting for proxy vs. self response status was investigated. For every model, the contribution of each additional variable to overall model fit was assessed using adjusted Wald testing, and only variables with statistically significant contribution to model fit were retained in final models. The possibility of effect modification was considered in all final models by using a Wald test to assess contribution of interaction terms between each confounder and the explanatory variable to model fit.

## Results

Community dwellers were younger than care home residents (see Table 2). Care home residents were more likely to report a severe lack of social support, but participated in more groups than did community dwellers. In all, 37.6% (95% CI: 35.2–39.9%) of community dwellers reported high levels of trust and feelings of reciprocity. Self-assessed health was similar in both settings ($p = 0.087$), with approximately 11% reporting poor health. However, functional capacity was worse among care home residents, who were much more likely to have difficulty in two or more functional domains and to be cognitively impaired. Mild psychiatric morbidity was also present in more care home than community residents.

In the care home setting, proxy respondents participated in more groups than did self respondents (3.4 vs. 2.7, $p < 0.0001$), despite having more functional impairment: 44.6% had problems in all three domains, compared with 3.5% among self respondents ($p < 0.0001$; see Table 3). Proxy respondents were also more cognitively impaired.

Among community dwellers, male sex ($p < 0.0001$) and increasing functional impairment ($p = 0.0015$) were associated with more severe lack of social support. Lack of social support was associated with minimal educational attainment ($p = 0.0022$) among care home residents. Low group participation was associated with increasing age and functional impairment in both community dwellers ($p = 0.009$ and $p < 0.001$ respectively) and residents of care homes ($p = 0.028$ and 0.001). Minimal education was also associated with reduced group participation in both settings (community $p < 0.001$, care homes $p = 0.034$). Additionally, greater group engagement was associated with female sex in care homes ($p = 0.0008$) and with higher occupational social class in the community ($p < 0.001$). Older respondents ($p = 0.008$) and women ($p = 0.026$) reported higher levels of trust, as did those with more than minimal education ($p < 0.0001$), and higher social class ($p = 0.004$). There was a trend towards higher levels of trust among those with less functional impairment ($p = 0.053$).

### Social support and care home residence

Adjusting for age, sex, function and cognition, those with a severe lack of social support had twice the odds of care home residence, compared with those expressing no lack (OR 2.17, 95% CI: 1.48–3.16). However, there was

**Table 1** Outline of analyses

| Objective | "Explanatory" variable* | "Outcome" variable* |
|---|---|---|
| Social capital and care home residence | Social Support Index (SSI) Group participation | **Care home residence** (binary) |
| Social capital and health | SSI Group participation Trust/reciprocity | **GHQ** (mental health binary: "case" > = score 4 "non-case" > 4 |
| | SSI Group participation Trust/reciprocity | **Disability** (# domains)4 levels (0,1,2,3 domains) |
| | SSI Group participation Trust/reciprocity | **Self-assessed health**3 levels (good, fair, poor) |

*The terms "explanatory" and "outcome" are for descriptive purposes only and are not meant to imply a causal relationship, which cannot be inferred with cross-sectional data.

