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Factors associated with the health and wellbeing of older people in a rural African setting

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INDEPTH WHO-SAGE Supplement

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Assessing health and well-being among older people in rural South Africa

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Background: The population in developing countries is ageing, which is likely to increase the burden of non-communicable diseases and disability.
Objective: To describe factors associated with self-reported health, disability and quality of life (QoL) of older people in the rural northeast of South Africa.
Design: Cross-sectional survey of 6,206 individuals aged 50 and over. We used multivariate analysis to examine relationships between demographic variables and measures of self-reported health (Health Status), functional ability (WHODASi) and quality of life (WHOQoL).
Results: About 4,085 of 6,206 people eligible (65.8%) completed the interview. Women (Odds Ratio (OR) = 1.30, 95% CI 1.09, 1.55), older age (OR = 2.59, 95% CI 1.97, 3.40), lower education (OR = 1.62, 95% CI 1.31, 2.00), single status (OR = 1.18, 95% CI 1.01, 1.37) and not working at present (OR = 1.29, 95% CI 1.06, 1.59) were associated with a low health status. Women were also more likely to report a higher level of disability (OR = 1.38, 95% CI 1.14, 1.66), as were older people (OR = 2.92, 95% CI 2.25, 3.78), those with no education (OR = 1.57, 95% CI 1.26, 1.97), with single status (OR = 1.25, 95% CI 1.06, 1.46) and not working at present (OR = 1.33, 95% CI 1.06, 1.66). Older age (OR = 1.35, 95% CI 1.06, 1.74), no education (OR = 1.39, 95% CI 1.11, 1.73), single status (OR = 1.28, 95% CI 1.10, 1.49), a low household asset score (OR = 1.52, 95% CI 1.19, 1.94) and not working at present (OR = 1.32; 95% CI 1.07, 1.64) were all associated with lower quality of life.
Conclusions: This study presents the first population-based data from South Africa on health status, functional ability and quality of life among older people. Health and social services will need to be restructured to provide effective care for older people living in rural South Africa with impaired functionality and other health problems.

Keywords: *adult health*; *ageing*; *self-reported health*; *disability*; *quality of life*; *South Africa*; *rural*; *INDEPTH WHO-SAGE*

Access the supplementary material to this article: INDEPTH WHO-SAGE questionnaire (including variants of vignettes), a data dictionary and a password-protected dataset (see **Supplementary files** under **Reading Tools** online). To obtain a password for the dataset, please send a request with 'SAGE data' as its subject, detailing how you propose to use the data, to global.health@epiph.umu.se

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The world's population is ageing and projections show that this increase will continue (1, 2). The percentage of the world's population aged 65 and over is projected to increase steeply in coming years

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(1–3). The growth in the world population aged 50 and over is expected to increase from 21% in 2011 to 34% in 2050. This increase will affect not only developed countries but also developing countries (1). In particular, in developing countries demographers have predicted an increase of 140% between 2006 and 2030 (4), from 35 to more than 69 million (3). The health effects of this global demographic change are, as yet, not fully known but estimations predict that the change in age structure in coming years will bring an increase in mortality due to non-communicable diseases, changing the pattern of the most common causes of death in the different regions of the world and the world as a whole (2). In 2005 it was estimated that a total of 37 million chronic disease deaths occurred worldwide, and more than three-quarters (77%) were in people aged above 60 (5, 6). Many of these deaths were preventable and a call has already been made for active interventions to decrease this death rate by 2015 (5). For most of the developing world, and particularly for sub-Saharan Africa, this epidemic of non-communicable diseases is appearing at a time when countries are also experiencing a crippling HIV epidemic. The recent availability of highly active anti-retroviral therapy (HAART) means that, for those people with access to treatment, AIDS is becoming a chronic disease requiring long-term clinical management (7, 8).

The high HIV prevalence and recent access to HAART, together with an ageing population and the emerging epidemic of non-communicable diseases, will put immense pressure on already weak health services as well as on society as a whole, with important changes in household structure (9) and in the roles and responsibilities of older people (10).

In South Africa, the proportion of the population aged 50 and over has slightly increased from 14.8% in 2006 (11) to 15% in 2009 (12) and is predicted to be 19% in 2030 (1). This research is based in the Agincourt sub-district of rural northeast South Africa, where the proportion 50 years and over in the study population was 9.9% in 1992, 10.7% in 2000 and 11.7% in 2007 (Fig. 1). In this area there are high labour migration rates of around 60% in adult males 35–50 years old (13) and high HIV-related mortality in young adults (14, 15). Despite a falling life expectancy at birth (14), we have seen an increase in the older population. Information from annually updated health and socio-demographic surveillance has shown an increase of 15% in non-communicable diseases during the past 10 years, while the number of chronic conditions overall requiring long-term care has increased 2.6-fold (16). This may increase the existing high burden on health services depending on the proportion of older people seeking health care. In addition, this may increase the demand for social support for these individuals in their communities.

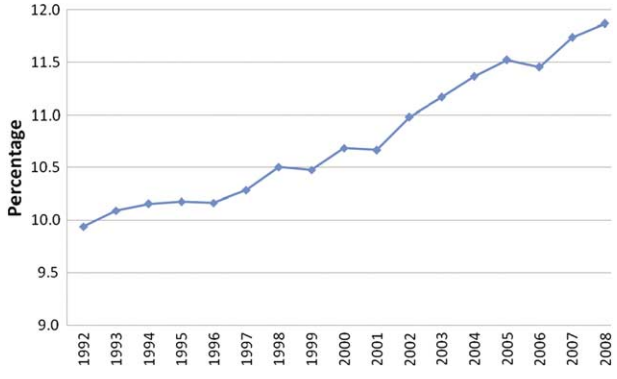

Fig. 1. Trend in proportion of population 50 years and older in Agincourt sub-district, South Africa, 1992–2007.

