



Social Capital and Quality of Life among Urban and Rural Older Adults. Quantitative Findings from the Irish Longitudinal Study on Ageing

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Abstract

While the association between health and quality of life (QoL) is well established, our understanding of the effect of inter-relationships and the wider social context is less well understood. Our aim was to examine the association between social capital, area-level deprivation, quality of relationships, and the control/autonomy domain of QoL. Data was from The Irish Longitudinal Study on Ageing (TILDA), a prospective nationally representative study of community-dwelling older adults in the Republic of Ireland. QoL was measured using CASP-19. Mixed effects linear regression models were estimated, stratified by urban rural location. QoL increased until around 68 years before decreasing into oldest age. Social cohesion was associated with the QoL of urban participants while social decay was important to the QoL of both urban and rural participants. Functional limitations, depressive symptoms and loneliness were also associated with poorer QoL. Social capital and the socio-economic environment influence QoL, independent of other factors. We show that the relationship between the social environment and QoL differs between rural and urban populations. While social decay was important in both settings, social cohesion was related to QoL among urban dwellers only and higher levels of area level deprivation was associated with lower QoL among rural residents.

Keywords Ageing · Older adults · Quality of life · CASP-19 · Social capital · Ireland · Social environment

Introduction

As life expectancy has increased due to medical advances, improved physical environment, increased economic prosperity, and better health behaviours (United Nations

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Department of Economic and Social Affairs Population Division 2015), there has been an attendant heightened interest in the Quality of Life (QoL) of older adults. This is borne of a desire to ensure that increased longevity is matched by improved wellbeing so that older adults can continue to lead enjoyable lives into old age, even in cases of poor physical or psychological health (Bowling 1996; Bowling et al. 2003; Higgs et al. 2003a). One result of this change of focus has been a shift from viewing older age solely through the lens of health and ill-health to a more holistic conception of QoL which incorporates a broad range of life domains (Bowling 1997; Higgs et al. 2003a; Hyde et al. 2003) and is firmly rooted within the context of positive ageing.

A great deal of research has shown that QoL in older age is strongly related to health (Bowling 1996; Wiggins et al. 2004; Netuveli et al. 2005; Blane et al. 2008; Zaninotto et al. 2016) and other proximal factors found within a variety of domains including socioeconomic, social support and participation, and financial wellbeing (Siegrist and Wahrendorf 2009; Zaninotto et al. 2009; Webb et al. 2011; Ateca-Amestoy and Ugidos 2013; Layte et al. 2013; McGarrigle et al. 2018; Ward et al. 2019). A smaller number of studies have also found associations between more distal neighbourhood-level socioeconomic factors and a range of health and QoL outcomes (Kawachi et al. 1999; Drukker and van Os 2003; Möttus et al. 2012; McCann et al. 2018).

Wiggins et al. (Wiggins et al. 2004), drawing on a sub-sample of the 1930s Boyd-Orr study of health and diet, examined a number of contextual factors thought to influence QoL. Using the Control, Autonomy, Self-realisation and Pleasure scale (CASP) to measure QoL (Hyde et al. 2003), they found that perceived area deprivation and quality of social contacts were the most important contextual area level factors. Elsewhere, Netuveli et al. (Netuveli et al. 2006) identified favourable neighbourhood environments and quality of relationships as important to QoL in older adults. Webb et al. (Webb et al. 2011) found that improved perceptions of neighbourhood characteristics, including the absence of vandalism, and a greater sense of belonging, trust and support were associated with increased QoL over time among the English Longitudinal Study of Ageing (ELSA) cohort. Similarly, individuals' assessment of place, particularly social deprivation and safety, also effect QoL (Scharf et al. 2002).

Social capital is understood here to refer to traits of social and civic organisation characterised by interpersonal trust, social mixing, fairness, and reciprocity (Coleman 1990; Putnam 2000). An absence of social capital, much discussed in literature concerned with the effects of income inequality, is hypothesised to exacerbate social differences between groups and individuals, thereby leading to reduced levels of interpersonal trust and reciprocity (Kaplan et al. 1996; Kawachi et al. 1997). Of importance here is the contention that social capital effects QoL via collective efficacy which sees greater social trust forming stronger ties whereby kin, friends, neighbours, and strangers alike provide social support and protect against social decay (Kawachi and Berkman 2000; Layte 2012). This research is positioned within the expanding field of environmental gerontology as we seek to better understand the association between the social environment and individual level wellbeing. We hypothesise that individuals who report lower levels of social capital will also have lower QoL scores, particularly within the control and autonomy domains of CASP, as these features of QoL are the most theoretically plausible to be influenced by the local environment and an individual's relationships within that environment. In this context, control refers to an individual's ability to shape the environment in which they live, while the related need for autonomy

refers to self-determination, both of which are necessary to be able to participate fully in society (Drukker and van Os 2003).

