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Abstract: Promoting quality of life in older age is an internationally recognised priority, requiring valid measurement. We present a short version of the established Older People's Quality of Life questionnaire (OPQOL-brief). The full OPQOL-35 was original in being developed from the perspectives of older people, assessed conceptually, and validated with a population sample using gold-standard psychometric assessment. The OPQOL-brief was also developed by asking older people to prioritise the most important items from the OPQOL-35, next assessed psychometrically with a population sample, and also statistically against the discarded 22 items. The aim was to assess the properties of the short, 13-item version of the OPQOL (OPQOL-brief), and to compare the performance of included and discarded items. The method was a national population survey of people aged 65+ living at home. The psychometric rigour of the OPQOL-brief was tested through assessments of reliability, validity and factor structure. The measures were OPQOL-brief, WHOQOL-QOL and CASP-19.The OPQOL-brief was found to be a highly reliable and valid, short measure of quality of life in older age. The OPQOL-brief is of value in assessment of interventions where a rigorously tested, short measure is required. The grounded development of the instrument is consistent with international policy emphasis on user involvement in shaping policy and research.

Dear Editor

We would be grateful if you would consider our paper for publication online in AGG.

We regard it as an important contribution to research in geriatrics and in gerontology as it provides the information on the properties of a short quality of life measures, developed bottom-up with older people.

The longer version has been published and is used internationally (Bowling 2009; Bowling and Stenner 2011). A short, robust, relevant measure of older people's quality of life has long been needed in evaluative research.

We look forward to hearing from you in due course.

Yours,

Prof Ann Bowling

OPQOL-13 brief paper AGG

Editor note Supplementary web files are uploaded in a single folder.

Abstract 204 words; text 3541; 1 box, 2 tables & separate Supplementary web file

A short measure of quality of life in older age: the performance of the brief Older People's Quality of Life questionnaire (OPQOL-brief)

Short title: Older People's Quality of Life questionnaire

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Running head: Quality of life measurement

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Abstract

Promoting quality of life in older age is an internationally recognised priority, requiring valid measurement. We present a short version of the established Older People's Quality of Life questionnaire (OPQOL-brief). The full OPQOL-35 was original in being developed from the perspectives of older people, assessed conceptually, and validated with a population sample using gold-standard psychometric assessment. The OPQOL-brief was also developed by asking older people to prioritise the most important items from the OPQOL-35, next assessed psychometrically with a population sample, and also statistically against the discarded 22 items. The aim was to assess the properties of the short, 13-item version of the OPQOL (OPQOL-brief), and to compare the performance of included and discarded items. The method was a national population survey of people aged 65+ living at home. The psychometric rigour of the OPQOL-brief was tested through assessments of reliability, validity and factor structure. The measures were OPQOL-brief, WHOQOL-QOL and CASP-19.The OPQOL-brief was found to be a highly reliable and valid, short measure of quality of life in older age. The OPQOL-brief is of value in assessment of interventions where a rigorously tested, short measure is required. The grounded development of the instrument is consistent with international policy emphasis on user involvement in shaping policy and research.

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Introduction

Population ageing, and corresponding rises in chronic illness, in high income nations

is widely accepted as a public health challenge (World Health Organization 2005). As

people live longer it is also important to ensure that the extra years of life are worth

living, although chronic illness can adversely affect broader QoL (Bowling 1996;

Wikman et al. 2011). QoL has been shown to be a strong predictor of adverse health

outcome, such as death and nursing home placement, even after adjustment for frailty,

in older people (Bilotta et al. 2011a). The promotion of broader quality of life (QoL)

in older age, and valid assessment of outcomes of targeted societal interventions, is

thus high priority for governments internationally (http://www.age-

platform.eu/.../age.../1231-2012-european-year-on-active. html;

www.who.int/ageing/active_ageing/en/index.ht - link valid 04/04/2012).