Changes in the social structure and roles and responsibilities of older people, particularly women, have already occurred (10). In this new reality, older women face additional responsibilities such as nursing their sick children and taking care of their grandchildren (17). Older people have also become the main bread winners through their social pension, which is sometimes the family's only source of income (18). In 2006, any South African citizen (women 60 years or older and men 65 years or older) living in South Africa could apply for the government monthly pension (the Old Age Grant). This grant also depends on the person's income, taking into account the total amount in the family if the person is married (19, 20).

For all the above reasons, the health and well-being of older adults in rural South Africa has become a crucial issue which may impact the well-being of the entire population. However, the impact of the changing age structure and the growth in chronic disease and disability is poorly understood. We have therefore set out to address this gap. In this article, we describe the findings of a population survey of people aged 50 and over which included information on their self-reported health, levels of disability and overall quality of life (QoL), which is the first time that such findings have been reported.

Methods

Study setting

The study site covers an area of 402 km^2 of semi-arid scrub land. It is situated in the rural northeast of South Africa in the Bushbuckridge sub-district of Ehlanseni District, Mpumalanga Province. In the 2006 census, there was a population of 71,587 people living in 21 villages and 11,734 households. Individuals aged 50 and over constituted 12% of the population.

The MRC/WITS Rural Public Health and Health Transitions Research Unit (Agincourt Unit) has been monitoring causes of death, births and migration in a population of around 70,000 people since 1992 (21). Each

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individual and household has a unique identifying number. The information is updated annually by trained fieldworkers through a household census. Each year, additional modules focusing on specific research and policy issues (for example, food security, household assets, health care utilisation, labour participation and temporary migration) are included. A verbal autopsy, to determine probable cause of death, is conducted on every death.

Although there has been substantial development in the area since democratic elections in 1994, and a standpipe providing clean water and an electricity supply to households is available in all villages, the infrastructure remains poor. There is a high unemployment rate with 36% of the total adult population unemployed and looking for work (29% of men and 46% of women – unpublished data, 2004). As is common in rural South Africa and the region, reflecting the structure of the regional economy, labour migration is high, especially in men aged 35–50 years old of whom 60% live outside the study area for more than 6 months per year (13).

There are six clinics and one health centre within the study area; these are served by three hospitals situated 25 and 45 km away (22). The public health service staff are heavily over-committed, staff training is limited, and chronic disease management programmes are not yet fully developed. Improvement of primary health care services is a priority for the Province (16).

Sample

Using the 2005 Agincourt census update, all 6,206 individuals aged 50 and over and living permanently in the study area were highlighted on the 2006 household roster used by field workers to update census information. In this manner, field workers knew which individuals should be invited to complete the additional questionnaire described in the next section. If an individual was not available for interview at the first visit, the field worker made up to two further visits to attempt to complete the interview. Before the 2006 census update, a similar but more extensive questionnaire was conducted in a sample of 575 individuals 50 years old or more. Those individuals were excluded from this study.

Data collection

Field workers employed in the annual census update were trained to administer the questionnaire. We used a questionnaire adapted from the World Health Organization (WHO) Study on Global AGEing and Adult Health (23) (the SAGE study). It included questions on self-reported health, functionality (mobility, self-care, pain and discomfort, cognition, interpersonal activities, sleep/energy, affect, vision and general health conditions) and well-being, as well as the eight questions which form the WHO Quality of Life (WHOQoL) measure. Additional demographic data were extracted from the Agincourt HDSS database: data routinely collected every year were extracted from the 2006 census, while Household Asset Score and Employment Status data were extracted from the most recent available data (2005 and 2004, respectively).

Local staff translated the questionnaires forward and backward into Shangaan, the local language. The final version of the questionnaire included amendments following a pilot conducted in several households before the start of data collection.

During the 4 months of field work, three stages of quality control were implemented: (1) field workers cross-checked each others' forms on a weekly basis; (2) field supervisors carried out daily supervision and weekly quality control checks; and (3) two full-time workers checked the completeness and quality of all census questionnaires including the SAGE questionnaires prior to data entry. Any identified errors were referred back to the field worker who revisited the respondent to correct the data.

Variables

We considered factors that could be associated with levels of QoL and disability in our population including: age, education, marital status, household assets, nationality, employment status and household conditions. We calculated age at interview from the recorded date of birth and reported age in four age groups: 50–59 years, 60–69, 70–79 and 80+.

Education was categorised according to the WHO-recommended levels of education: no formal education; less than six years of formal education; and six years or more of formal education. This information was obtained from the census database, which is updated every 5 years using a full questionnaire on education status (last updated in 2006).

Since many unions are traditional rather than civic and polygamy is practised by some people, we categorised marital status into two groups: (1) currently married or living as married; and (2) single, including anyone without a current partner (i.e. those who had never married or were separated, divorced or widowed).

To evaluate the potential role of socio-economic status in our analyses, we used a household asset score. This score was developed using principal component factor analysis and 34 variables derived from the 2005 census questionnaire – including information collected about the type and size of dwelling, access to water and electricity, appliances and livestock owned and transport available.

During and following the civil war in Mozambique, the Agincourt area received many refugees; hence we recorded a variable 'nationality of origin' (South African/Mozambican). The Mozambican group are separately identified in the census data and it has been previously observed that this group differs from the host South

Table 1. Domains and scales

	Health status	WHODASi	WHOQoL
Domains	Mobility	Interpersonal activities	Enough energy for daily life
	Self-care	Difficulties in daily living:	Enough money to meet needs
	Pain and discomfort	● Standing	Satisfaction with:
	Cognition	● Walking	● Your health
	Interpersonal activities	● Household duties	● Yourself
	Sleep/energy	● Learning	● Ability to perform daily activities
	Affect	● Concentrating	● Personal relationships
	Vision	● Self-care	● Condition of your living place
			Rate your overall quality of life
Scale	0 (poor health) to 100 (good health)	0 (low ability) to 100 (high ability)	0 (low quality of life) to 100 (high quality of life)

African population in measures such as education, household assets and child mortality (24). Many Mozambicans have now taken South African nationality which allows them to work legally and receive state pensions.