Our aim therefore was to investigate the relationship between social and economic environmental factors and QoL. To achieve this we analysed the association between social capital and area-level deprivation, quality of relationships, and the control/autonomy domain of QoL using CASP-19 (Hyde et al. 2003; Wiggins et al. 2008) in a sample drawn from a nationally representative cohort of community dwelling older adults. As social capital has previously been shown to differ between urban and rural populations (Lannoo et al. 2012), separate analyses were conducted for urban and rural areas (based on Irish Census of population definitions). This approach also takes account of differences in population density and for potential differences in group norms and the accessibility of institutional supports which in rural areas is more traditionally based on kinship and church rather than work and secular organisations in urban settings (Lannoo et al. 2012).

Methods

Sample

We used data from the second Wave of The Irish Longitudinal Study on Ageing (TILDA) which was collected between 2012 and 2013. TILDA is a prospective nationally representative study of 8175 community dwelling adults aged ≥ 50 years resident in the Republic of Ireland. Details of the methodology employed by TILDA are fully documented elsewhere (Kenny et al. 2010; Kearney et al. 2011; Whelan and Savva 2013). In summary, TILDA participants were selected using multi-stage stratified random sampling whereby 640 geographical areas, stratified by socioeconomic characteristics, were selected, followed by 40 households within each selected area. The Irish Geodirectory listing of all residential addresses provided the sampling frame. TILDA employs two modes of survey data collection: computer-assisted personal interview (CAPI); and a self-completion questionnaire (SCQ). The CASP items were collected at each Wave as part of the SCQ. Wave 2 ($n = 7134$) had a response rate of 87% of whom 6003 (84%) returned SCQs. We restricted our analysis to geographic clusters defined by administrative Electoral Divisions (ED) that contained at least five participants within them. This was to ensure that we adequately captured heterogeneity of individual level social capital within geographic clusters. The analytic sample therefore consisted of 3629 (2123 urban and 1506 rural) TILDA participants aged 52 years and older.

Outcome Measure

QoL was measured using CASP-19, a theoretically informed tool developed specifically for middle and older age (Higgs et al. 2003b; Hyde et al. 2003). The full CASP includes four domains – Control, Autonomy, Self-realisation, and Pleasure. Control refers to one's ability to shape the environment in which they live, while the related need for autonomy refers to self-determination, both of

which are necessary to be able to fully participate in society. We focused our analysis on the control and autonomy domains.

Conceptually, the control and autonomy domains of CASP are similar, as are the indicators used to measure them, for example, '*I feel that what happens to me is out of my control*' included in the control domain, and '*I can do the things that I want to do*' used in the autonomy domain. Given these similarities, the two domains are operationalised here as a single construct (control/autonomy). This approach is supported by the results of an earlier evaluation of the psychometric properties of CASP-19 (Sexton et al. 2013), which recommended control/autonomy as a unidimensional construct. Our measure of QoL therefore composed of nine of the original CASP-19 items, four relating to control and five measuring autonomy.

Each statement in the scale has four response categories (often, sometimes, not often, never) responding to how well the "statement applies to me". Each of the 9 items was scored from zero to three and then summed, giving a range of zero to 27 with higher scores indicating better QoL. We found this revised scale to have good internal reliability (Table 1, Cronbach's α : rural sample = 0.75, urban sample = 0.78).

Explanatory Variables

Socio-demographic variables, age, age squared (as QoL has a quadratic relationship with age (Zaninotto et al. 2009)), gender and marital status were included in our models. The association between marital status, and QoL has been shown to differ between men and women (Webb et al. 2011; Han et al. 2014) so for this reason we included an interaction term for gender and marital status that includes four categories (female not married; female married; male not married; male married).

Physical functioning was measured by asking respondents whether their activities were limited by an illness or disability and the cumulative number of reported physical limitations from an extensive list of possibilities was included. The 11 limitations listed were: walking 100 m; running or jogging about 1.5 km; sitting for about 2 h; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing one flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending arms above shoulder level; pulling or pushing large objects like a living room chair; lifting or carrying weights over 10 pounds/5 k, like a heavy bag of groceries; picking up a small coin from a table.