**Table 2** Community and long-term care populations. Values are given as percentages (95% CI) unless stated otherwise

| Variable Number sampled | Community 1,677 | Care homes 2,493 | p-value |
|---|---|---|---|
| *Age*: mean (95% CI) | 74.3 (73.9–74.6) | 85.0 (84.6–85.4) | < 0.0001 |
| $N$ = unweighted (missing), weighted[a] | $N$ = 1,677 (0) | $N$ = 2,493 (0), 2,493.0 | |
| *Sex*: men | 44.3% (41.9–46.7) | 23.4% (21.4–25.4) | < 0.0001 |
| women | 55.7% (53.3–58.1) | 76.6% (74.6–78.6) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,677 (0) | N = 2,493 (0), 2,493.1 | |
| *Education*: left ≤ 15 years old | 70.7% (68.4–72.8) | 73.6% (70.5–76.6) | 0.13 |
| left > 15 years old | 29.3% (27.2–31.6) | 26.4% (23.4–29.5) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,671 (6) | $N$ = 1,197 (1,296), 1,019.0 | |
| *Occupational social class*: i | 2.6% (1.9–3.5) | 2.6% (1.7–4.1) | 0.041 |
| ii | 24.2% (22.2–26.4) | 21.0 (17.7–24.7) | |
| iii-n | 24.7% (22.6–26.9) | 26.0% (22.6–29.9) | |
| iii-m | 23.4% (21.4–25.5) | 19.1% (16.0–22.6) | |
| iv | 15.5% (13.8–17.3) | 18.9% (16.0–22.3) | |
| v | 9.6% (8.3–11.2) | 12.3% (9.8–15.5) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,596 (81) | $N$ = 808 (1,685), 685.5 | |
| *Marital status*: single | 6.0% (4.9–7.2) | 15.4% (13.8–17.2) | < 0.0001 |
| married—living together | 54.6% (52.2–57.0) | 2.5% (1.9–3.3) | |
| married—living apart | 1.1% (0.7–1.7) | 7.0% (5.8–8.3) | |
| divorced | 4.7% (3.8–5.8) | 4.1% (3.3–5.2) | |
| widowed | 33.6% (31.4–35.9) | 71.0% (68.7–73.1) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,675 (2) | $N$ = 2,472 (21), 2,472.0 | |
| *Social support index*: no lack | 59.6% (57.1–62.0) | 51.6% (47.7–55.4) | < 0.0001 |
| some lack | 26.0% (23.9–28.2) | 25.9% (22.7–29.4) | |
| severe lack | 14.4% (12.7–16.2) | 22.5% (19.5–25.9) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,557 (120) | $N$ = 986 (1,507), 840.2 | |
| *Groups*: mean number (IQR, range) | 0.86 (0–1, 0–6) | 3.12 (1–5, 0–13) | < 0.0001 |
| $N$ = unweighted (missing), weighted | $N$ = 1,671 (6) | $N$ = 2,478 (15), 2,476.6 | |
| *Trust*: high | 37.6% (35.2–39.9) | Question not asked in care home sample | n.a. |
| intermediate | 35.3% (33.0–37.6) | | |
| low | 27.1% (25.0–29.3) | | |
| $N$ = unweighted (missing), weighted | $N$ = 1,651 (26) | (2,493) | |
| *SAH*: good | 56.5% (54.1–58.9) | 52.3% (48.9–55.7) | |
| fair | 32.2% (30.0–34.4) | 36.5% (33.3–39.8) | 0.087 |
| poor | 11.3% (9.9–13.0) | 11.2% (9.2–13.5) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,676 (1) | $N$ = 1,218 (1,275), 1,041.0 | |
| *Domains of functional impairment*: 0 | 65.7% (63.4–68.0) | 14.3% (12.7–16.0) | |
| 1 | 21.0% (19.1–23.0) | 21.0% (19.1–23.0) | < 0.0001 |
| 2 | 12.2% (10.8–13.9) | 37.4% (35.1–39.8) | |
| 3 | 1.0% (0.63–1.63) | 27.4% (25.3–29.6) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,675 (2) | $N$ = 2,493 (0), 2,493 | |
| *General Health Questionnaire* case (≥4) | 14.0% (12.4–15.9) | 26.0% (22.7–29.5) | < 0.0001 |
| $N$ = unweighted (missing), weighted | $N$ = 1,526 (151) | $N$ = 981 (1,512), 828.3 | |
| *Cognition score*: mean (95% CI) number of questions wrong | 0.56 (0.52–0.61) | 3.33 (3.15–3.52) | < 0.0001 |
| $N$ = unweighted (missing), weighted | $N$ = 1,677 (0) | $N$ = 1,617 (876), 1,466.5 | |

[a]Weighting only applied in care homes. IQR, interquartile range

no statistically significant association among those reporting only some lack of social support (OR 1.13, 95% CI: 0.75–1.69). Education and occupational social class failed to improve model fit and were thus left out of the final model.

Social support and health

Among care home residents, those with severe lack of social support had increased odds of psychiatric morbidity, adjusting for age and education (see Table 4, Fig. 1). Those with moderate lack of social support had no greater odds of psychiatric morbidity than did individuals with no lack. Among community dwellers, the same pattern was observed: severe lack of social support was associated with nearly twice the odds of mental health problems, taking into account the influence of age, education, cognition and social class, whereas those with moderate lack showed no such increase in psychiatric morbidity.

