COACTION

Health and quality of life among older rural people in Purworejo District, Indonesia

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Introduction: Increasing life expectancy and longevity for people in many highly populated low- and middle-income countries has led to an increase in the number of older people. The population aged 60 years and over in Indonesia is projected to increase from 8.4% in 2005 to 25% in 2050. Understanding the determinants of healthy ageing is essential in targeting health-promotion programmes for older people in Indonesia.

Objective: To describe patterns of socio-economic and demographic factors associated with health status, and to identify any spatial clustering of poor health among older people in Indonesia.

Methods: In 2007, the WHO Study on global AGEing and adult health (SAGE) was conducted among 14,958 people aged 50 years and over in Purworejo District, Central Java, Indonesia. Three outcome measures were used in this analysis: self-reported quality of life (QoL), self-reported functioning and disability, and overall health score calculated from self-reported health over eight health domains. The factors associated with each health outcome were identified using multivariable logistic regression. Purely spatial analysis using Poisson regression was conducted to identify clusters of households with poor health outcomes.

Results: Women, older age groups, people not in any marital relationship and low educational and socio-economic levels were associated with poor health outcomes, regardless of the health indices used. Older people with low educational and socio-economic status (SES) had 3.4 times higher odds of being in the worst QoL quintile (OR = 3.35; 95% CI = 2.73–4.11) as compared to people with high education and high SES. This disadvantaged group also had higher odds of being in the worst functioning and most disabled quintile (OR = 1.67; 95% CI = 1.35–2.06) and the lowest overall health score quintile (OR = 1.66; 95% CI = 1.36–2.03). Poor health and QoL are not randomly distributed among the population over 50 years old in Purworejo District, Indonesia. Spatial analysis showed that clusters of households with at least one member being in the worst quintiles of QoL, functioning and health score intersected in the central part of Purworejo District, which is a semi-urban area with more developed economic activities compared with other areas in the district.

Conclusion: Being female, old, unmarried and having low educational and socio-economic levels were significantly associated with poor self-reported QoL, health status and disability among older people in Purworejo District. This study showed the existence of geographical pockets of vulnerable older people in Purworejo District, and emphasized the need to take immediate action to address issues of older people's health and QoL.

> 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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Advances in public health and medical technologies have driven population growth in the last century. Increasing life expectancy and longevity in many highly populated low- and middle-income countries has led to an increased number of older people. In 2006, about 500 million people (7.5%) of the 6.5 billion world population were aged 65 years and over, and this number is projected to double by 2030, to represent 12.5% of the global population (1, 2). During 2007–2050, the population in low- and middle-income countries is projected to increase by 61% (3). By 2030, the population aged 65 years and over is projected to increase by 140% in developing countries (1, 4). About 53% of this older population lives in Asia, home to 61% of the world's population.

Indonesian population structure has shifted significantly towards an ageing population since 1950. The total fertility rate (TFR) has decreased from 5.5 in 1950–1955 to 2.4 children per woman in 2000–2005. Life expectancy has increased from 37.5 to 68.6 years during the same period. As a consequence, the population aged 60 years and over increased from 6.2% in 1950 to 8.4% in 2005 and is projected to increase to 23.7% in 2050 (5). The Indonesia National Socio-Economic Survey in 2004 showed variation in the proportion of older people across the provinces in Indonesia ranging from 2% in Papua to 12.8% in Yogyakarta. The proportion of older people in Central Java was about 9.5%. The survey also showed that about one-third of those over 60 years reported an illness during the month prior to the survey with no differences between rural and urban areas (6).

The expected growth in the ageing population in Indonesia poses significant challenges to the health system and government. Currently, the health system focuses more on battling infectious diseases such as malaria, tuberculosis, diarrhoea and dengue fever. Resources have not been allocated proportionally to the larger and increasingly threatening burden of chronic non-communicable diseases such as heart diseases, stroke, diabetes, cancer and hypertension (7). Changing family structure and patterns of work and retirement pose immediate economic challenges, particularly to the social insurance systems. The pensions and social insurance system only cover a small percentage of the Indonesian population who work in the formal sector, which excludes most of the older population. Indonesian social insurance schemes, which are limited to covering formal workers in productive age groups and poor population sectors, are not designed to anticipate an ageing population (8). The lack of a social safety net increases the vulnerability of older people to poor health and quality of life (QoL), mostly due to the threat of chronic illness from non-communicable diseases, and lack of financial support for accessing health care.