The number of *depressive symptoms* was measured using the short 8-item version of the Centre for Epidemiological Studies-Depression (CES-D) scale (O'Halloran et al. 2014; Briggs et al. 2018). This scale measures the frequency that respondents have experienced a variety of depressive symptoms within the past week, with higher scores indicating increased depressive symptomology (Radloff 1977; Karim et al. 2015).

Loneliness was measured using the five-item University of California at Los Angeles (UCLA) Loneliness Scale, which measures perceived social isolation with higher scores indicating greater isolation (Russell 1996).

To measure *social contact*, we used a binary dummy variable for taking part in social activities at least once per week (versus less than once per week). The activities included were: attending films, plays and concerts; classes and lectures; playing game such as cards and bingo; going to a public house; eating out; and participating in sports or exercise (House et al. 1982).

Quality of relationships with family and friends was measured using a seven-item Likert scale repeated for spouse, children, and friends (Breeze and Lang 2008). Each item was scored from 1 (most positive responses) to 4 (least positive responses) and the total summed scores were grouped into quintiles. The reference categories were no spouse, no children, and no friends.

Neighbourhood social capital was measured at the individual level using seven items. Similar to Stafford et al. (Stafford et al. 2011) we operationalised two domains of social capital: social cohesion and social decay. The five items used to measure social cohesion were: *I really feel part of this area; most people in this area can be trusted; most people in this area are friendly; people in this area will always treat you fairly; and if you were in trouble, there are lots of people in this area who would help you.* The two indicators used to estimate social decay were: *there is no problem with vandalism and graffiti in this area; people feel safe walking alone after dark in this area.* Participants were asked to agree with each statement on a scale of one to seven. Standardised scores for both indicators were estimated using confirmatory factor analysis. The factor loadings for both cohesion and decay are shown separately for urban and rural participants in Table 1. The social cohesion factor scores were heavily skewed ($\mu = 0$, Median = 0.24, $\sigma = 0.86$) due to the high percentage of respondents scoring high on this construct. Therefore, tertiles were calculated for this indicator.

It is reasonable to expect that the length of time people live in an area will have a bearing on the nature of their relationships in the local community and therefore their social capital. For this reason, we have also controlled for the length of time that participants have lived in their current home. This indicator was recorded for the first time in Wave 3 so it was therefore necessary to impute the values for our analysis using data from Wave 2. To do this, years living in house was calculated as (years in house at wave 3 – (interview date wave 3 – interview date wave 2)). There was a large amount of missing data (26.4%) so the mean years living in participants' current home were imputed so as not to exclude them from the analysis. To assess effect of this imputation, a sensitivity analysis was conducted whereby results with the full data (including

Table 1 Factor loadings and fit statistics of exploratory factor analysis of social capital indicators

	Urban		Rural	
	Cohesion	Decay	Cohesion	Decay
I really feel part of this area	0.59		0.57	
Most people in this area can be trusted	0.51		0.47	
Most people in this area are friendly	0.64		0.66	
People in this area will always treat you fairly	0.61		0.57	
If you were in trouble, there are lots of people in this area who would help you	0.63		0.67	
No problem with vandalism and graffiti in this area		0.43		0.46
People feel safe walking alone after dark in this area		0.44		0.41
KMO	0.78		0.75	
Bartlett's test of sphericity	$\chi^2(21) = 3093.4$, $P < 0.001$		$\chi^2(21) = 2065.7$, $P < 0.001$	

imputed values) were compared to the sample with missing cases excluded and results were similar.

Mean centred *area level deprivation* scores for each ED were included. These scores were taken from the national deprivation index based on the 2011 Census of the population developed by the Small Area Health Research Unit (SAHRU), Trinity College Dublin. This index provides a measure of deprivation based on five domains: unemployment, social class, car ownership, proportion of rented accommodation, and residential overcrowding. Higher scores indicate less deprivation. Deprivation scores were available for each Electoral Division (ED) which are the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Central Statistics Office. There are 3409 such districts in the Republic of Ireland. Our sample was drawn from 294 urban and 268 rural EDs.

Statistical Analysis

Mixed effects linear regression models with random intercepts were used for the main analysis. This method was chosen due to the multi-stage sampling design employed by TILDA that results in observations clustered within households which are in turn clustered within the EDs primary sampling units. EDs and households were modelled as random effects in each analysis, with households nested within EDs, and sample members nested within households. Covariates measured at the individual level were treated as fixed effects. A major advantage of this approach is that it allows us to partition the variance in order to estimate the percentage variance explained at the individual, household and cluster (ED) level.