For policy outcomes to be relevant to people, measures of QoL need to have social, as

well as policy, relevance, and conceptual strength. Definitions of QoL vary by

discipline of the investigator, although Lawton (1983a, 1983b, 1991) developed a

popular, multidimensional concept of QoL, represented by behavioural and social

competence, perceived QoL, psychological and mental well-being, and the external

environment. When a concept cannot be measured directly (e.g. QoL), a series of

questions about different aspects of the concept are asked, which should form a scale,

and are tested for reliability, validity and sensitivity. However, with increasing

interest in measuring QoL broadly, there is recognition of the need for shorter

measures among investigators, often because their core questionnaires are already

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lengthy, the wish to minimise respondent and research burden, or they only want a ''snap shot'' of a topic rather than comprehensive coverage. In such circumstances, simple, single item self-rating questions are often used, although this is at the expense of detail. Moreover, measurement theory holds that single items are at a relative disadvantage to multi-item measures, which are more stable, reliable, and precise. This is because more items produce replies that are more consistent and less prone to distortion from bias, enabling random errors to be cancelled out (Bowling 2005a). Thus there is an increasing trade-off in research between scale length and levels of psychometric acceptability. Careful development work with short scales, of even 12 items or less, can result in a high level of measurement accuracy (Ware and Dewey 2000)..

QoL is a subjective concept, and thus measures need to be socially relevant. Few investigators have developed their measures 'bottom-up' with the population of interest. Thus most measures have unknown social relevance. Survey and qualitative research with population samples of people aged 65+, living at home, reported that the foundations of QoL emphasised by people were psychological well-being and positive outlook, having health and functioning, social relationships, leisure activities, neighbourhood resources, adequate financial circumstances and independence (Bowling 2005b; Bowling et al. 2003; Bowling and Gabriel 2004). These lay themes were consistent with a synthesis of cross-disciplinary theories about the main influences on QoL (Bowling 2005). These included the importance to well-being of perceived independence and control over life (Baltes and Baltes 1990; Bowling et al. 2007), social networks, activities, participation and capital; features of the external environment (Lawton 1983a, 1983b, 1991), levels of physical and mental functioning, and, to a lesser extent, socio-economic circumstances (Bowling 2005b). The

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mechanisms of how social networks influence health and well-being have been the most often examined. For example, social network theory holds that network members provide each other with emotional support, companionship and a sense of belonging, information and advice (e.g. about health and coping), practical and financial help. These benefit quality of life by acting as a buffer against the deleterious effects of social stress on physical and mental health, and enhance immune function (Cohen and Wills, 1985; Holt-Lunstad et al. 2010).The influence of social relationships on risk for mortality is allegedly comparable with the well-established risk factors of smoking, diet, and exercise for mortality; and it has been argued that social relationship-based interventions could enhance quality and length of life (Holt-Lunstad et al. 2010). Strong personal ties, community networks and communications - products of social capital - can facilitate individuals' access to emotional and socio-economic resources. Putnam (1993) defined social capital as the "features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (p. 167); he attributed variations in the quality of life in communities to the different levels of social capital and civic engagement within them. This empirical research, supported by the synthesis of the literature across disciplines, led to the 'bottom-up' development of the full 35-item version of the Older People's Quality of Life Questionnaire (OPQOL) (Bowling 2009; Bowling and Stenner 2011). The 'bottom-up' development of this instrument is consistent with international policy emphasis on public and user involvement in shaping public policy, services, and research processes (Staniszewska 2009). In order to address the increasing requirement for a robust, shorter measure of QoL, this paper aims to examine the properties of the 13-item version of the OPQOL-brief.