Indonesian older people play an important role in their families and their society. In traditional Javanese society, older parents typically co-reside with one of their youngest children, usually a daughter (extended family), who accepts responsibility to take care of them until they die. Well-off older persons provide key intergenerational support for families (9), have high social status and are respected in their communities. Javanese people highly respect older people because of the value placed on lineage. Though many of the older people in Indonesia, particularly those who are widowed, live in poverty, they also contribute significantly to the rural economy; many engage actively in agricultural industries as non-skilled labour. Most of them, particularly women, have low education. Older people who are still working are less economically dependent on their next-of-kin (10). Elderly care and intergenerational relationships have become an emerging issue, particularly for those who live in urban areas, as societal values change from extended family to nuclear family structures, and younger generations become more mobile in search of better career opportunities.

A significant amount of research and literature on older people in Indonesia is available, mainly from anthropological studies focusing on the socio-cultural aspects of ageing, intergenerational relationships and changes in family structure and support for older people (10–13). However, studies on health status and QoL among the older population are largely lacking, and very little is known about morbidity among Indonesia's older population (6, 14).

Self-reported health has been identified as a strong predictor of morbidity and subsequent mortality (15, 16). While evidence has mainly come from developed countries, it can also be extended to low-income settings such as Indonesia, as shown by Frankenberg and Jones in the panel data analysis of the Indonesia Family Life Survey (IFLS) in 1993, 1997 and 2000. The IFLS data shows that individuals who perceived their health as poor are more likely to die, and the association remains even after being adjusted for physical function, physical illness and depression, weight, height and indicators of high blood pressure (17). An understanding of older people's health and well-being will provide important information on any special health care needs and demand for services, and this knowledge can be used to guide planning of health interventions and programmes (18).

The primary objectives of this study are to describe patterns of socio-economic and demographic factors that determine the health status of older people in Indonesia. The secondary objective is to identify the clustering pattern of poor health among them. Knowledge on the determinants of health status and spatial distribution of poor health will help to improve our understanding of older people's health, thus providing evidence for the

district authorities in promoting better health status and developing targeted interventions for disadvantaged populations in their specific geographical areas.

Methods

Study area and participants

The WHO Study on global AGEing and adult health (SAGE) (19) was conducted in a functioning Health and Demographic Surveillance System (HDSS) site in Purworejo District, Central Java, Indonesia. The Purworejo HDSS is a member of the INDEPTH Network, which consists of 38 HDSS sites in Africa, Asia and Oceania (http://www.indepth-network.org). The district is located between longitudes 109° and 110°E and latitude 7°S, about 60 km from Yogyakarta City. It covers an area of 1,035 km^2, spanning a diverse geographical area from the coast in the south to the mountains in the north. The district has 750,000 inhabitants (26% under 15 years old, 63% in the economically productive age group and 11% over 65 years old). Eleven percent of those over six years of age have had no formal education. About 89% of the population live in rural areas. The Purworejo HDSS has been running since 1994 covering a total of 600,000 person-years of observation (20). In 2006, the total population under surveillance was 55,000 (13,443 households living in 128 enumeration areas). The study was conducted between January and June 2007. We identified and invited all adults aged 50 years and over to participate in the study, a total of 14,958 people.

Instruments

This study used the modified and shortened version of the INDEPTH WHO-SAGE questionnaire (19), consisting of subjective well-being and QoL, function and disability, and health status description modules. All the questionnaires were translated into Bahasa Indonesia and were pilot-tested during November–December 2006.

Data collection and management

Household visits were conducted by trained surveyors who administrated the survey questionnaire. Supervisors conducted spot-checks and revisits to 5% of the participants to ensure the quality of data obtained. All questionnaires were checked and validated by field supervisors and then sent to the central office in Gadjah Mada University, Yogyakarta, for data entry. Data entry was conducted in D-Entry software and the SAGE data was linked to the surveillance database. Double entry was also conducted on 5% of total questionnaires. Demographic variables (such as age, highest level of education completed, marital status, household size and proportion of person over 50 years old within household) and geographic coordinates of each household were extracted from the surveillance database. The SAGE dataset was also linked to data from the household socio-economic survey conducted in 2004. The socio-economic survey collected data on household characteristics and ownership of non-disposable and disposable goods, and socio-economic status (SES) quintiles were derived through principal component analysis (21). The final merged dataset was converted into STATA data format for data analysis.