Employment status (currently working or not) is based on Agincourt 2004 census data, when it was most recently collected. The majority of those not working were not looking for work, but had retired in the sense they had concluded their working career.

In order to examine whether health and well-being were affected by the age structure of the household, we created a dichotomous variable for those living in households with younger members and those living in households with no one under the age of 50, using data from the 2006 census.

Health Status, Disability and Quality of Life (QoL) scores

These three measures progress from what may be seen as a more basic health status assessment (Health Status) through to more complex functioning of the person (WHODAS) and then the person's satisfaction with their life (WHOQoL). WHODAS is a scale designed to measure disability (with a high score indicating a severe lack of physical functioning). Thus, for consistency between the scores used in this study, an inverted score designated WHODASi has been used, with the consequence that all three scores are based on a 0–100 scale, and in all cases a high score indicates a good outcome. Table 1 shows the domains used to calculate the variables and their scales.

Health Status is a composite score which includes functionality and QoL domains. Health Status generally refers to physical and occupational functions, psychological states, social interaction and somatic sensations (25). This general health score was derived using item response theory (IRT) parameter estimates in Winsteps, a Rasch measurement software package (http://www.winsteps.com). IRT uses Maximum Likelihood Estimation, which combines the pattern of responses as well as the characteristics of each specific item for the multiple health

Table 2. Background characteristics by response for 6,206 adults 50 years and older living permanently in the Agincourt sub-district, 2006

Variables	Respondents ($N=4,085$)	Non-respondents ($N=2,121$)	p-Value for difference respondents vs. non-respondents
Sex (%)			
Men	1,012 (24.8)	926 (43.7)	<0.001
Women	3,073 (75.2)	1,195 (56.3)	
Mean age (SD)	66.6 (10.6)	64.8 (11.3)	<0.001
Age group (years)			
50–59	1,297 (31.7)	923 (43.5)	<0.001
60–69	1,221 (29.9)	546 (25.7)	
70–79	1,077 (26.4)	413 (19.5)	
80+	490 (12.0)	238 (11.2)	
Education level (%)			
No formal education	2,601 (65.8)	1,038 (67.5)	<0.001
Less than or equal to 6 years	757 (19.2)	218 (14.1)	
More than 6 years	594 (15.0)	292 (18.9)	
Marital status (%)			
Single	2,223 (54.4)	1,125 (53.0)	=0.302
Current partnership	1,862 (45.6)	996 (47.0)	
Household asset score (%)			
First quintile	629 (15.9)	313 (18.5)	=0.125
Second quintile	753 (18.9)	312 (18.5)	
Third quintile	766 (19.3)	330 (19.5)	
Fourth quintile	841 (21.2)	329 (19.5)	
Fifth quintile	978 (24.6)	405 (24.0)	
Mean number of household members (SD)	7.0 (4.1)	7.4 (4.6)	=0.002
Household members aged 50 years and over (SD)	32.1 (25.9)	28.9 (25.9)	<0.001
Nationality of origin			
South African	2,972 (72.8)	1,399 (66.0)	<0.001
Mozambican	1,111 (27.2)	720 (34.0)	
Occupational status in 2004			
Working	503 (14.6)	481 (28.8)	<0.001
Not working	2,930 (85.3)	1,189 (71.2)	

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Table 3a. Demographic variables by sex [*n*, (%)] for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

Variable	Males	Females	Total	*p*-Value for difference between male and female
Sex (%)	1,012 (24.8)	3,073 (75.2)	4085 (100)	$p < 0.001$
Mean Age in years (95% CI)	67.8 (67.1, 68.5)	66.1 (65.7, 66.4)		
Age group (years)				
50–59	275 (27.2)	1,022 (33.3)	1,297 (31.7)	df = 3
60–69	321 (31.7)	900 (29.3)	1,221 (29.9)	$p = 0.001$
70–79	269 (26.6)	808 (26.3)	1,077 (26.4)	
80+	147 (14.5)	343 (11.2)	490 (12.0)	
Partnership status				
In a partnership	771 (76.2)	1,091 (35.5)	1,862 (45.6)	df = 1
Currently single	241 (23.8)	1,982 (64.5)	2,223 (54.4)	$p < 0.001$
Education level				
No education	549 (54.2)	2,052 (66.8)	2,601 (63.7)	df = 3
Less than 6 years	214 (21.1)	543 (17.1)	757 (18.5)	$p < 0.001$
Six years or more	209 (20.6)	385 (12.5)	594 (14.5)	
Missing data	40 (4.0)	93 (3.0)	133 (3.3)	
Household asset score (quintiles)				
First (lowest)	159 (15.7)	470 (15.3)	629 (15.4)	df = 5
Second	167 (16.5)	586 (19.1)	753 (18.4)	$p = 0.016$
Third	171 (16.9)	595 (19.4)	766 (18.7)	
Fourth	212 (20.9)	629 (20.5)	841 (20.6)	
Fifth (highest)	279 (27.6)	699 (22.7)	978 (23.9)	
Missing data	24 (2.4)	94 (3.1)	118 (2.9)	
Household with and without people aged less than 50 years				
With under 50	853 (84.3)	2841 (92.5)	3694 (90.4)	df = 1
Without under 50	159 (15.7)	232 (7.5)	391 (9.6)	$p < 0.001$
Nationality of origin				
South African	767 (75.9)	2,205 (71.8)	2,972 (72.8)	df = 1
Mozambican	244 (24.1)	867 (28.2)	1,111 (27.2)	$p = 0.011$
Occupational status in 2004				
Working	169 (19.7)	334 (13.0)	503 (14.7)	df = 1
Not working	690 (80.3)	2,240 (87.0)	2,930 (85.4)	$p < 0.001$

questions (each with multiple response categories) to produce the final health score. The health score is then transformed to a scale of 0–100. IRT models the relationship between a person's reported Health Status and their probability of responding to each question in a multi-item scale. A key feature of IRT modelling is that item parameter estimates should be invariant to group membership (i.e. each item functions similarly across groups of people from different cultures) (26).