Materials and methods

The OPQOL-35 was reduced to form a brief version with lay input from 236 men and women aged 60+, at three national older people's forum meetings across England, who checked the most important OPQOL items to them. These items were then assessed psychometrically. A face-to-face interview questionnaire, included the OPQOL, and was administered by trained interviewers to respondents in their homes, who were aged 65+, and responded to two waves of Office for National Statistics (ONS) Omnibus interview surveys in Britain. The survey conducts face to face interviews with approximately 1200 adults aged 16 or over, living in private households in Britain, each month. The sampling frame used for Omnibus Surveys was the British Postcode Address File (PAF) of 'small users' (all private household addresses). The combined survey response rate for adults of all adults ages was 62% (2256 achieved interviews out of 3660 eligible base). Of these responders, ONS interviewers identified 589 respondents aged 65+, and administered the full OPQOL-35 to each of them (see Supplementary web-file Box 1 for survey response rates).

Link to supplementary web-file Box 1 here

The Omnibus sample which was used was representative of the population of Britain, using population estimates from the last census, in relation to age and sex. The characteristics and circumstances of the survey sample are shown in Supplementary web-file Table 1.

Link to Supplementary web-file Table 1 here.

The OPQOL

The measure of QoL analysed here is the OPQOL-brief - the short form of the

OPQOL-35 questionnaire. The latter was previously validated on community-

dwelling older populations, and ethnically diverse population samples, in Britain

(Bowling 2009; Bowling and Stenner 2011). It was further tested among geriatric

service out-patients in Milan, Italy, and shown to have excellent applicability to

cognitively normal older people, and to be applicable to most of the people suffering

from mild or moderate dementia (Bilotta et al. 2010, 2011a, 2011b).

The full OPQOL consisted of 35 statements, with the participant being asked to

indicate the extent to which he/she agrees with each statement by selecting one of five

possible options ("strongly disagree", "disagree", "neither agree nor disagree", "agree"

and "strongly agree", each with a score of 1 to 5). Higher scores indicate a better

QOL. The total score ranges from 35 (worst possible QOL) to 175 (best possible

QOL). The 35 statements of the full OPQOL questionnaire cover life overall (4 items,

score range 4-20), health (4 items, 4-20), social relationships and participation (8

items, 8-40), independence, control over life and freedom (5 items, 5-25), home and

neighbourhood (4 items, 4-20), psychological and emotional well-being (4 items, 4-

20), financial circumstances (4 items, 4-20), culture and religion (2 items, 2-10). The

ONS Omnibus sample's distributions on the 35 OPQOL items by domain are shown

in Supplementary web-file Table 2 (this also shows the frequency distributions on the

13 items forming the OPQOL-brief, as marked by +). All items show some positivity

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bias, which is usual in the assessment of QoL, as well as life satisfaction (Diener 2009).

Analyses

The ONS Omnibus Survey was the vehicle for testing the OPQOL-brief. Descriptive analyses included means, frequencies, chi-square tests, and Spearman's rho rank-order correlations. Measures of scale reliability were applied in order to assess the extent to which scale items measure the same construct, with freedom from random error (internal consistency).

Reliability tests applied to the QoL scales included Cronbach's alpha measure of homogeneity. This is the strength of the association between each scale item and the full scale, item-item and item-total correlations. Initial exploratory and confirmatory factor analyses were carried out to examine the factor structure of items. The OPQOL-brief was tested for validity against variables hypothesised to be associated with QoL: respondents' circumstances and characteristics, and their importance ratings of the different domains of QoL included in the OPQOL. It was hypothesised that those with optimal health status, physical functioning, global QoL, and QoL importance ratings, more helpers and supporters, more social activities, and, to a lesser extent, those in higher socio-economic groups and younger ages, would have better QoL (higher OPQOL-brief scores). Associations with sex were expected to be weak, reflecting the literature on QoL (Bowling 2005b). Criterion (concurrent) validity is the independent corroboration that the scale is measuring what it intends to

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measure. In the absence of a true gold standard of QoL, correlations were assessed between the OPQOL-brief and two longer measures of QoL developed for use with older people (CASP-19: Control, Autonomy, Self-realisation and Pleasure, and the World Health Organization's WHOQOL-OLD Hyde et al. 2003; Power et al., 2005). The psychometric properties of the 13 items included in the OPQOL-brief were compared with the 22 discarded items. A further proxy variable was a global self-rated QoL item.