Lack of social support was not associated with functional impairment in care homes. However, across all levels of function, severe lack of perceived social support among community dwellers was associated with almost twice the odds of being more functionally impaired. There was no statistically significant association between moderate lack of social support and functional impairment.

In care homes, there was no association between perceived level of social support and SAH. Among community-dwelling respondents, expressed lack of so-

**Table 3** Comparison of self and proxy respondents within care homes. Values are given as percentages (95% CI) unless stated otherwise

| Variable<br>Number (unweighted) | Self respondents<br>1,222 | Proxy respondents<br>1,271 | *p*-value |
|---|---|---|---|
| *Age*: mean years (95% CI) | 84.6 (84.1–85.1) | 85.3 (84.8–85.8) | 0.078 |
| $N$ = unweighted (missing), weighted | $N$ = 1,222 (0), 1,044.1 | $N$ = 1,271 (0), 1,448.9 | |
| *Sex*: men | 27.0% (24.0–30.1) | 20.8% (18.3–23.6) | 0.0028 |
| women | 73.6% (69.9–76.0) | 79.2% (76.4–81.7) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,222 (0), 1,044.0 | $N$ = 1,271 (0), 1,449.0 | |
| *Marital status*: single | 15.0% (12.7–17.7) | 15.7% (13.5–18.2) | 0.0003 |
| married—living together | 4.2% (3.0–5.9) | 1.2% (0.76–2.0) | |
| married—living apart | 6.0% (4.6–7.9) | 7.7% (6.1–9.6) | |
| divorced | 5.2% (3.8–7.0) | 3.4% (2.4–4.8) | |
| widowed | 69.5% (66.2–72.6) | 72.0% (69.0–74.8) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,209 (13), 1,029.0 | $N$ = 1,263 (8), 1,443.0 | |
| *Groups*: mean number (IQR, range)[a] | 2.7 (1–4, 0–11) | 3.4 (1–6, 0–13) | < 0.0001 |
| $N$ = unweighted (missing), weighted | $N$ = 1,207 (15), 1,028.0 | $N$ = 1,271 (0), 1,449.0 | |
| *Domains of functional impairment*: 0 | 24.7% (21.9–27.9) | 6.7% (5.3–8.5) | < 0.0001 |
| 1 | 30.2% (27.2–33.4) | 14.3% (12.1–16.8) | |
| 2 | 41.5% (38.2–44.9) | 34.4% (31.1–37.7) | |
| 3 | 3.5% (2.5–5.1) | 44.6% (41.3–47.9) | |
| $N$ = unweighted (missing), weighted | $N$ = 1,222 (0), 1,044.0 | $N$ = 1,271 (0), 1,449.0 | |
| *Cognition score*: mean (95% CI) number of questions wrong | 1.8 (1.7–2.0) | 7.0 (6.7–7.3) | < 0.0001 |
| $N$ = unweighted (missing), weighted | $N$ = 1,222 (0), 1,044.1 | $N$ = 395 (876), 422.4 | |

[a]IQR, interquartile range

cial support was associated with worse SAH; those with severe lack of social support had about twice the odds of worse SAH across all levels of SAH. For those with only moderate lack, the association was of borderline statistical significance.

Group participation and health

In care homes, there was no evidence of an association between group participation and psychiatric morbidity (Table 4, Fig. 2). Among community dwellers, however, participation in each additional group was associated with reduced odds of psychiatric morbidity, taking age and education into account. Sex, cognitive impairment and social class failed to improve model fit.

As group participation increased, the odds of being more functionally impaired decreased across all levels of function for both care home residents and community dwellers. Among care home respondents, this association persisted when the model was adjusted for proxy vs. self response (OR 0.87, 95% CI: 0.84–0.90).

Group participation was not associated with SAH in the care home population. Among community dwellers, and across all levels of SAH, those who participated in more groups had lower odds of poorer SAH, adjusting for age, education and social class.

Trust/reciprocity and health

Adjusting for age, education and cognitive function, having a high level of trust in others was associated with lower odds of psychiatric morbidity (Table 4, Fig. 3).

Level of trust/reciprocity was associated with extent of functional impairment: adjusting for age, education, and social class, individuals expressing high trust had lower odds of functional impairment, across all levels of function, than those with low trust. There was no statistically significant association between intermediate levels of trust and function.