Three models are presented sequentially for urban and rural separately. The first model contains the outcome variable only. The second includes the two social capital indicators and cluster level area deprivation scores; while the third model appends to model 2, the socio-demographic and relationship indicators. Likelihood-ratio tests were used to evaluate each iteration of the model versus the next simplest alternative model.

Inverse probability weights were applied in all analyses. These weights were estimated by comparing the age, sex, educational attainment, marital status and geography of participants to their distribution in the Irish Census of population 2011. Analyses were conducted using Stata/MP 14.2 (StataCorp 2015).

Results

The characteristics of both the urban and rural samples are presented in Table 2. Overall, the distribution of key characteristics was similar across the two samples. Mean QoL scores were similar for urban (18.7) and rural participants (18.8). There was a higher percentage of men among the rural sample. Depressive symptoms were more prevalent in urban areas and a higher percentage of urban participants were socially active on a weekly basis. Rural participants were more likely to be married and more likely to rate the quality of their relationship with their spouse in the highest quintile. Rural participants also rated their relationships with children and friends higher than their urban peers. Turning finally to the two features of social capital, social cohesion

Table 2 Characteristics of urban and rural analytic samples

		Urban	Rural
Gender	Mean QoL	18.7 (18.5,19.0)	18.8 (18.5,19.1)
	Mean age	64.8 (64.3,65.4)	64.5 (63.9,65.2)
	Male	48.7 (46.8,50.7)	52.7 (50.4,55.0)
	Female	51.3 (49.3,53.2)	47.3(45.0,49.6)
Gender*marital status	Female married	29.4 (27.8,31.1)	33.1 (31.1,35.1)
	Female not married	21.8 (19.7,24.1)	14.2 (12.2,16.5)
	Male married	36.2 (34.3,38.2)	40.3 (38.1,42.5)
	Male not married	12.5 (10.8,14.3)	12.4 (10.4,14.7)
	Mean functional impairments	2.2 (2.0,2.3)	2.0 (1.9,2.2)
	Mean depressive symptoms	5.7 (5.3,6.2)	4.7 (4.3,5.1)
	Mean UCLA loneliness	1.9 (1.8, 2.0)	1.9 (1.8,2.1)
Weekly social activities	No	20.6 (18.7,22.7)	29.0 (26.2,31.9)
	Yes	79.4 (77.3,81.3)	71.0 (68.1,73.8)
Relationship quality spouse	No spouse	33.3 (30.7,36.0)	25.2 (22.5,28.1)
	Best	15.7 (14.0,17.5)	21.7 (19.3,24.2)
	2nd	19.1 (17.3,21.0)	20.2 (18.0,22.7)
	3rd	7.9 (6.8,9.2)	7.0 (5.7,8.5)
	4th	12.9 (11.5,14.6)	13.9 (12.0,15.9)
	Worst	11.1 (9.6,12.7)	12.0 (10.4,13.9)
Relationship quality children	No children	18.0 (15.9,20.3)	15.2 (12.9,17.9)
	Best	22.2 (20.2,24.2)	27.8 (25.4,30.4)
	2nd	9.1 (7.8,10.6)	9.6 (8.0,11.5)
	3rd	19.0 (17.3,20.9)	18.3 (16.3,20.5)
	4th	18.0 (16.3,19.9)	17.3 (15.3,19.6)
	Worst	13.7 (12.2,15.4)	11.7 (9.9,13.7)
Relationship quality friends	No friends	2.8 (2.1,3.7)	2.7 (1.8,4.1)
	Best	19.9 (18.1,21.9)	23.7 (21.2,26.3)
	2nd	21.9 (20.0,23.9)	20.1 (18.0,22.3)
	3rd	19.5 (17.6,21.6)	18.9 (17.0,21.0)
	4th	18.3 (16.5,20.4)	17.0 (15.0,19.2)
	Worst	17.5 (15.7,19.5)	17.7 (15.7,19.9)
Social cohesion	Lowest	39.8 (37.0,42.7)	26.0 (23.6,28.6)
	2nd	35.2 (32.7,37.7)	32.8 (30.4,35.4)
	Highest	25.0 (22.8,27.4)	41.1 (38.2,44.1)
	Mean social decay	0.00 (−0.08, 0.04)	0.00 (−0.04,0.02)
	Mean area deprivation	−0.14 (−0.29,0.01)	−0.38 (−0.45,−0.31)
	Years in same house	28.9 (28.0,29.7)	29.9 (28.8,30.9)
	N observations	2123	1506

was higher in rural areas while there was no difference evident in decay. Finally, objectively measured area level deprivation was on average higher in rural areas.