Multiple linear regression analysis was used to assess validity further by examining the ability of theoretically relevant variables to predict total OPQOL-brief scores. A hierarchical approach was used, with independent variables entered in their theoretical order of importance. Statistical significance was set at $P<0.05$. The variables entered did not correlate by more than 0.760; tests for multicollinearity were satisfied. Socio-demographic variables were entered to adjust for their effects.

Results

The percentages of workshop participants who rated the importance of the OPQOL items are displayed in Supplementary web-file Box 2. Fourteen of the 35 items were prioritised as the most important by over half of the workshop participants

Link to supplementary web-file Box 2 here

Each of the 14 items prioritised by participants, except 'The local shops, services and facilities are good overall', loaded on both factors 1 and/or 2 of factor analysis conducted with the national ONS Omnibus sample (see Supplementary web-files

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Tables 3 and 4 for tables, statistics and interpretation). As this item also achieved the lowest reliability correlations, it was excluded from the OPQOL-brief, which finally comprised the remaining 13 items for further psychometric testing (see Box 1). The two components on which the 13 items loaded can be labelled as: Component 1: psycho-social wellbeing and health; Component 2: life restrictions and limitations.

Link to Supplementary web-file Tables 3 and 4 here.

Box 1 here

Means, and standard deviations, for the OPQOL-brief are shown in Table 1.

Table 1 here

The theoretical range for the summed OPQOL-brief is 13 to 65 (13 items by their 5-point response scales, coded from 1-5); the actual range achieved in the survey was 33-65. The OPQOL-brief was recoded into categories in order to facilitate presentations of distributions, and which led to a more even distribution, ensuring numbers per category were sufficient for analyses: 21% (120) scored between 33-50 (QoL worst), 34% (198) scored 51-55, 19% (112) between 56-59, and 26% (153) scored 60-65 (QoL best).

The OPQOL-brief was shown to be highly reliable. Cronbach's alpha measure of internal consistency exceeded the 0.70 threshold at 0.856 for the 13 items (n: 583 cases included in analysis). This was very similar to the Cronbach's alpha achieved

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for the full OPQOL-35 of 0.876 (in analyses of the ONS Omnibus survey data). Item-item reliability correlations for the OPQOL-brief ranged between r: 0.174 and 0.598, with similar variables achieving highest correlations (e.g. 'I enjoy my life overall' by 'I look forward to things': r: 0.598) and dissimilar variables achieving lower correlations (e.g. 'I am healthy enough to get out and about' by 'My family, friends, neighbours would help me if needed' r: 0.174), as would be expected. Items were not over-correlating suggesting that there was no item redundancy. The corrected item-total reliability correlations for the 13 items all exceeded the 0.30 threshold for acceptability (range: r: 0.36 for 'I have enough money to pay for household bills' to r: 0.67 for 'I enjoy life overall'). Cronbach's alpha for the OPQOL-brief of 0.856 was not improved if any of the items were deleted, suggesting all should be retained (see Table 1).

There is no 'gold standard' against which to assess measures of QoL, given the subjective nature of the concept. Proxy assessments were made by comparing it against other measures of QoL in older age: the CASP-19 and WHOQOL-OLD. The Spearman's rank correlations for the OPQOL-brief with the CASP-19 was rho: 0.661 (p<0.001) and with the WHOQOL-OLD was rho: 0.642 (p<0.001) (the respective correlation between the OPQOL-35 and the WHOQOL-OLD was rho: 0.699 (P<0.001), and rho: 0.739 (p<0.001) with the CASP-19). These correlations with other, longer, QoL measures support the validity of the OPQOL-brief (higher correlations would not be expected due to their varying content).