Across all levels of SAH, high levels of trust were associated with lower odds of worse SAH when compared with low trust, adjusting for age, education, and social class. There was no association between intermediate levels of trust and SAH.

For each of the analyses investigating associations of social capital with GHQ-defined psychiatric morbidity, a second set of models were done to investigate the influence of adding adjustment for functional impairment (functional impairment was not included in the initial set of models to avoid potential over-adjustment due to strong associations between functional impairment and depression) (Cronin-Stubbs et al. 2000; Geerlings et al. 2001). In both community and care home settings, results from both sets of models were very similar (see Table 4).

The possibility of effect modification was considered; no evidence of statistically significant effect modification was found in any of the models.

**Discussion**

Care home residence

Individuals reporting severe lack of social support had over twice the odds of being a care home resident, adjusting for age, sex, functional impairment, cognition,

**Table 4** Results of multivariable logistic regression and ordinal logistic regression models

| Indicator of social capital | Health 'outcome' | Setting | N unweighted (weighted) | Final adjusted models: variables included[a] | OR applies to (baseline = no lack of social support or low trust) | OR (95% CI) |
|---|---|---|---|---|---|---|
| Perceived Social Support | Mental Health (GHQ) | Care homes | 936 (793.5) | SSI + functional impairment | Moderate lack of SS | 0.89 (0.54–1.45) |
| | | | | | Severe lack of SS | 1.69 (1.08–2.65) |
| | | Community | 1,496 | SSI + age, education | Moderate lack of SS | 0.87 (0.53–1.41) |
| | | | | | Severe lack of SS | 1.62 (1.05–2.52) |
| | | Community | | SSI + functional impairment | Moderate lack of SS | 1.04 (0.72–1.50) |
| | | | | | Severe lack of SS | 1.88 (1.25–2.82) |
| | | | | SSI + age, education, cognition, social class | Moderate lack of SS | 1.09 (0.76–1.57) |
| | | | | | Severe lack of SS | 2.32 (1.57–3.42) |
| | Functional impairment | Care homes | 986 (840.2) | SSI | Moderate lack of SS | 0.85 (0.60–1.20) |
| | | | | | Severe lack of SS | 0.79 (0.54–1.15) |
| | | Community | 1,493 | SSI + age, education, social class, sex | Moderate lack of SS | 1.20 (0.93–1.55) |
| | | | | | Severe lack of SS | 1.90 (1.39–2.59) |
| | Self-assessed health | Care homes | 986 (840.2) | SSI + age | Moderate lack of SS | 1.11 (0.79–1.55) |
| | | | | | Severe lack of SS | 1.27 (0.85–1.90) |
| | | Community | 1,493 | SSI + age, education, social class | Moderate lack of SS | 1.26 (1.00–1.60) |
| | | | | | Severe lack of SS | 1.96 (1.47–2.62) |
| Group participation | Mental health (GHQ) | Care homes | 980 (827.8) | Groups + disability | Per additional group | 0.96 (0.89–1.04) |
| | | Community | 1,526 | Groups + age | Per additional group | 0.95 (0.88–1.03) |
| | | | | Groups + disability | Per additional group | 0.78 (0.66–0.92) |
| | | | | Groups + age, education | Per additional group | 0.72 (0.61–0.84) |
| | Disability | Care homes | 2,478 (2,476.6) | Groups + age, sex | Per additional group | 0.93 (0.90–0.96) |
| | | Community | 1,592 | Groups + age, education, social class | Per additional group | 0.80 (0.72–0.89) |
| | Self-assessed health | Care homes | 1,204 (1,025.4) | Groups + age | Per additional group | 0.95 (0.89–1.00) |
| | | Community | 1,591 | Groups + education, social class, age | Per additional group | 0.80 (0.72–0.88) |
| Trust in others | Mental health (GHQ) | Community | 1,512 | Trust + disability | Intermediate trust | 0.80 (0.55–1.17) |
| | | | | | High trust | 0.66 (0.45–0.98) |
| | | | | Trust + age, education, cognition | Intermediate trust | 0.78 (0.55–1.12) |
| | | | | | High trust | 0.59 (0.41–0.86) |
| | Disability | Community | 1,574 | Trust + age, education, social class | Intermediate trust | 0.87 (0.66–1.13) |
| | | | | | High trust | 0.69 (0.53–0.90) |
| | Self-assessed health | Community | 1,573 | Trust + age, education, social class | Intermediate trust | 0.91 (0.71–1.17) |
| | | | | | High trust | 0.63 (0.49–0.82) |