Data analysis

Three outcome measures were used in the analysis: self-reported QoL, self-reported problems in functioning and disability, and overall health status. Each of those measures was developed as composite indices from series of validated questions (22).

The composite index for self-reported QoL was adapted from the WHO Quality of Life (WHOQoL) tool (23). The index was derived from eight questions assessing respondent's thoughts about their life and life situation, satisfaction with themselves and their health, ability to perform daily living activities, personal relationships, living conditions and overall life. Answers to the Likert scale were summed up and later transformed to a 0–100 scale with 0 representing the worst QoL and 100 representing the best QoL.

Questions to assess problems in functioning and disability were adapted from the WHO Disability Assessment Schedule (WHODAS) 12-item instrument (24). The series of questions assessed any difficulties faced by the respondents in performing different daily life activities due to their health conditions. The responses were collected on the Likert scale and different weights were assigned to responses from different questions. The total score was then inverted to transform it to an index between 0 and 100, with 0 representing extreme problems or complete disability and 100 representing a total absence of disability, termed WHODASi. The use of WHODAS in the INDEPTH WHO-SAGE study has been described elsewhere (22).

Overall health status was measured using self-reported health derived from eight health domains, including affect, cognition, interpersonal relationships, mobility, pain, self-care, sleep/energy, and vision (19). Two questions in each domain, which measured the difficulties faced by the respondents in performing activities, were put to the respondents and responses were collected using a five-response scale. Item response theory with partial credit model was used to generate a composite health status score. Following each item calibration using chi-squared fit statistics to evaluate its contribution to the composite health score, the raw composite score was transformed through Rasch modelling into a continuous cardinal scale, with 0 representing worst health and 100 representing best health (22). The psychometric

properties of the health score have been evaluated elsewhere (25).

All the three continuous indices (WHOQoL, WHO DASi and overall health status) were later categorised into quintiles, independently. The three outcome measures were defined as being in the worst quintiles for QoL, functioning and disability, and overall health, as defined by the three indices, respectively. Sociodemographic and economic factors associated with being in the worst quintile of each health outcome were identified through multivariable logistic regression. The SES quintiles were later regrouped into low (first and second), middle (third) and high (fourth and fifth) quintiles. Educational levels were defined as low (no formal education), medium (less than 6 years of education) and high (at least 6 years of education). As there was moderate correlation between educational level and socio-economic groups, we combined the educational and socio-economic groups into five categories in the analysis. The regression analysis was performed separately for each outcome measure. All analyses were conducted using STATA statistical software version 10.0.

The SAGE data containing individual observations on the health outcomes was transformed into household level data, by counting the number of individuals in each household belonging to the worst quintile of each index. This household level data was later merged with the geographical coordinates in the surveillance area. The purely spatial analysis using Poisson probability modelling was conducted to identify clusters of households with at least one member being in the worst quintile of QoL, disability and health score, independently. The total number of people aged 50 years and over in each household was used as the population in the analysis. Monte Carlo hypothesis testing was used with 999 replications and a significance level of 0.05. The risk estimates for each cluster were identified. The analysis was conducted using SaTScan™ software, version 7.0 (26).

The Research Ethics Committee at Gadjah Mada University and Purworejo District Health Offices approved the SAGE study in Purworejo District, Indonesia. Documented informed consent was obtained from each individual prior to the study.

Results

A total of 14,958 individuals aged 50 years and over were visited, with data obtained from 12,459 individuals (83%). Cleaned and complete data from 11,753 individuals were available for analysis. The background characteristics of the respondents and the non-respondents (n = 2,564) were presented in Table 1. Reasons for not participating in the study included: could not be reached after two visit attempts (81%), refusal (8.3%), died (5%) and out-migration (5.7%).