To measure disability levels we used the WHODAS II (World Health Organization Disability Assessment Schedule II) scale that assesses day-to-day functioning in six activity domains. There are 10 questions with multiple response options. Measurement of functionality was calculated by asking participants about difficulty experienced performing certain activities during the past 30 days, and transformed into the WHODASi score for functional ability as described above.

QoL was measured using the Word Health Organisation Quality of Life (WHOQoL) scale. WHO defines QoL as 'the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns' (27, 28). QoL domains include questions on self-rated general health and questions on satisfaction. The WHOQoL score is presented on a scale of 8–40

Table 3b. Demographic variables by age group for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

Age groups	50–59, *N* (%)	60–69, *N* (%)	70–79, *N* (%)	80+, *N* (%)	Total *N* (%)	*p*-Value
Sample distribution	1,297 (31.8)	1,221 (29.9)	1,077 (26.4)	490 (12)	4,085 (100)	
Mean (95% CI)	54.5 (54.4–54.7)	64.8 (64.6–64.9)	74.5 (74.3–74.7)	84.9 (84.6–85.3)		
Sex						
Male	275 (21.2)	321 (26.3)	269 (25.0)	147 (30.0)	1,012 (24.8)	df = 3
Female	1,022 (78.8)	900 (73.7)	808 (75.0)	343 (70.0)	3,073 (75.2)	$p = 0.001$
Marital status						
In a partnership	732 (56.4)	615 (50.4)	374 (34.7)	141 (28.8)	1,862 (45.6)	df = 3
Currently single	565 (43.6)	606 (49.6)	703 (65.3)	349 (71.2)	2,223 (54.4)	$p < 0.001$
Education level						
No formal education	630 (48.6)	736 (60.3)	844 (78.4)	391 (79.8)	2,601 (63.7)	df = 9
Primary or less than six years	304 (23.4)	253 (20.7)	144 (13.4)	56 (11.4)	757 (18.5)	$p < 0.001$
Six years or more	316 (24.4)	193 (15.8)	61 (5.7)	24 (4.9)	594 (14.5)	
Missing	47 (3.6)	39 (3.2)	28 (2.6)	19 (3.9)	133 (3.3)	
Socio-economic quintiles						
First (lowest)	198 (15.3)	153 (12.5)	186 (17.3)	92 (18.8)	629 (15.4)	df = 15
Second	233 (18.0)	198 (16.2)	220 (20.4)	102 (20.8)	753 (18.4)	$p < 0.001$
Third	238 (18.4)	246 (20.2)	199 (18.5)	83 (16.9)	766 (18.8)	
Fourth	258 (19.9)	258 (21.1)	231 (21.5)	94 (19.2)	841 (20.6)	
Fifth (highest)	337 (26.0)	326 (26.7)	217 (20.2)	98 (20.0)	978 (23.9)	
Missing	33 (2.5)	40 (3.3)	24 (2.2)	21 (4.3)	118 (2.9)	
Adult in the household						
Youth plus older	1,206 (93.0)	1,123 (92.0)	964 (89.5)	401 (81.8)	3,694 (90.4)	df = 3
Only older	91 (7.0)	98 (8.0)	113 (10.5)	89 (18.2)	391 (9.6)	$p < 0.001$
Nationality						
South African	957 (73.8)	919 (75.3)	740 (68.7)	356 (72.7)	2,972 (72.8)	df = 3
Mozambican	339 (26.2)	301 (24.7)	337 (31.3)	134 (27.4)	1,111 (27.2)	$p = 0.003$
Occupational status						
Working	284 (26.4)	160 (15.3)	44 (4.9)	15 (3.6)	503 (14.7)	df = 3
Not working	791 (73.6)	883 (84.7)	859 (95.1)	397 (96.4)	2,930 (85.4)	$p < 0.001$

(where 8 is the best QoL) and transformed to a 0–100 scale corresponding to the other scores.

Data entry and analysis

We entered data using CSPro 3.1 data entry programme (http://www.census.gov/ipc/www/cspro/index.html) which includes validation checks, and data was then extracted to Stata 10.1 (College Station, TX, USA) for analysis.

Logistic regression was performed to assess the relation between potentially associated factors and confounders, and the three outcomes, i.e. health score, functionality (WHODASi) and quality of life (WHOQoL). We first carried out a univariate analysis with each of the census variables and then constructed a multivariate model based on the results of the univariate analyses (Tables 5, 7 and 9). Variables which were significantly related to the outcome measures in a univariate analysis were introduced into the model sequentially and then discarded if the effect was not significant at the level of $p = 0.1$.

Ethical clearance

Ethical clearance for the MRC/WITS Rural Public Health and Health Transitions Research Unit – Health and Socio-Demographic Surveillance System (Agincourt) – census and modules has been granted by the Committee for Research on Human Subjects (Medical) of the University of the Witwatersrand, Johannesburg, South Africa (Ref No. M960720). Ethical clearance for the Agincourt-INDEPTH Study on Global Ageing and Adult Health was given by the Committee for Research on Human Subjects (Medical) of the University of the Witwatersrand, Johannesburg, South Africa (Ref No. R14/49).