Results of the mixed effects regression analysis are presented separately for urban and rural samples in Table 3. Model 1 shows the unadjusted association between social cohesion, social decay, area deprivation, and QoL. Greater social cohesion and less social decay was associated with better QoL and these associations were stronger among the urban sample. Area level deprivation was associated with poorer QoL and this association was stronger among the rural sample. For an indication of the effect size of the coefficients, participants with one or more limiting illnesses had a QoL score of 17.9 (95%CI: 17.7 to 18.1) compared to 20.4 (95%CI: 20.2 to 20.6) among those with no limiting illness. Therefore, the difference in QoL between participants in the most socially cohesive neighbourhoods and those in the least cohesive was comparable to the difference in QoL scores associated with a limiting illness.

Adjusted results are presented in Model 2. After the inclusion of covariates, social cohesion was associated with the quality of life of urban participants only (2nd highest cohesion: $\beta = 0.68$, 95%CI: 0.34 to 1.01; highest social cohesion: $\beta = 0.89$, 95%CI: 0.50 to 1.28). The social decay domain of social capital remained important to the QoL of both urban ($\beta = 0.55$, 95%CI: 0.34 to 0.77) and rural participants ($\beta = 0.29$, 95%CI: 0.02 to 0.56), while higher area deprivation was associated with poorer QoL among rural participants only ($\beta = -0.35$, 95%CI: -0.66 to -0.05). In all instances where significant associations remained after the inclusion of covariates, the strength of the associations weakened. Of the covariates included in our analysis, QoL increased with age and this association was strongest among urban respondents. Compared to the reference group of married females, married men had significantly lower QoL with similar strengths of association observed across the two samples. Functional limitations, depressive symptoms and loneliness were all associated with poorer QoL. Again, the coefficients were similar for both rural and urban participants.

While the quality of participants' relationship with their spouse was not associated with QoL, participants with the lowest quality relationships with their children had significantly lower QoL and this effect was strongest among rural participants. Similarly, the quality of relationships with friends was only significant among those reporting the poorest quality (versus those with no friends). However, non-kinship relationships were more important to QoL among urban participants. The length of time that participants had lived at the same address had no significant effect on QoL.

Overall, while a small amount of variance in QoL among urban participants was explained by differences between geographic clusters (baseline model), this was fully explained by the fixed effect parameters in our adjusted models 1 and 2. Conversely, among the rural sample, a non-negligible 3.5% of variance in QoL was apportioned to differences between EDs in the adjusted model.

Finally, Figure 1 shows predicted QoL scores from our final models by participants' age. The overall pattern for urban and rural groups shows similar QoL scores at age 52, which increased with age to around 68 years before decreasing into oldest age. Importantly, the QoL of urban participants increased more rapidly before declining at an accelerated rate. Figure 2 shows the predicted values from the adjusted model (model 2) by social cohesion tertiles and shows that QoL scores increased linearly with higher social cohesion associated with higher QoL scores. While there was little difference between urban and rural participants QoL scores at the lower end of social cohesion scores, the QoL of urban dwellers was consistently better at the upper end.

Table 3 Mixed effects linear regression models with random intercepts to examine the association between social capital and QoL