Over half of the study participants were women (54%), and the majority (84%) had less than 6 years of education. Only 7.2% of the study participants were aged 80 years and over. The data showed that 29% of the participants were not in a marital relationship but most of the participants did not live alone. The average number of household members was 3.5. As the study covered all older people in the surveillance area, the household socio-economic quintiles presented in this study

Table 1. Background characteristics of respondents and non-respondents among adults aged 50 years and over in Purworejo, Indonesia

Variables	Respondents (N = 11,753)	Non-respondents (N = 2,564)
Sex, n (%)		
Men	5,420 (46.1)	1,285 (50.1)
Women	6,333 (53.9)	1,278 (49.9)
Age, mean (standard deviation)	64.1 (9.4)	65.5 (11.5)
Age group, n (%)		
50–59 years	4,344 (36.9)	928 (36.2)
60–69 years	4,045 (33.3)	709 (27.7)
70–79 years	2,644 (22.7)	595 (23.2)
80 years and over	720 (7.2)	331 (12.9)
Education level, n (%)		
No formal education	3,440 (29.6)	659 (27.4)
Less than or equal to 6 years	6,459 (54.7)	1,257 (52.2)
More than 6 years	1,854 (15.7)	491 (20.4)
Marital status, n (%)		
In current partnership	8,400 (71.0)	1,925 (77.6)
Being single	3,353 (29.0)	556 (22.4)
Socio-economic quintile, n (%)		
First quintile	2,394 (20.4)	225 (17.1)
Second quintile	2,317 (19.8)	259 (19.6)
Third quintile	2,390 (20.3)	248 (18.8)
Fourth quintile	2,387 (20.3)	303 (23.0)
Fifth quintile	2,265 (19.2)	285 (21.6)
Number of household member, mean (standard deviation)	3.5 (1.7)	3.5 (1.8)
Proportion of household member aged 50 years and over, n (%)		
<25%	995 (8.6)	324 (12.9)
25–49%	3,288 (28.0)	646 (25.6)
50–74%	3,853 (32.6)	733 (29.1)
≥75%	3,617 (30.9)	818 (32.5)

Note: All figures were weighted to the Purworejo HDSS population in 2007.

reflected the quintiles in the whole surveillance population (Table 1).

Table 2 presents summary statistics of three different health indices of WHOQoL, WHODASi and overall health status scores across different age groups and sexes. Overall, a higher proportion of women aged over 50 years in Purworejo District were categorised in the worst quintiles of health indices as compared to men. These patterns were observed consistently in all age groups. A larger discrepancy in functioning and disability and health status was observed across age groups in men and women. The differences of QoL index were, however, less prominent across age groups in men and women. The results showed that function, QoL and overall health status decreased substantially among the oldest age-group, with more than 50% of those over 80 belonging to the worst function and disability and overall health status quintiles.

Being in the older age group, having low education and being in a low socio-economic group, and not being in a marital relationship were significantly associated with higher odds of being in the worst quintiles for QoL, functioning and disability, and overall health, respectively. The multivariable analysis showed that respondents aged over 80 years were more than 3.3 times more likely to be in the worst quintile of QoL compared to those aged between 50 and 59 years. They were 12.6 and 10.6 times more likely to be in the worst functioning and overall health score quintiles, respectively. The education and socio-economic gradient was also prominent for QoL reporting, with individuals in the low SES group who had a low level of education being 3.4 times more likely be in the worst quintile of QoL compared to those with high education in the high SES group (Table 3 and Fig. 1). The overall effects of low SES and education were less prominent, though statistically significant, for being in the worst disability and overall health status quintiles.

The spatial analysis revealed clusters of households with at least one member being in the worst quintile of QoL, functioning and disability, and overall health, respectively (Fig. 2). Clusters of households with a member being in the worst quintile of self-reported QoL were identified in the northern part of the district, which is a mainly hilly and mountainous area. This area is less developed, less urbanised and contains many households categorised in the poorest socio-economic quintile. In contrast, the clusters of households with at least one member being in the worst quintile of overall health status were identified in the mid-southern part of the district, mainly highly populated semi-urban and coastal areas. This part of Purworejo District is mainly low land covering four main sub-districts of Bayan, Banyuurip, Kutoarjo and Purworejo. These are the four most populated sub-districts in Purworejo District with a population density ranging from 918 to