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Table 4. Range of Health Status (quintiles) by demographic variables [*n*, (%)] for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

	Health status quintile					
Variable	1 (poorest)	2	3	4	5 (best)	*p*-Value
Sex						
Male	160 (15.8)	170 (16.8)	175 (17.3)	215 (21.2)	292 (28.8)	df = 4
Female	641 (20.9)	597 (19.4)	562 (18.3)	639 (20.8)	634 (20.6)	$p < 0.001$
Age group (years)						
50–59	170 (13.1)	240 (18.5)	220 (17)	315 (24.3)	352 (27.1)	df = 12
60–69	183 (15)	209 (17.1)	239 (19.6)	283 (23.2)	307 (25.1)	$p < 0.001$
70–79	270 (25.1)	207 (19.2)	202 (18.8)	193 (17.9)	205 (19)	
80 and over	178 (36.3)	111 (22.7)	76 (15.5)	63 (12.9)	62 (12.7)	
Partnership						
In a partnership	277 (14.9)	341 (18.3)	328 (17.6)	411 (22.1)	505 (27.1)	df = 4
Currently single	524 (23.6)	426 (19.2)	409 (18.4)	443 (19.9)	421 (18.9)	$p < 0.001$
Education level						
No education	590 (22.7)	500 (19.2)	475 (18.3)	510 (19.6)	526 (20.2)	df = 8
Less than 6 years	120 (15.9)	140 (18.5)	147 (19.4)	166 (21.9)	184 (24.3)	$p < 0.001$
Six years or more	65 (10.9)	97 (16.3)	96 (16.2)	159 (26.8)	177 (29.8)	
Household asset score (quintiles)						
First (lowest)	126 (20.0)	120 (19.1)	111 (17.7)	131 (20.8)	141 (22.4)	df = 16
Second	159 (21.1)	148 (19.7)	138 (18.3)	155 (20.6)	153 (20.3)	$p = 0.321$
Third	145 (18.9)	135 (17.6)	147 (19.2)	163 (21.3)	176 (23.0)	
Fourth	164 (19.5)	177 (21.1)	152 (18.1)	163 (19.4)	185 (22.0)	
Fifth (highest)	179 (18.3)	165 (16.9)	160 (16.4)	219 (22.4)	255 (26.1)	
Household with and without people aged less than 50						
With under 50	696 (18.8)	702 (19)	671 (18.2)	787 (21.3)	838 (22.7)	df = 4
Without under 50	105 (26.9)	65 (16.6)	66 (16.9)	67 (17.1)	88 (22.5)	$p = 0.003$
Nationality of origin						
South African	623 (21.0)	558 (18.8)	506 (17.0)	619 (20.8)	666 (22.4)	df = 4
Mozambican	178 (16.0)	209 (18.8)	229 (20.6)	235 (21.1)	260 (23.4)	$p = 0.003$
Occupational status in 2004						
Working	59 (11.7)	74 (14.7)	93 (18.5)	119 (23.7)	158 (31.4)	df = 4
Not working	612 (20.9)	569 (19.4)	518 (17.7)	612 (20.9)	619 (21.1)	$p < 0.001$

Results

From the 6,206 people aged 50 years and over selected from the 2005 census, 4,085 (65.8%) responded to a questionnaire. Of those that did not complete a questionnaire, 1,616 (26.0%) were absent at the time of the interview, 218 (3.5%) had died, 47 (0.75%) declined to take part and 240 (3.9%) were unable to answer the questions (mainly due to different health conditions).

A comparison of respondents and non-respondents (Table 2) shows that non-respondents were significantly younger (mean age 64.8 vs. 66.6, $p < 0.001$), included a higher proportion of men (43.7% vs. 24.8%, $p < 0.001$) and were better educated. There were no differences in marital status or socio-economic status, but respondents included significantly more South Africans than Mozambicans and proportionally more people who were currently not working (85.3% vs. 71.2%; $p < 0.001$).

About 85% of respondents were 'currently not working', but the majority of these were not formally 'unemployed' (i.e. actively searching for work but not finding it). The 5.7% of people who were formally unemployed included 15% of those aged 50–59 and 4.3% of those aged 60–69 (data not shown).

Among the respondents, there were significant differences between men and women in all the variables (Table 3a). Only a quarter of the respondents were men (24.8%), and

Table 5. Factors associated with poor Health Status[a] score for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

Variables	Univariate model OR (95% CI)	Multivariate model OR (95% CI)
Sex		
Male	1	1
Female	1.42 (1.23, 1.64)	1.30 (1.09, 1.55)
Age group (years)		
50–59	1	1
60–69	1.13 (0.97, 1.32)	1.05 (0.88, 1.26)
70–79	1.81 (1.53, 2.13)	1.46 (1.19, 1.78)
80+	3.09 (2.45, 3.89)	2.59 (1.97, 3.40)
Education level		
No formal education	1.97 (1.64, 2.35)	1.62 (1.31, 2.00)
Less than 6 years	1.51 (1.22, 1.88)	1.42 (1.12, 1.79)
Six years or more	1	1
Marital status		
Single	1.52 (1.34, 1.72)	1.18 (1.01, 1.37)
In current partnership	1	1
Household with and without people aged less than 50		
With under 50	1	Not included in the final model
Without under 50	1.19 (0.97, 1.48)	
Household asset score		
First quintile (lowest)	1.23 (1.01, 1.51)	Not included in the final model
Second quintile	1.36 (1.12, 1.65)	
Third quintile	1.18 (0.98, 1.43)	
Fourth quintile	1.33 (1.11, 1.60)	
Fifth quintile (highest)	1	
Nationality of origin		
South African	1	1
Mozambican	0.95 (0.82, 1.09)	0.76 (0.64, 0.91)
Occupational status in 2004		
Working	1	1
Not working	1.69 (1.40, 2.05)	1.29 (1.06, 1.59)

[a]IRT (Item Response Theory) used when measuring health status. The Health Status scale was divided in quintiles. The best Health Status was defined as those in the two highest quintiles, while the worst Health Status was defined as those in the three lower quintiles.

the men were older (67.8 years vs. 66.1 years; $p < 0.001$), more likely to be in a current partnership (76.2% vs. 35.5%; $p < 0.001$) and more likely to be in paid employment.