	Baseline model		Model 1		Model 2	
	Urban	Rural	Urban	Rural	Urban	Rural
Social cohesion (Ref. Lowest)	2nd		2.02*** (1.59,2.44)	1.57*** (1.01,2.12)	0.68*** (0.34,1.01)	0.30 (-0.16,0.75)
	Highest		2.49*** (2.01,2.97)	2.21*** (1.66,2.76)	0.89*** (0.50,1.28)	0.42 (-0.05,0.89)
	Social decay		0.64*** (0.37, 0.92)	0.35* (0.00,0.70)	0.55*** (0.34,0.77)	0.29*** (0.02,0.56)
	Area deprivation		-0.34*** (-0.47,-0.21)	-0.46* (-0.86,-0.07)	-0.08 (-0.18,0.02)	-0.35*** (-0.66,-0.05)
Sex*marital (Ref. Female married)	Age				0.56*** (0.35,0.78)	0.35* (0.07,0.62)
	Age ²				-0.004*** (-0.006,-0.003)	-0.003*
	Female not married				0.03 (-1.01,1.08)	0.85 (-0.44,2.14)
	Male married				-0.84*** (-1.16,-0.51)	-0.76*** (-1.14,-0.37)
Weekly social activities (Ref. No)	Male not married				0.12 (-0.92,1.17)	0.57 (-0.73,1.87)
	Number functional limitations				-0.63*** (-0.71,-0.56)	-0.60*** (-0.69,-0.50)
	CES-D depression symptoms				-0.10*** (-0.13,-0.08)	-0.11*** (-0.15,-0.08)
	UCLA loneliness				-0.55*** (-0.63,-0.47)	-0.56*** (-0.66,-0.45)
Relationship quality spouse (Ref. No spouse)	Yes				1.23*** (0.86,1.60)	0.68*** (0.28,1.09)
	Best				0.69 (-0.37,1.74)	0.67 (-0.65,2.00)
	2nd				-0.14 (-1.19,0.91)	0.33 (-0.97,1.64)
	3rd				-0.27 (-1.37,0.84)	-0.14 (-1.54,1.26)
Relationship quality children (Ref. No children)	4th				-0.97 (-2.03,0.09)	-0.17 (-1.50,1.15)
	Worst				-1.01 (-2.07,0.06)	-0.79 (-2.09,0.52)
	Best				0.38 (-0.15,0.90)	0.52 (-0.16,1.20)
	2nd				0.42 (-0.19,1.03)	0.30 (-0.49,1.08)

Table 3 (continued)

	Baseline model		Model 1		Model 2	
	Urban	Rural	Urban	Rural	Urban	Rural
3rd					-0.12 (-0.64,0.41)	-0.46 (-1.16,0.24)
4th					-0.41 (-0.95,0.12)	-0.56 (-1.26,0.14)
Worst					-0.81*** (-1.38,-0.24)	-1.07*** (-1.86,-0.29)
Best					0.07 (-0.88,1.02)	0.57 (-0.65,1.80)
2nd					-0.38 (-1.32,0.55)	0.48 (-0.74,1.70)
3rd					-0.19 (-1.14,0.76)	-0.44 (-1.67,0.79)
4th					-0.77 (-1.73,0.18)	0.11 (-1.13,1.35)
Worst					-1.03* (-1.99,-0.07)	-0.69 (-1.93,0.56)
Years in same house					0.01 (-0.01,0.02)	-0.01 (-0.02,0.01)
Constant	18.95 (18.73,1.18)	18.94 (18.68,19.19)	17.68 (17.38,17.99)	17.47 (17.03,17.91)	2.31 (-4.98,9.60)	9.81*** (0.53,19.08)
N ED clusters	294	268	294	268	294	268
N household clusters	1703	1167	1703	1167	1703	1167
N observations	2123	1506	2123	1506	2123	1506
Likelihood-ratio test	χ^2 (2) = 88.27	χ^2 (2) = 48.94	χ^2 (2) = 75.57	χ^2 (2) = 43.57	χ^2 (4) = 58.15	χ^2 (4) = 13.97
% variance area level	2.20	2.75	0.14	2.96	0.00	3.50
% variance household level	41.74	34.12	59.18	64.98	29.19	19.80