Table 2. Distribution of health indices by age-group and sex among 11,753 adults aged 50 years and over in Purworejo District, 2007

Indices	Men	Women
WHO Quality of Life (QoL) score		
Mean score (95% CI)		
50–59 years	75.5 (75.3–75.7)	75.1 (74.9–75.3)
60–69 years	74.6 (74.3–74.8)	73.9 (73.7–74.1)
70–79 years	73.3 (72.9–73.6)	72.6 (72.3–72.9)
80 years and over	71.7 (70.9–72.4)	71.5 (70.7–72.3)
Percentage in the worst quintile (95% CI)		
50–59 years	11.8 (10.4–13.2)	14.7 (13.2–16.1)
60–69 years	17.3 (15.5–19.1)	22.0 (20.3–23.7)
70–79 years	25.9 (23.5–28.4)	32.0 (29.6–34.4)
80 years and over	37.4 (32.4–42.3)	42.9 (37.7–48.1)
WHO Disability Assessment Schedule (WHODASi) score		
Mean score (95% CI)		
50–59 years	93.2 (92.8–93.6)	91.2 (90.8–91.7)
60–69 years	88.4 (87.7–89.0)	84.2 (83.6–84.9)
70–79 years	81.0 (80.0–81.9)	76.2 (75.2–77.2)
80 years and over	70.9 (68.7–73.1)	66.4 (64.1–68.7)
Percentage in the worst quintile (95% CI)		
50–59 years	5.5 (4.5–6.5)	8.8 (7.7–10.0)
60–69 years	14.3 (12.6–15.9)	23.4 (21.6–25.1)
70–79 years	28.0 (25.4–30.5)	40.1 (37.5–42.6)
80 years and over	52.0 (46.8–57.1)	59.2 (54.0–64.3)
Overall health score		
Mean score (95% CI)		
50–59 years	77.3 (76.9–77.8)	74.7 (74.3–75.1)
60–69 years	73.0 (72.5–73.5)	69.9 (69.5–70.3)
70–79 years	68.4 (67.9–69.0)	66.0 (65.6–66.5)
80 years and over	64.1 (63.2–65.1)	62.9 (61.9–63.8)
Percentage in the worst quintile (95% CI)		
50–59 years	6.0 (5.0–7.0)	10.6 (9.4–11.9)
60–69 years	15.6 (13.9–17.2)	27.2 (25.4–29.1)
70–79 years	30.7 (28.1–33.3)	43.6 (41.0–46.1)
80 years and over	50.4 (45.3–55.5)	60.8 (55.7–65.9)

Note: All figures were weighted to the Purworejo HDSS population in 2007.

1,700 inhabitants per km^2. Most households in these areas fall within the richest socio-economic quintile with the majority of people over 50 having had at least six years of education.

Discussion

In addition to risks for the oldest old, our study showed that people with low levels of education and SES had higher odds of having poorer self-reported QoL and health. Economic instability during old age may

Table 3. Three different models in assessing factors associated with poor health indices among 11,753 adults aged 50 years and over in Purworejo District, 2007