Demographic variables presented by age group (Table 3b) show that the proportion of males increased with age (21.2% in 50–59 age group vs. 30% in the 80+ age group; $p = 0.001$); the younger age group was better educated (24.4% in the 50–59 age group vs. 4.9% in 80+ have 6 years or more of formal education; $p < 0.001$); the two younger age groups have higher socio-economic status (26.0 and 26.7% in the younger groups vs. 20.2 and 20.0% in the older age groups; $p < 0.001$).

Table 4 shows the range of Health Status responses by each of the demographic variables, while Table 5 shows the results of univariate and multivariate logistic regression analysis examining the odds of reporting a Health Status in one of the bottom two quintiles. Household asset score, household age structure and nationality of origin did not show a significant association in univariate analysis. In the final multivariate model, women had a 30% higher risk than men (odds ratio (OR) = 1.30, 95% confidence interval (CI) 1.09, 1.55) of reporting a low Health Status. Older age (OR = 2.59, 95% CI 1.97, 3.40), lower education level (OR = 1.62, 95% CI 1.31, 2.00), single marital status (OR = 1.18, 95% CI 1.01, 1.37) and not working at present (OR = 1.29, 95% CI 1.06, 1.59) were also all related to a poorer Health Status. People of Mozambican origin were 24% less likely to report a Health Status in the bottom two quintiles (OR = 0.76, 95% CI 0.64, 0.91).

The quintiles for self-reported ability (WHODASi score) are shown in Table 6, while Table 7 shows the results of univariate and multivariate logistic regression analysis examining the odds of reporting a WHODASi score in one of the bottom two quintiles (poorer self-reported functioning). In multivariate analysis, women were more likely to be in the bottom two quintiles of self-reported functioning (OR = 1.38, 95% CI 1.14, 1.66), as were older people (OR = 2.92, 95% CI 2.25, 3.78), those with less education (OR = 1.57, 95% CI 1.26,1.97), those not in a current partnership (OR = 1.25, 95% CI 1.06, 1.46) and those who were not working (OR = 1.33, 95% CI 1.06, 1.66).

Although women were significantly more likely than men to be in the lowest two quintiles of self-reported QoL – WHOQoL (Table 8), this effect disappeared after adjusting for other variables, as did the effect of household age structure and nationality of origin (Table 9). In the final multivariate model, older age (OR = 1.35, 95% CI 1.06, 1.74), lack of education (OR = 1.39, 95% CI 1.11, 1.73), not being in a current partnership (OR = 1.28, 95% CI 1.10, 1.49), having a low household asset score (OR = 1.52, 95% CI 1.19, 1.94) and not working at present (OR = 1.32; 95% CI 1.07, 1.64) were all associated with a higher odds of being in one of the lower two quintiles for WHOQoL (Table 9).

Discussion

In this study we describe the well-being and functionality of the population aged 50 and over in the Agincourt

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Table 6. WHODASi[a] by demographic variables [*n*, (%)] for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

	WHODASi quintile					
Variable	1 (high ability)	2	3	4	5 (low ability)	*p*-Value
Sex						
Male	328 (32.4)	184 (18.2)	165 (16.3)	160 (15.8)	175 (17.3)	df = 4
Female	701 (22.8)	542 (17.6)	526 (17.1)	642 (20.9)	662 (21.5)	$p < 0.001$
Age group (years)						
50–59	398 (30.7)	264 (20.4)	220 (17)	256 (19.7)	159 (12.3)	df = 12
60–69	364 (29.8)	238 (19.5)	210 (17.2)	217 (17.8)	192 (15.7)	$p < 0.001$
70–79	198 (18.4)	177 (16.4)	188 (17.5)	233 (21.6)	281 (26.1)	
80 and over	69 (14.1)	47 (9.6)	73 (14.9)	96 (19.6)	205 (41.8)	
Partnership						
In a partnership	545 (29.3)	369 (19.8)	323 (17.4)	343 (18.4)	282 (15.2)	df = 4
Currently single	484 (21.8)	357 (16.1)	368 (16.6)	459 (20.7)	555 (25.0)	$p < 0.001$
Education level						
No education	583 (22.4)	419 (16.1)	443 (17)	539 (20.7)	617 (23.7)	df = 8
Less than 6 years	214 (28.3)	149 (19.7)	127 (16.8)	147 (19.4)	120 (15.9)	$p < 0.001$
Six years or more	206 (34.7)	130 (21.9)	99 (16.7)	89 (15)	70 (11.8)	
Household asset score (quintiles)						
First (lowest)	168 (26.7)	98 (15.6)	105 (16.7)	127 (20.2)	131 (20.8)	df = 16
Second	181 (24)	139 (18.5)	129 (17.1)	153 (20.3)	151 (20.1)	$p = 0.218$
Third	184 (24)	157 (20.5)	123 (16.1)	136 (17.8)	166 (21.7)	
Fourth	191 (22.7)	148 (17.6)	148 (17.6)	176 (20.9)	178 (21.2)	
Fifth (highest)	281 (28.7)	166 (17)	170 (17.4)	179 (18.3)	182 (18.6)	
Household with and without people aged less than 50						
With under 50	940 (25.5)	662 (17.9)	631 (17.1)	720 (19.5)	741 (20.1)	df = 4
Without under 50	89 (22.8)	64 (16.4)	60 (15.4)	82 (21)	96 (24.6)	$p = 0.199$
Nationality of origin						
South African	719 (24.2)	535 (18)	522 (17.6)	560 (18.8)	636 (21.4)	df = 4
Mozambican	309 (27.8)	191 (17.2)	169 (15.2)	241 (21.7)	201 (18.1)	$p = 0.005$
Occupational status in 2004						
Working	179 (35.6)	98 (19.5)	85 (16.9)	81 (16.1)	60 (11.9)	df = 4
Not working	686 (23.4)	523 (17.9)	502 (17.1)	574 (19.6)	645 (22.0)	$p < 0.001$

[a]WHODASi: Using the World Health Organization Disability Assessment Schedule II (WHODAS II) the variable scale was inverted and divided into quintiles.