[a] Age, sex, education and social class were considered for each model; functional impairment and cognition were also included in mental health modeling. Two sets of models are reported for mental health: one adjusting for functional impairment and one excluding it. Only variables whose contribution to model fit was statistically significant were retained in final models. SSI, social support index; SS, social support; GHQ, General Health Questionnaire; CI, confidence interval; OR, odds ratio

**Social Support - associations with health in care home and community settings**
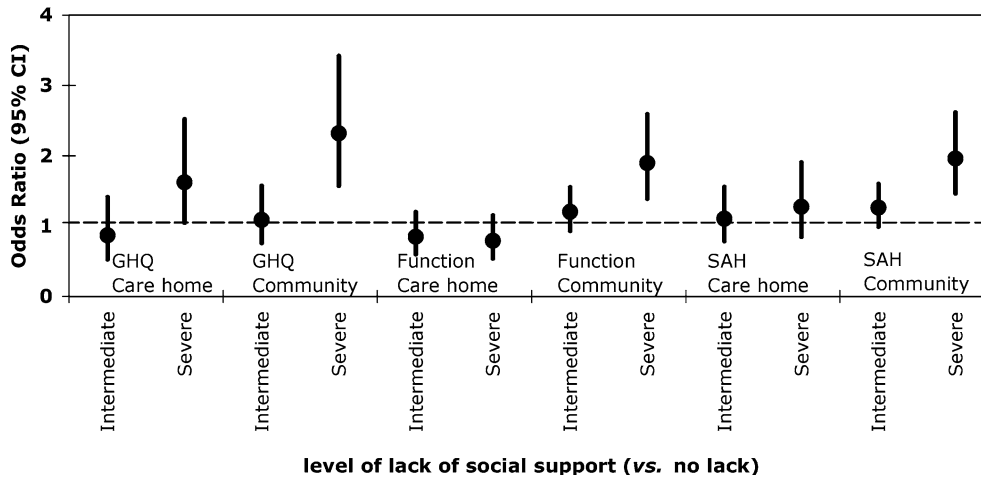


**Fig. 1** Social support—associations with health in care home and community settings. Odds of poor health (psychiatric morbidity according to the GHQ, functional impairment, or poor SAH) by degree of social support lack as reported in the Social Support Index, compared with no lack. Severe perceived lack of social support was associated with increased odds of psychiatric morbidity among care home and community residents, and with increased odds of functional impairment and poor self-assessed health among community dwellers. *GHQ* General Health Questionnaire, *SAH* self-assessed health, *CI* confidence interval

education and social class. This suggests that an individual's social capital, as expressed through his/her social support, may be a factor which is protective against care home placement, an interpretation consistent with previous studies' identification of lack of social support as a risk factor for care home placement (Freedman et al. 1994; Rockwood et al. 1996; Kersting 2001). However, the possibility of reverse causation is relevant: perhaps individuals do not enter care homes because of a lack of social support, but instead lose perceived social support once they move in. This might relate to geo-

graphical isolation and reduced interaction with family and friends in the course of day-to-day care.

### Group participation

In both care home and community settings and across all levels of function, participation in more groups was associated with lower levels of functional impairment. Among care home residents, the magnitude of this association was fairly small. In the community setting, however, the association was stronger. A similar pattern was observed with SAH, where no association was observed between group participation and SAH in care homes but the association was statistically significant in the community setting. The possibility of reverse causation is important when interpreting these findings: it is quite likely that, especially in a community setting, higher levels of functional impairment, and plausibly worse SAH, would be a barrier to group participation.