Variables	Model 1: Being in the worst QoL quintile as outcome		Model 2: Being in the worst WHODASi quintile as outcome		Model 3: Being in the worst health status score quintile as outcome	
	Unadjusted ORs (95% CI)	Adjusted ORs (95% CI)	Unadjusted ORs (95% CI)	Adjusted ORs (95% CI)	Unadjusted ORs (95% CI)	Adjusted ORs (95% CI)
Sex						
Men	1	1	1	1	1	1
Women	1.30 (1.19–1.42)	1.13 (1.02–1.26)	1.57 (1.44–1.73)	1.39 (1.25–1.55)	1.69 (1.55–1.85)	1.50 (1.35–1.66)
Age group						
50–59 years	1	1	1	1	1	1
60–69 years	1.62 (1.45–1.83)	1.41 (1.25–1.59)	3.09 (2.69–3.55)	2.75 (2.38–3.17)	3.09 (2.71–3.52)	2.73 (2.38–3.11)
70–79 years	2.69 (2.38–3.04)	2.09 (1.83–2.39)	6.74 (5.86–7.75)	5.54 (4.76–6.44)	6.55 (5.73–7.48)	5.34 (4.63–6.16)
80 years and over	4.38 (3.69–5.22)	3.32 (2.75–4.01)	16.1 (13.3–19.4)	12.6 (10.3–15.5)	13.6 (11.4–16.4)	10.6 (8.69–12.9)
Marital status						
Being single	1.86 (1.7–2.05)	1.32 (1.16–1.49)	2.74 (2.5–3.01)	1.56 (1.38–1.77)	2.79 (2.55–3.06)	1.56 (1.38–1.76)
In current partnership	1	1	1	1	1	1
Percentage aged 50 years and over in the household						
<25%	0.88 (0.74–1.05)	0.85 (0.64–1.13)	1.06 (0.9–1.25)	0.76 (0.57–1.02)	1.02 (0.87–1.19)	0.81 (0.60–1.07)
25%–49%	0.84 (0.75–0.94)	1.05 (0.87–1.27)	0.80 (0.71–0.89)	0.92 (0.75–1.13)	0.73 (0.65–0.82)	0.90 (0.73–1.09)
50%–74%	0.73 (0.65–0.82)	0.96 (0.84–1.10)	0.68 (0.61–0.76)	0.93 (0.81–1.07)	0.64 (0.57–0.71)	0.89 (0.78–1.02)
≥75%	1	1	1	1	1	1
Family size	0.96 (0.93–0.99)	1.04 (0.99–1.09)	0.98 (0.95–1.01)	1.08 (1.02–1.13)	0.96 (0.93–0.98)	1.05 (1.00–1.10)
Education and SES						
High SES, high education	1	1	1	1	1	1
High SES, low-middle education	1.78 (1.46–2.16)	1.37 (1.12–1.68)	2.31 (1.92–2.79)	1.36 (1.12–1.66)	2.33 (1.95–2.79)	1.39 (1.15–1.68)
Middle SES, all education levels	2.22 (1.82–2.71)	1.77 (1.44–2.16)	2.36 (1.95–2.87)	1.44 (1.18–1.77)	2.25 (1.87–2.71)	1.37 (1.12–1.66)
Low SES, middle-high education	2.81 (2.32–3.41)	2.47 (2.03–3.01)	1.77 (1.46–2.15)	1.27 (1.04–1.57)	1.81 (1.51–2.18)	1.30 (1.07–1.58)
Low SES, low education	5.11 (4.21–6.21)	3.35 (2.73–4.11)	4.15 (3.42–5.03)	1.67 (1.35–2.06)	4.21 (3.50–5.06)	1.66 (1.36–2.03)

Note: WHOQoL, World Health Organization Quality of Life; WHODASi, World Health Organization Disability Assessment Schedule. All analyses were weighted to the Purworejo HDSS population in 2007.
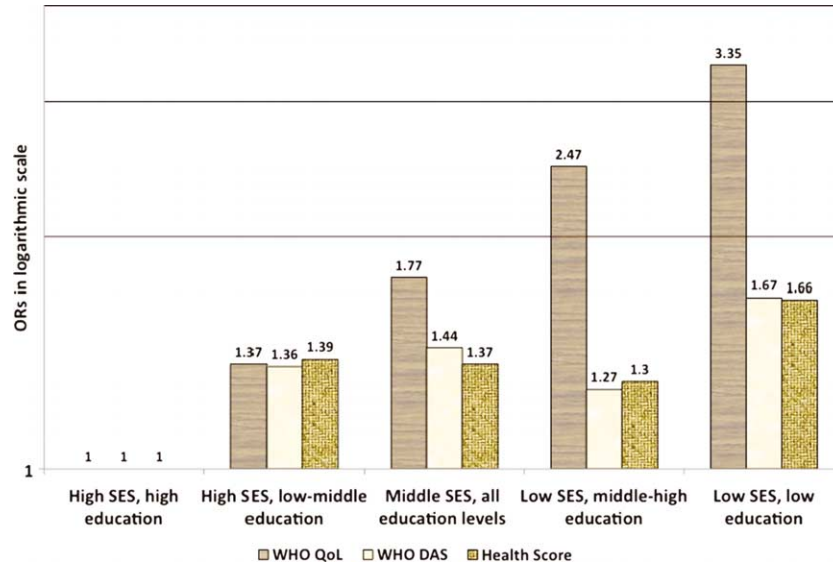
Fig. 1. The odds ratio for poor health among different education and socio-economic groups among 11,753 adults aged 50 years and over in Purworejo District, 2007.