Health and Socio-demographic Surveillance Site by measuring three main variables (scores) that flow from a more basic health status assessment (Health Status) through to more complex functioning of the person (WHODASi) and then to the person's satisfaction with their life (WHOQoL).

Women were 30% more likely than men to report a poor state of health (low Health Status). Other factors associated with a worse Health Status were aged above 70 years, lower levels of formal education, being single and currently not working. On the other hand, being of Mozambican origin is related to a better-reported Health Status. As with the Health Status, women were more likely to report poorer functionality (WHODASi) than men. Age significantly affected functionality only from 70 years of age. People aged 80 and over had a threefold increase in risk of reporting poorer functionality. Progressively lower levels of education related to a gradual increase in functional problems. Being single or 'not working at present' were also associated with worse functionality. There was no gender difference in QoL. However, our analysis showed the following factors related to lower QoL: older age group, no formal education, being single and currently not working.

Table 7. Factors associated with poor self-reported functioning (WHODASi[a]) for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

Variables	Univariate model OR (95% CI)	Multivariate model OR (95% CI)
Sex		
Male	1	1
Female	1.49 (1.28, 1.73)	1.38 (1.14, 1.66)
Age group (years)		
50–59	1	1
60–69	1.07 (0.90, 1.27)	1.00 (0.83, 1.21)
70–79	1.94 (1.64, 2.29)	1.62 (1.32, 1.99)
80+	3.38 (2.73, 4.20)	2.92 (2.25, 3.78)
Education level		
No formal education	2.19 (1.80, 2.67)	1.57 (1.26, 1.97)
Less than 6 years	1.49 (1.18, 1.88)	1.33 (1.03, 1.72)
Six years or more	1	1
Marital status		
Single	1.66 (1.46, 1.88)	1.25 (1.06, 1.46)
In current partnership	1	1
HH with and without people aged less than 50		
With under 50	1	Not included in the final model
Without under 50	1.28 (1.03, 1.57)	
Household asset score (quintiles)		
First quintile (lowest)	1.24 (1.03, 1.50)	Not included in the final model
Second quintile	1.11 (0.91, 1.35)	
Third quintile	1.16 (0.95, 1.41)	
Fourth quintile	1.19 (0.97, 1.46)	
Fifth quintile (highest)	1	
Nationality of origin		
South African	1	Not included in the final model
Mozambican	0.98 (0.85, 1.13)	
Occupational status in 2004		
Working	1	1
Not working	1.83 (1.48, 2.25)	1.33 (1.06, 1.66)

[a]WHODASi: Using the World Health Organization Disability Assessment Schedule II (WHODAS II) the variable scale was inverted and divided into quintiles. ORs reflect odds for those in the two lowest quintiles of functionality.

Finally there was a gradient in the expected direction in the relationship between lower QoL and lower socio-economic status measured by household asset score.

Our data show that women report significantly poorer functionality for both Health Status and WHODASi, the two measures that include variables of functionality, although they do not report a lower QoL. There are several possible explanations for this. Women may objectively have poorer functionality but do not regard this as a problem, or women may be more active in the home than their retired partners and therefore more aware of a change in functionality, or women may be more aware of their own health and therefore report health problems in a higher proportion than men. At present, the data are not available to explore this issue further.

The oldest age group (people aged 70 and over) reported worst QoL and functioning. However, the age group 60–69 years presented no significant difference in Health Status and functioning measures compared with the 50–59 year age group. Moreover, they reported a significantly better QoL than the younger 50–59 age group. This may be related to the fact that women who retire at 60 and men at 65 are still in good health. In addition, they receive old-age grants (pensions) which allows them a better life with higher food security and, importantly, with greater capacity to help children in their households who then enjoy higher food security and better schooling (29). At older ages (70 and over), Health Status and functioning had deteriorated and they reported worse levels of both variables despite still receiving pension grant.

The household asset score was created as a proxy for household socio-economic status. The asset data used in this study were collected in 2005, a year earlier than the study was conducted. Our data did not show any relation between this score and either the Health Status or the WHODASi. However, the household asset score is significantly related to the WHOQoL that measures satisfaction with one's life. This could mean that people's socio-economic status has no relation to being physically and socially functional, but impacts on how satisfied people are with their life and expectations (30).

Unemployment among Agincourt's adult population (including both permanent and temporary residents) is 36%, representing 29% of men and 46% of women (Collinson, personal communication). In our study sample, 85% of all respondents were 'not currently working', but only 5.7% were formally unemployed. There is a significant relationship between currently not working and Health Status, WHODASi and WHOQoL even after controlling for age group.

Other work in the Agincourt study site has shown residents of Mozambican origin to be a vulnerable subgroup (24, 31). We thus expected Mozambican nationality to have a significant relationship with low Health Status, low WHODASi and low WHOQoL. However, no relationship with WHOQoL and WHODASi was found, and being Mozambican was associated with less likelihood of reporting a lower Health Status, meaning that those of Mozambican origin reported feeling in better health than their South African counterparts. This may be related to a healthy immigrant selectivity that may decrease over coming years (32).