**Fig. 2** Group participation—associations with health in care home and community settings. Odds of poor health (psychiatric morbidity according to the GHQ, functional impairment, or poor SAH) per additional group participated in. Participation in more groups was associated with lower odds of functional impairment in both care home and community residents, and with lower odds of psychiatric morbidity and poor self-assessed health among community-dwelling respondents. *GHQ* General Health Questionnaire, *SAH* self-assessed health, *CI* confidence interval

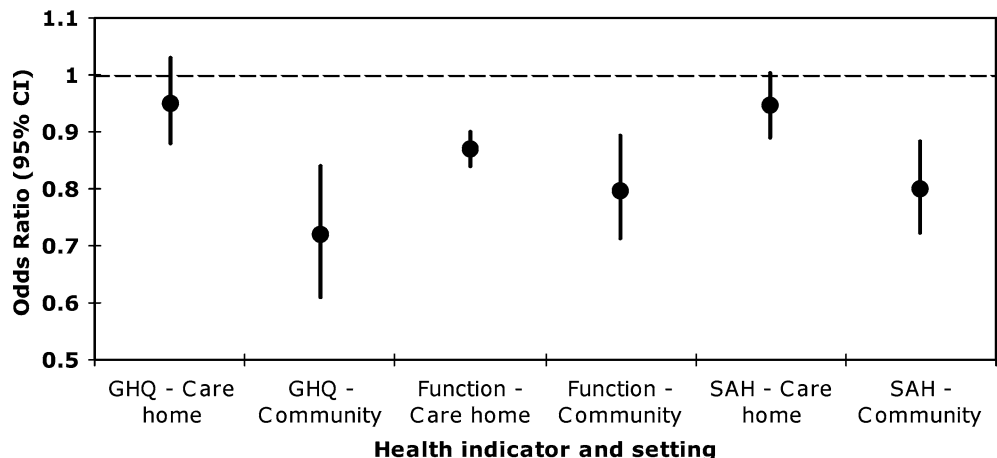**Group participation - associations with health in care home and community settings**

**Fig. 3** Trust—associations with health indicators in community setting. Odds of poor health (psychiatric morbidity according to the General Health Questionnaire, functional impairment, or poor self-assessed health) by level of reported trust in others, compared with low trust. High levels of reported trust were associated with lower odds of poor mental health, functional capacity and self-assessed health. *CI* Confidence interval
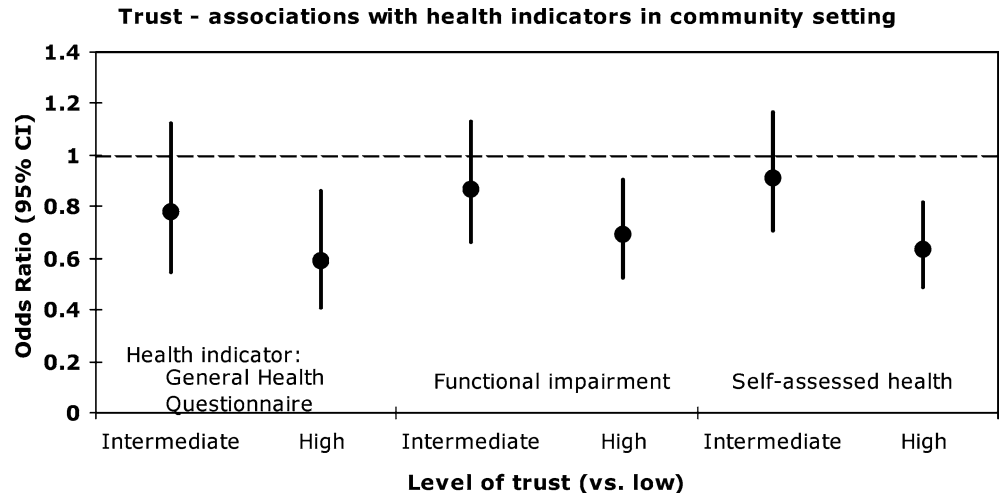


Group participation differed between the two settings, with care home residents reporting participation in more groups. This may be explained by relative ease of access to groups in care homes compared with the community, and may also reflect care home residents having more leisure time and less social interactions with family. Since the lists of groups considered differed between the two settings (Appendix), group membership in the community setting may arguably require higher levels of active participation and initiative. Proxy respondents were said to participate in more groups than self respondents, despite being too frail and/or cognitively impaired to answer the survey. This may indicate an over-reporting of participation by care home staff, or differing views of what constitutes 'participation'. Any health benefit of group participation may be more dependent on the 'quality' (e.g. active rather than passive) of group interactions. If group participation in care homes tended to be of more passive quality, this may explain, at least in part, the finding that associations between group participation and health were weaker in care homes than in the community setting. Also, it is possible that self respondents in care homes may have tended to under-report or forget what groups they participate in. This, combined with the finding that self respondents were less sick than proxy respondents, would tend to reduce any association between group participation and health towards the null value if the relatively well self respondents under-reported group participation while the sicker proxies may have over-reported. This possibility is supported by the observation that adjusting the group participation & functional impairment model in the care home setting for self vs. proxy response resulted in a stronger association: OR 0.87 (95% CI: 0.84–0.90) adjusting for proxy response vs. OR 0.93 (95% CI: 0.90–0.96) not doing so.