potentially be more of a threat to the urban older than to their rural counterparts. The majority of older Javanese in our study were still engaged in agricultural production and were typically more economically productive and stable compared to their urban counterparts. Our data reaffirmed the results from the IFLS conducted in 1993 that showed older Indonesian men and women often remain economically active; males and younger age groups were more active than women and older age groups. The IFLS data indicated that older men who co-resided still worked about 30 hours per week, while those who did not co-reside worked about 38 hours per week. The IFLS data also showed that the availability of

intergenerational financial transfer does not necessarily influence parent's labour supply (27).

Family and local community support for older people is still reliable in rural Java. Only a very small proportion of older Indonesians receive a pension as their source of income (about 13% of males and 4% of females in 1985 with no significant change since then). Those who receive a pension are mainly urban dwellers who had worked in government sectors, the military or industries. Pensions are not paid to urban poor or traditional agricultural workers (14). The National Social Security Law for poor people, proposed by the government in 2004, has yet to be agreed by the legislative body and operationalised by
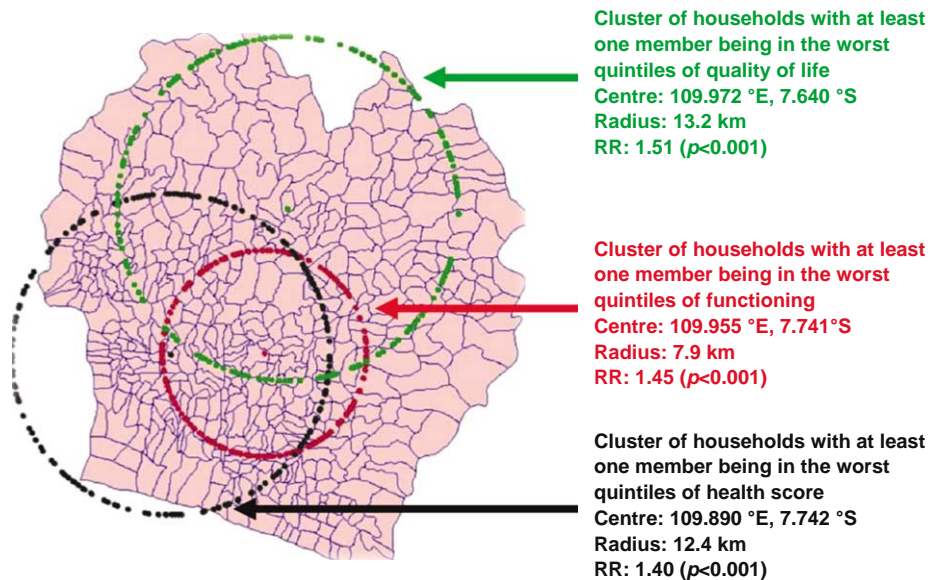

Cluster of households with at least one member being in the worst quintiles of quality of life
Centre: 109.972 °E, 7.640 °S
Radius: 13.2 km
RR: 1.51 (*p*<0.001)

Cluster of households with at least one member being in the worst quintiles of functioning
Centre: 109.955 °E, 7.741°S
Radius: 7.9 km
RR: 1.45 (*p*<0.001)

Cluster of households with at least one member being in the worst quintiles of health score
Centre: 109.890 °E, 7.742 °S
Radius: 12.4 km
RR: 1.40 (*p*<0.001)

Fig. 2. Spatial distribution of poor health indices among 11,753 adults aged 50 years and over in Purworejo District, 2007.

the government. This delay has resulted in inefficient and inappropriate distribution of funds to the needy. The Indonesian Government has fostered community participation in the provision of care and economic support to the elderly, mainly to reduce community dependence on the insufficient resources provided directly by the government.