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

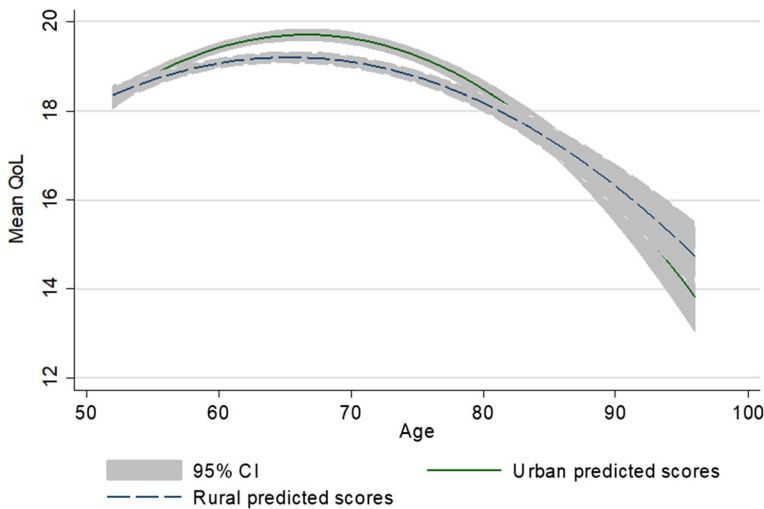


Fig. 1 Predicted QoL score by age, and urban/rural

Discussion

We have demonstrated that social capital and the social and economic environment more broadly influenced QoL among older adults, independent of age, marital status, inter-personal relationships, physical health, depressive symptoms, social participation, and loneliness. We have also shown that the relationship between the social environment and QoL differs between rural and urban populations. In particular, while perceived social decay was important in both settings, social cohesion was related to QoL among urban dwellers only while higher levels of area level deprivation was associated with lower QoL among rural residents. This is similar to Nummela et al. (Nummela et al. 2008) who found an association between social cohesion and self-rated

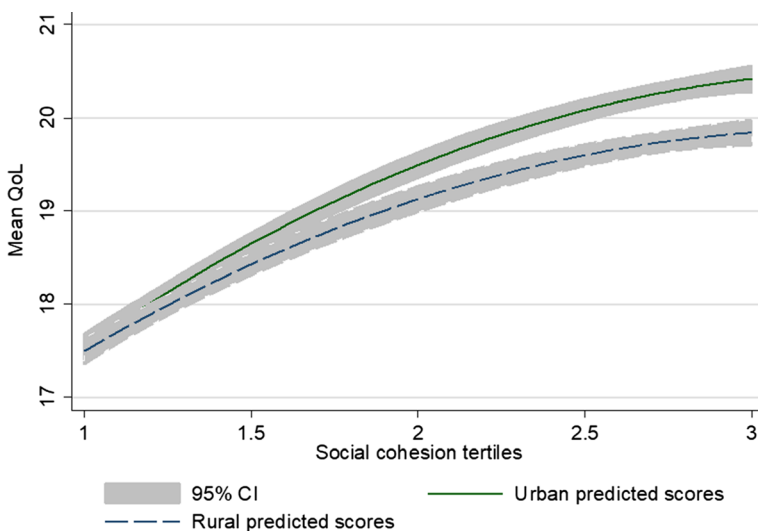


Fig. 2 Predicted QoL score by social cohesion, and urban/rural (adjusted)

health among urban residents only. However, while social capital and area level deprivation explained some of the variance in QoL attributable to differences in ED residence in rural areas, the majority of this variation remained unexplained. This points to important variation in the make-up of these areas that require further, more in-depth examination. In terms of the magnitude of the effect, the strength of the association between social cohesion and QoL among urbanites was similar to that of having one or more limiting illnesses which is recognised as an important factor in the wellbeing of older adults (Netuveli et al. 2005).

While we hypothesised that higher social capital is beneficial to QoL, we cannot discount the possibility of reverse causation whereby higher QoL may in fact lead to more positive reports of individual-level social capital. Indeed, Sirven and Debrand (Sirven and Debrand 2012) report that the effect of health on social capital is greater than that of social capital on health. The same however, cannot be argued with any great veracity for the relationship between area level deprivation and QoL as doing so would require that we observe individuals with lower QoL, locating themselves in more deprived areas. Furthermore, the fact that the length of time individuals have lived in an area showed no effect in our analysis further challenges this argument.

Social capital may influence QoL among older adults through a number of potential mechanisms. One likely pathway is via psychosocial mechanisms whereby greater support, reciprocity, and collective-efficacy (Kawachi et al. 1999; Sampson et al. 2002; Galster 2010) may provide a source of self-esteem and a sense of control over one's environment. This is particularly relevant here as the control domain of CASP refers to one's ability to shape the environment in which they live, while the related need for autonomy refers to self-determination. On the other hand, a lack of social cohesion which manifests as social decay, may be characterised by a poor physical environment defined by dilapidation, vandalism or similar may increase residents' sense of powerlessness (Galster 2010) which is a negative constituent of the autonomy and control aspects of QoL. While there are a number of proposed explanations for urban / rural differences in the amount and nature of social capital, one potential explanation is that urban centres provide more overt opportunities for the creation and maintenance of social networks (Lannoo et al. 2012). However, this explanation somewhat ignores the multitude of less overt outlets for social interactions in communal meeting places such as churches and other community settings. Personal agency, and a sense of independence, has been shown to mediate exclusionary experiences (Walsh et al. 2012) and while it may be the case that older adults in more densely populated areas, have greater choice of informal support networks, it is important that the role of personal agency is not promoted to the exclusion of the possibility that older adults may be forced by social and other circumstances to make different decisions regarding social contacts and relationships (Walsh et al. 2012). This may also explain why poor quality relationships with friends is more clearly related to the QoL of urban dwellers as the quality of their non-family networks is of central importance while the quality of relationships with children is more keenly felt among rural older adults. This latter finding also supports the observation that rural social networks are more typically based on traditional institutions such as the family (Beggs et al. 2010). This all points to the important potential of policy initiatives that enable older adults to maintain their social networks by safe-guarding existing, and promoting new, opportunities for positive social interactions.