In further support of the validity of the OPQOL-brief, it was moderately and highly significantly associated, in expected directions, with variables hypothesised to influence QoL, using Spearman's rank-order correlation coefficients. These included

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self-rated active ageing (rho: -0.503, p<0.001), self-rated health status (rho: -0.517, p<0.001), physical functioning (degree of ability walking 400 yards, performing heavy housework, shopping/carrying heavy bags, going up/down steps/stairs summed) (rho: -0.432, p<0.001), self-rated global QoL (rho: -0.560, p<0.001), importance ratings of QoL sub-domains of health (rho: 0.210, p<0.001), social relationships (rho: -0.410, p<0.001), independence/control/freedom (rho: -0.365, p<0.001), home and neighbourhood (rho: -0.369, p<0.001), psychological/emotional well-being (rho -0.311, p<0.001), financial circumstances (rho: -0.222, p<0.001), leisure/social activities (rho -0.453, p<0.001), numbers of helpers and supporters (rho: 0.342, p<0.001), numbers of social activities (rho: 0.439, p<0.001). There were weaker, but still statistically significant, associations with socio-economic status and age: socio-economic status (National Statistics socio-economic classification: NS-SEC) (rho: -120, p<0.001), and age (rho: -0.125, p<0.001).

Thus, in support of the scale's convergent validity, those with optimal health status, physical functioning, global QoL, and QoL importance ratings, more helpers and supporters, and more social activities. To a lesser extent, those in higher socio-economic status (SES) groups and who were younger, had higher OPQOL-brief scores, indicating better quality of life. However, while SES and age were highly significant with QOL, the correlations were fairly weak. There was no significant correlation with sex (rho:-0.03). An association between quality and life and sex would not be expected, in support of discriminant validity. [7]

The reliability and validity of the 13 items included in the OPQOL-brief were compared with the 22 excluded items. The Cronbach's alpha of the 13-item OPQOL-brief was 0.856, compared with a lower alpha of 0.757 for the 22 discarded items,

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supporting the stronger internal consistency of the OPQOL-brief (despite having

fewer items than the 22 comparison variable - Cronbach's alpha is inflated by larger

numbers of items).The Spearman's correlation between the OPQOL-brief and global

self-rated QoL was rho: 0.753, and between the remaining 22 items summed and

global self-rated QoL, it was rho: 0.564, supporting the stronger validity of the

former. The number of missing cases in the OPQOL-13 was just 6 out of 589

responders, compared with 27 in the summed 22-item discarded scale. In a correlation

analysis of the amount of explained variation between the 13- and 22- item scales, the

amount of explained variance (r-squared) was 58%. Thus, the OPQOL-13 explained

over half the variance in the longer 22-item scale. The OPQOL-brief plotted against

the discarded items summed (OPQOL-22) showed several outliers (Supplementary

web-file Figure 1). An improved pattern between the OPQOL-brief (13 items) against

the full OPQOL-35 (see Supplementary web-file Figure 2). This supports the internal

consistency of the OPQOL-brief, and the decision to exclude the selected 22 items.

In a final validation exercise, those variables which achieved statistical significance at

univariate level with the OPQOL-brief were entered hierarchically into a linear

multiple regression analysis, in order to assess which variables independently

predicted OPQOL-brief scores, adjusting for age, sex and socio-economic status (see

Table 2).

Table 2 here

The model was highly significant. As would be expected, optimal ratings of active

ageing, global QoL, most, although not all, of the importance ratings of QoL domains,

number of potential helpers, and self-rated health status were independently

significant predictors of the variance in OPQOL-brief scores. Variables which also

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did not retain independent statistical significance in the model were: number of social

activities, physical functioning, socio-economic status, sex or age. The model,

explained 56% of the variance in OPQOL scores (Adjusted r-squared (Adj.

R2)):0.564).