Associations between social engagement and health have been investigated in some previous studies. In a Swedish study of adults aged 45–73, high community levels of social engagement were associated with better health, adjusting for individual-level factors (Lindstrom

et al. 2002), but a Finnish study did not find a statistically significant association between group participation and SAH (Hyyppa and Maki 2001). Group participation was associated with better SAH in a subgroup of older adults in a small Canadian study (Veenstra 2000). Social disengagement was associated with increased cognitive decline in a longitudinal study of older adults (Bassuk et al. 1999).

Social support

Severe lack of social support was associated with psychiatric morbidity in both care home and community settings, but the association was stronger among community respondents. These findings are consistent with existing literature linking social support with mental health (Kawachi and Berkman 2001). However, the possibility of reverse causation must be considered: distressed individuals may be more likely to perceive and report poor social support (Kawachi and Berkman 2001). The pattern of stronger associations between social support and health in community versus care home settings was also found for functional impairment and SAH. In these cases, there was no association in care homes. This may reflect a greater sensitivity to the benefits of social support in the community, where older adults may be more reliant on friends and family for basic needs.

Trust

In the current study, high trust was associated with lower odds of functional impairment and psychiatric morbidity and better SAH. Individuals with intermediate trust did not differ from those with low trust in terms of these health indicators. Thus, the *level* of trust seems to be relevant. These findings are consistent with those of a multilevel study in which higher community-level civic engagement and trust were associated with better

SAH, adjusting for individual-level health-related factors in community-dwelling adults (Kawachi et al. 1999). Higher trust was associated with better SAH in a multilevel US analysis (Subramanian et al. 2002), and an individual-level analysis involving adults of all ages in Finland (Hyyppa and Maki 2001). A small Canadian study found no association between trust and SAH (Veenstra 2000).

The similar results obtained from the two sets of models (including vs. excluding functional impairment) investigating the association between each of the three social capital indicators and GHQ-defined mental health suggest that adjusting for functional impairment did not lead to over-adjustment, and that the model results are fairly robust.

The 10-year difference in age between the community and care home samples reflects the differences between these populations—care home residents tend to be more frail than community dwellers, and frailty is associated with increasing age (Mitnitski et al. 2002). Given the age difference, the possibility of a cohort effect should be considered. There may be important differences in social behaviours and values between cohorts. For example, older cohorts may have higher levels of social engagement and trust (Putnam 2000). In an attempt to limit the influence differential age effects on this study, age was taken into account in the multivariable models.

Subjective reports and personal historical details were missing for proxy respondents in care homes. This 'silence by proxy' presents great challenges in research involving frail older adults, as it is often hardest to gather information from those who are the most frail, particularly in care homes where family members may be unavailable to fill in historical details. In this study, proxy respondents were more disabled and had more cognitive impairment. These frailest individuals were by necessity left out of the analyses exploring associations between social support and health, and between group participation and mental or self-assessed health because SSI, GHQ and SAH all rely on subjective self-report. However, in the one analysis in which both proxy and self respondents were able to be included (group participation and functional impairment), adjusting for proxy response affected the model results only slightly, and did not alter their statistical significance. Because the cognition screen relied on personal response to the survey, cognitive function was also unknown for some proxy respondents. This missing information likely impacted on the ability to adjust for cognitive status in the analyses, and thus confounding by cognitive status may remain. One might also imagine that social support could be more relevant to health in frail older adults, as they might be most reliant on family and friends for care and encouragement, and that benefits of group participation could be greater in terms of optimising mobility and function. As such, the associations found in this study could be underestimates.

## Study limitations

There are three important limitations to this study and the interpretation of its results: it is a secondary analysis, it is based on cross-sectional survey data, and it is an individual-level analysis of constructs which are also relevant on a communal level.