Our findings support the view that QoL is not reducible to health alone but rather is a multidimensional construct of which health is but one component (Higgs et al. 2003b). Furthermore, our results add to the growing evidence of the importance of social networks and inter-personal relationships in particular. In practical terms this suggests that a positive psychosocial environment may buffer against the negative effects of declining health. Moreover, there is some evidence that social capital interventions at may help lessen health inequalities by addressing social determinants of health (Coll-planas et al. 2017).

An important strength of our analyses is that it draws on a large nationally representative sample of community dwelling older adults. However, a necessary limitation of the approach that we have taken here is that by limiting our analyses to geographic clusters with a minimum of five participants, our sample may not be fully representative of the wider population, particularly in less densely populated areas.

While ambiguity and heterogeneity in the conceptualisation of social cohesion can be challenging, these same characteristics mean that this construct may enable us to better understand the fluidity and complexity of old age. The operationalisation of social cohesion employed here, being based on multiple indicators, goes some way to capturing the multidimensionality of the concept. However, we touch on only a small sub-section of the six domains common to conceptual frameworks applied to the study of social participation and exclusion among older adults that were identified in a scoping review by Walsh et al. (2017) - safety, a marker of social decay within the neighbourhoods and community domain; social cohesion / relations; and deprivation from within the domain of material and financial resources (Walsh et al. 2017). By focusing on an aggregated measure of specific domains of QoL, our contribution to our understanding of wellbeing in the broadest sense is naturally curtailed. This is particularly the case in attempting to understand differences between urban and rural settings as we may not adequately capture important elements of the dynamics of life course ageing, social capital and place.

Ideally, we would have liked to have included a measure that captured social capital at the aggregate cluster level, however, this data was not available to us and therefore social capital was reported at the individual level which is open to the usual biases inherent in this type of measurement such as self-selection and reporting bias. However, our inclusion of area level deprivation goes some way to capturing the wider objective characteristic of the geographic areas in which participants live. Social inclusion in older age is shaped by a broad sweep of factors that range from social processes such as population ageing to place characteristics, including social cohesion and belonging, and individual capacities (Jehoel-Gijsbers and Vrooman 2012; Walsh et al. 2012). Our research focused on a only a subset of these factors. While TILDA provides a breadth of information on ageing it was not designed with an in-depth focus on sociological constructs such as social capital. As such, our ability to unpack the complex processes at play is limited. However, we hope that this research might compliment more theoretically driven research. Furthermore, as this research is cross-sectional, we do not capture the full diversity of life course trajectories of ageing, social capital or place, highlighted by Walsh et al. (2012 & 2017). This is an area where methodologies such as life histories may provide a more profitable means of capturing the multifaceted nature of the life course. Finally, while our data are drawn from a large population based study, our analyses does not capture the full diversity of spatial settings, particularly in rural areas (Walsh et al. 2012).

Conclusions

This study demonstrates that the broader social environment, including relationships, matter to the QoL of older adults and the importance of different aspects of social capital and relationships to kin, friends, and neighbours. Our findings also suggest that there may be differences not only between urban and rural areas but, importantly, within each. Compared to younger age groups, older adults who experience social exclusion and other forms of disadvantage tend to do so for longer periods (Scharf and Keating 2012). Therefore, in the current context of increasing life expectancy, it is essential that efforts to address this all too common negative feature of ageing are intensified. This research and studies within the discipline of environmental gerontology more broadly are of increasingly critical importance in the context of population ageing and rapid social changes.

Compliance with Ethical Standards The study was conducted according to the guidelines set out in the 1964 Helsinki Declaration and its later amendments. Ethical approval for TILDA was granted by the Faculty of Health Sciences Research Ethics Committee of Trinity College Dublin. Informed consent was obtained from all individual participants included in the study.

Declaration of Interest The authors declare no conflict of interest.

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