Discussion

This paper presented a psychometrically robust, short version of the OPQOL. The

impact of health and social care interventions can be multi-faceted, and influence

people's broader quality of life. Thus their evaluation necessitates the use of a multi-

dimensional measure of quality of life, and one which has social relevance. The

OPQOL-brief performed well in a population sample of older people in Britain. It is

of potential value in the outcome assessment of health and social interventions, which

can have a multidimensional impact on people's lives. The full OPQOL-35 was

shown to have superior reliability and validity to other broader measures of QoL in

older age - the CASP-19 (19 items) and WHOQOL-OLD (24 items) (Bowling 2009;

Bowling and Stenner 2011). It was also shown to have prognostic value in research on

older people (Bilotta et al. 2011). This work has built on a well-established and

validated measure of broader QoL for older people, in order to generate an

internationally relevant short version. The OPQOL-Brief makes a unique contribution

to the field of assessment, especially in the face of demands for shorter assessment

tools from researchers, clinicians and practitioners, who may be administering

multiple measures. It is original in its social relevance, based on a paradigm of

developing measures based on people's own views and priorities. Both the full and

brief versions of the OPQOL cover areas of life emphasised by older people, but not

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included in the CASPE-19 or WHOQOL-OLD (e.g. home and neighbourhood, psychological and emotional outlook).

Population ageing has led to a need for practical and valid, measures both to help shape policy aiming to promote healthy ageing and well-being, and to evaluate the outcomes of such interventions. Such instruments also need to be commensurate with available - usually limited - resources to administer them. Therefore, the psychometric acceptability of measures needs to be balanced against practicability. Shorter instruments, while inevitably more limited in scope and sensitivity than longer measures, have the benefits of reduced respondent and research burden and costs. The full OPQOL-35 was unique, and differs from other QoL measures, in being derived from the individual experiences of lay people, cross-checked against theoretical models for assessment of conceptual grounding and comprehensiveness, and tested psychometrically with excellent results (Bowling 2009; Bowling and Stenner 2011). The strengths of the longer and shorter forms of the OPQOL are their foundations on the wider perspectives of national population samples of older people. Thus they have social relevance from the outset, rather than relying solely on methods of statistical reduction. Lay people have broad perspectives of QoL, unconfined to the narrower disciplines of investigators (Bowling et al. 2003). Policy interventions can also have a multi-faceted impact on lives, and outcome measures need to reflect this. the full OPQOL was able to independently predict several adverse health outcomes at one year in an older out-patient population. [1] However, the full OPQOL-35, like other QoL measures for older populations, [15, 16] is a relatively lengthy questionnaire, and it may be somewhat cumbersome to administer in population, social and health care settings (e.g. in the context of a geriatric multidimensional assessment, which is a complex and time-consuming tool per se) (Yates et al. 2011).The OPQOL-brief aims

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to address the need for a shorter measure of broader QoL in older age. It was shown to be a highly reliable and valid, short measure of QoL in older age.

Conflict of interest statement: All authors declare no competing or financial interests or personal relationships with other people or organisations that could inappropriately influence (bias) their work. All authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author).

Box 1. OPQOL-brief: 13 (out of 35) items rated as most important by workshop participants (% rating item most important) (n = 236)

* I enjoy my life overall (81%)

* I look forward to things (52%)

* I am healthy enough to get out and about (75%)

* My family, friends or neighbours would help me if needed (71%)

* I have social or leisure activities/hobbies that I enjoy doing (61%)

* I try to stay involved with things (58%)

* I am healthy enough to have my independence (82%)

* I can please myself what I do (59%)

* I feel safe where I live (78%)

* I get pleasure from my home (53%)

* I take life as it comes and make the best of things (60%)

* I feel lucky compared to most people (54%)

* I have enough money to pay for household bills (71%)