Secondary analysis of data collected for other purposes, including social surveys, presents challenges and has limitations. Analyses must use the data as collected, certain questions of interest may not have been included or worded ideally, and there may be missing values. The level of evidence from secondary analyses is lower than that obtained from a purpose-designed study, in which the data collection is done to conform to requirements of the pre-specified study design. However, secondary analysis can yield useful results. The Health Survey for England 2000 presents a unique opportunity to investigate concepts relating to social capital and their relationships with health, and to compare these associations between populations of community-dwelling older adults and those residing in care homes. In particular, care home residents are often not included in community-based studies of social capital.

Due to the cross-sectional nature of this survey, it is not possible to determine causality or its direction. Ideally, longitudinal data would be preferable in allowing one to determine whether low levels of group participation or social support *preceded* (and might plausibly suggest a causal relationship with) ill health or care home residence, rather than the alternative possibility that an individual has low social capital due to functional impairment and access barriers. Longitudinal data also allow for deeper investigation of the complex relationships that may exist between social capital and health. For example, a recent UK study found that social engagement predicted four- (but not eight-) year self-assessed health but not objective health in a cohort of 359 older adults (Bennett 2005). In another study, high social engagement was associated with reduced health service use when analysed cross-sectionally, but was associated with increased use of home help services at 8 year follow-up (Bath and Gardiner 2005).

Some have argued that social capital is an intrinsically ecological phenomenon and that individual-level analysis is not relevant (Kawachi and Berkman 2000). However, others argue that individual-level analysis is important, as there may well be differences in the social capital experienced by individuals within a community unit, and that analysis at a community level may not allow consideration of individual-level factors which are also related to health (Veenstra 2000; Hyyppa and Maki 2001). A purely ecological-level analysis would have weaknesses as well, notably the 'ecological fallacy', i.e. problems arising from extrapolation of group-level findings to individuals. The optimal strategy may well be a combined, 'multilevel' approach in which both individual- and community-level factors are taken into account (Kawachi et al. 1999; Lindstrom et al. 2002).

## Conclusions

Measured at an individual level, severe lack of social support was associated with higher odds of care home residence. Social support, group participation, and trust/reciprocity each showed statistically significant association with all of the indicators of health studied (psychiatric morbidity, functional impairment, and SAH) among community dwellers. However, only two of these associations (social support + psychiatric morbidity, and group participation + function) were statistically significant among care home residents, highlighting differences between these two populations of older adults in terms of social capital, its expression, and possible relevance to health. This study's comparison of community and care home residents represents an important contribution to the existing understanding of associations between social capital and health in older adults.

These results must be interpreted with caution, given that they are based on cross-sectional data and thus causality, and its direction, cannot be established. However, they are consistent with a number of previous studies undertaken with different populations and levels of analysis, and thus add to a growing body of evidence.

The theoretical definition of social capital, its relevance to health, and the evidence for possible interventions to increase social capital and their effectiveness are all subjects of debate. However, these findings suggest that further research into associations between social capital, living situation, and health in older adults is warranted. Given the paucity of current literature based on the study of older adults living in care homes and long-term care institutions, further work involving this population would add to our current knowledge base. In both care home and community settings, future investigations should ideally be longitudinal and take into account the multiple levels, from individual to community, on which social capital is relevant.

## Appendix: group participation

Community list

1. Political parties
2. Trade unions (including students' union)
3. Environmental group
4. Parent/school association
5. Education, arts or music group/evening class
6. Tenants'/residents' group or neighbourhood watch
7. Religious group or church organisation
8. Group for elderly people (e.g. lunch clubs)
9. Youth group (e.g. scouts, guides, youth clubs, etc.)
10. Social club/working men's club
11. Sports club
12. Women's institute/townswomen's group
13. Women's group
14. Other group or organisation (specify)

Care home list

1. Religious services
2. Films or videos
3. Entertainment from outside the home
4. Bingo or games, including card games
5. Discussion groups
6. Reminiscence group
7. Arts and crafts, including knitting, sewing, and painting
8. Classes or lectures
9. Music or singing group
10. Clubs/social groups
11. Trips and outings
12. Parties
13. Self-help or mutual support group

Adapted from HSE 2000 documentation (Prior et al. 2000).

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