The Agincourt HDSS includes individuals living permanently in the area and those that spend more than 6 months per year outside the study area but remain linked to their rural households. Some permanent

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Table 8. WHOQoL[a] by demographic variables [*n* (%)] for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

	WHOQoL quintile					
Variable	1 (high)	2	3	4	5 (low)	*p*-Value
Sex						
Male	244 (24.2)	217 (21.5)	168 (16.6)	171 (16.9)	210 (20.8)	df = 4
Female	566 (18.4)	623 (20.3)	608 (19.8)	678 (22.1)	596 (19.4)	$p < 0.001$
Age group (years)						
50–59	269 (20.8)	274 (21.1)	246 (19.0)	261 (20.1)	246 (19.0)	df = 12
60–69	279 (22.9)	281 (23.0)	238 (19.5)	257 (21.0)	165 (13.5)	$p < 0.001$
70–79	185 (17.2)	214 (19.9)	209 (19.4)	225 (20.9)	242 (22.5)	
80 and over	77 (15.7)	71 (14.5)	83 (16.9)	106 (21.6)	153 (31.2)	
Partnership						
In a partnership	432 (23.2)	394 (21.2)	371 (19.9)	371 (19.9)	292 (15.7)	df = 4
Single	378 (17.0)	446 (20.1)	405 (18.2)	478 (21.5)	514 (23.1)	$p < 0.001$
Education level						
No education	454 (17.5)	508 (19.5)	513 (19.7)	565 (21.7)	558 (21.5)	df = 8
Less than 6 years	169 (22.3)	163 (21.5)	131 (17.3)	164 (21.7)	129 (17.0)	$p < 0.001$
Six years or more	157 (26.4)	151 (25.4)	102 (17.2)	91 (15.3)	93 (15.7)	
Household asset score (quintiles)						
First (lowest)	94 (14.9)	128 (20.4)	117 (18.6)	135 (21.5)	155 (24.6)	df = 16
Second	119 (15.8)	158 (20.1)	144 (19.1)	168 (22.3)	164 (21.8)	$p < 0.001$
Third	162 (21.1)	155 (20.2)	141 (18.4)	177 (23.1)	131 (17.1)	
Fourth	157 (18.7)	183 (21.8)	157 (18.7)	174 (20.7)	169 (20.1)	
Fifth (highest)	269 (27.6)	200 (20.5)	187 (19.1)	165 (16.9)	155 (15.9)	
Household with and without people aged less than 50						
With under 50	735 (19.9)	772 (20.9)	708 (19.2)	768 (20.8)	710 (19.2)	df = 4
Without under 50	78 (20.0)	68 (17.4)	68 (17.4)	81 (20.7)	96 (24.6)	$p = 0.099$
Nationality of origin						
South African	624 (21)	617 (20.8)	559 (18.8)	587 (19.7)	585 (19.7)	df = 4
Mozambican	189 (17.0)	223 (20.1)	215 (19.4)	262 (23.6)	221 (19.9)	$p = 0.014$
Occupational status in 2004						
Working	136 (27.0)	114 (22.7)	95 (18.9)	86 (17.1)	72 (14.3)	df = 4
Not working	568 (19.4)	603 (20.6)	566 (19.3)	614 (21.0)	579 (19.8)	$p < 0.001$

[a]WHOQoL: The World Health Organization Quality of Life score was calculated and then divided into quintiles.

residents work in the surrounding area making it difficult to find them at home. In this study, 76% of non-respondents were not found at home for interview despite three visits to the household. Men participate in the labour force more than women, and the non-respondents represented nearly 50% of all men and 30% of all women expected to participate in the study. Table 2 shows that non-respondents included twice the proportion of workers compared to respondents. Moreover, 69% of workers among the non-respondent group were aged between 50 and 59 years (data not shown). Those who out-migrate permanently from the study area (around 3% of the total population per year) are not followed up and so it is not possible to measure their impact on the health status and functionality of the remaining population. Thus, the study may have underestimated the reported health of the population given that the results show the health status of those that live most of the year in the study area.

This study presents the first population-based data from South Africa on Health Status, functionality and WHOQoL. Other studies have focused on specific diseases (33, 34) or on defining the best domains with which to evaluate QoL and Health Status (30).

Table 9. Factors associated with poor quality of life (WHOQoL)[a] for 4,085 adults aged 50 and over in Agincourt sub-district, 2006

Variables	Univariate model OR (95% CI)	Multivariate model OR (95% CI)
Sex		
Male	1	Not included in the final model
Female	1.17 (1.01, 1.35)	
Age group (years)		
50–59	1	1
60–69	0.82 (0.70, 0.97)	0.73 (0.61, 0.89)
70–79	1.19 (1.01, 1.37)	0.91 (0.75, 1.11)
80+	1.74 (1.41, 2.15)	1.35 (1.06, 1.74)
Education level		
No formal education	1.69 (1.40, 2.05)	1.39 (1.11, 1.73)
Less than 6 years	1.41 (1.12, 1.77)	1.33 (1.04, 1.70)
Six years or more	1	1
Marital status		
Now single	1.46 (1.28, 1.65)	1.28 (1.10, 1.49)
In current partnership	1	1
Household with and without people aged less than 50		
With under 50	1	Not included in the final model
Without under 50	1.24 (1.01, 1.53)	
Household asset score (quintiles)		
First (lowest)	1.76 (1.43, 2.16)	1.52 (1.19, 1.94)
Second	1.62 (1.33, 1.97)	1.49 (1.19, 1.86)
Third	1.38 (1.13, 1.68)	1.29 (1.04, 1.61)
Fourth	1.41 (1.17, 1.71)	1.34 (1.09, 1.66)
Fifth (highest)	1	1
Nationality of origin		
South African	1	Not included in the final model
Mozambican	1.18 (1.03, 1.36)	
Occupational status in 2004		
Working	1	1
Not working	1.50 (1.22, 1.83)	1.32 (1.07, 1.64)

[a]WHOQoL: The World Health Organization Quality of Life score was calculated and then divided into quintiles. A better quality of life was defined as those included in the three lowest quintiles; while a worse quality of life was defined as those included in the two highest quintiles.

Measuring health status, functionality and QoL at the population level in older people is important to understand the health, welfare and social support needs of this growing proportion of the population. As the Agincourt population continues to age, along with millions living in similar rural settings, it will become increasingly important for health and social services to adapt and improve in order to provide effective care for a growing older population with significantly impaired functionality and other health problems. We plan to continue to monitor the health and well-being of older people. This will provide information on how societal changes are affecting their health and well-being, assist policy makers to predict demand for health services, and inform the development of appropriate and cost-effective health and social services.

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