Table 1. Mean/standard deviation (s.d.) of 13-items in OPQOL-brief (n: 583-587)			
OPQOL-brief 13 items+: *+ OPQOL-brief item numbers in OPQOL-35 were 1, 3, 8, 9, 13, 14, 17, 19, 21, 25, 29, 22, 30 (22 discarded OPQOL-35 item numbers were: 2, 4, 5, 6, 7, 10, 11, 12, 15, 16, 18, 20, 23, 24, 26, 27, 28, 31-34)*	**Mean (s.d.)**	**Item-Total correlation**	**Cronbach's alpha if item deleted (α for 13 item scale: 0.856)**
I enjoy my life overall	4.273 (0.67)	0.67	0.84
I look forward to things	4.21 (0.74)	0.58	0.84
I am healthy enough to get out and about	4.11 (0.99)	0.56	0.84
My family, friends or neighbours would help me if needed	4.39 (0.69)	0.37	0.85
I have social or leisure activities/ hobbies that I enjoy doing	3.94 (0.96)	0.59	0.84
I try to stay involved with things	4.02 (0.82)	0.63	0.84
I am healthy enough to have my independence	4.17 (0.92)	0.55	0.84
I can please myself what I do	4.26 (0.80)	0.40	0.85
I feel safe where I live	4.34 (0.75)	0.41	0.85
I get pleasure from my home	4.39 (0.62)	0.36	0.86

I take life as it comes and make the best of things	4.37 (0.63)	0.59	0.84
I feel lucky compared to most people	4.30 (0.69)	0.53	0.85
I have enough money to pay for household bills	4.12 (0.70)	0.50	0.85
OPQOL-brief 13 items summed	54.93 (6.11)	---	---

Table 2 Multiple linear regression of independent predictors of OPQOL-brief (ONS Omnibus Survey)		
Independent predictor variables	Unstandardised B Standardised Beta	95% confidence interval (2-tailed t-test) P=
Self-rated active ageing	-0.956 -0.152	-1.428- -1.485 (-3.985) 0.0001
Self-rated global QoL	-2.047 -0.287	-2.540- -1.555 (-8.163) 0.0001
Respondents' ratings of importance of QoL domains contained in OPQOL:		
QoL: health	0.310 +0.019	-3.759- -0.172 (0.617 0.538 ns
QoL social relationships	-1.072	-1.714-

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	-1.115	-0.430 (-3.281) 0.001
QoL: independence, control over life, freedom	-1.625 -0.126	-2.503- -0.747 (-3.636) 0.001
QoL: home and neighbourhood	-1.198 -0.106	-1.971- -0.425 (-3.045) 0.002
QoL: psychological and emotional well-being	0.105 0.009	-0.725- 0.936 (0.249 0.804 ns
QoL: financial circumstances	0.288 0.028	-0.362- 0.938 (0.870) 0.385 ns
QoL: leisure and social activities	-0.828 -0.098	-1.434- -0.222 (-2.683) 0.008
Total number of different social activities done in last month (out of	0.211 0.065	0.037- 0.459

listed 8)		(1.675) 0.095 ns
Total number of relatives, friends, neighbours who would help with practical tasks	0.069 0.121	0.035- 0.102 (4.023) 0.001
Self-rated health status, compared to others of same age	-0.763 -0.139	-1.197- 1.018 (-3.451) 0.001
Physical functioning: sum of ability to: walk 400 yards, do heavy housework, shop/carry heavy bags, steps/stairs	-0.088 -0.058	-0.212- 0.036 (-1.391) 0.165
Age	0.195 0.016	-0.560- 0.949 (0.507) 0.612
Sex	-1.135 -0.011	-0.853- 0.582 (-0.371) 0.711 ns
NS-SEC	0.104 0.019	-0.222- 0.430 (0.627)

		0.531 ns
Housing tenure	-0.161 -0.026	-0.520- 0.199 (-0.877) 0.381 ns
Constant	67.402	---
R2	0.577	---
Adjusted R2	0.564	---
Anova F statistic; p=	42.088; 0.0001	---

Web-based appendices:

Supplementary web-file Box 1

Supplementary web-file Table 1

Supplementary web-file Table 2

Supplementary web-file Tables 3 and 4

Acknowledgements

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