Living arrangements are an important influence on care of older people. Our respondents who were not in any marital relationship reported significantly worse QoL (OR =1.32), worse functioning (OR =1.56) and worse health status (OR =1.56) compared to those in a marital relationship. Traditional Indonesian values mean that children are supposed to stay together and to take care of their parents, especially when they are no longer economically productive. However, changes in social values over the past few decades have led to increasing migration to larger cities for better career opportunities, changes that may have affected elder care practices (10). The IFLS in 1993 showed that 60% of those over 60 years shared a house with their children. The data shows that older household heads are less likely to co-reside. The predictors for co-residence include households with large numbers of children, households where the family head is currently married, households in urban areas, or areas with expensive housing. None of these factors were identified as significant predictors for the transition to co-residence with a child in the follow-up survey in 1997 (28). Data from this SAGE survey can be linked to the longitudinal HDSS data to assess how changes in living arrangements and migration over time could potentially affect older people's welfare and well-being in the study population.

Our findings show clusters of households with poor self-reported health, functioning and QoL among older people. This points to the existence of health inequality in the study area and signifies the need to identify factors determining the distributions of poor health outcomes in this rural population. Knowledge of the epidemiological burden of poor health outcomes and their associated factors is an important prerequisite for the government to develop health promotion and intervention programmes for the older population in Purworejo District and throughout Indonesia (6).

Results from this study that show clusters of households with poor self-reported health outcome may potentially indicate areas with higher risk of subsequent mortality. Assessing the future morbidity and mortality patterns longitudinally using this SAGE survey as baseline data could prove this hypothesis. Results from the multivariable analysis are supported by the results from the spatial analysis that showed clusters of households with poor QoL located in the northern part of Purworejo District, which is a largely remote, mountainous area that is not easily accessed by public transportation. This area

has lower socio-economic development and a higher proportions of the population with low levels of education, who might have poor perceptions of health, well-being and illnesses, and thus have higher morbidity and lower use of health care services.

The hardworking Javanese population views 'life as a continuous series of misfortunes, calamities and hardships which a human being has to experience and to endure readily'. The Javanese lead an active life through constant endeavour (*ichtiyar*) in activities relating to agricultural production, economic life and social and family matters. Despite their view of life (*ichtiyar*), the Javanese peasant population accepts what comes (*nrimo*) and accepts fate willingly (*ingkang nrimah*), an attitude which helps them to avoid disappointment or emotional upset when things go wrong. When discussing the burdens of life, the Javanese typically surrender and accept fate (*pasrah lan sumarah*). Older Javanese people appear to be content to await death, hopefully surrounded by their children and grandchildren when their time comes (29). The Javanese acceptance of fate in their life might explain why the majority reported good health and QoL when asked in the study.

QoL is one of a number of complex components of successful ageing covering life expectancy, life satisfaction, mental and psychological health, cognitive function, physical health and functioning, income, living conditions and arrangements, social support and social networks. Measuring QoL is also a complex exercise, especially among older people (14). In addition to the above-mentioned aspects, QoL is also very bound by culture and may represent different constructs in different settings. Results from health status assessments can usually be used to predict QoL for older populations; however, it is not uncommon to observe discrepancies between these two measures (30).

Service provision for older people, particularly health promotion and social services, is generally lacking in Indonesia. Most older people care institutions are based in urban areas and there is no alternative care for older people in rural settings. Since the mid-1980s the Ministry of Health in Indonesia has promoted services to older people through 'the Integrated Health Post Service for Elderly People' programme (*Posyandu Lansia*) (31). This is a community-organised health promotion centre at village level supervised by staff from the nearest primary health care centre. The concept of the Integrated Health Post Service was initially developed to address maternal and child health issues and later expanded to cover the ageing population. However, the programme lacks a strong health promotion dimension, and puts a lot of focus on the often-inadequate therapeutic aspects of older people's illnesses. Activities to promote healthy ageing and healthy life-styles to enhance older people's well-being are mainly lacking in the programme. As

Indonesia is predicted to have the world's fastest growing older population during the 1990–2025 period (14), the government needs to immediately address the issues through policy and action to promote the well-being and health of its older population.

Limitations of the study

While assessments of self-reported health and QoL have been extensively researched in many countries, corresponding methodological developments, particularly in low-middle income country settings, are still challenging. Efforts have been undertaken to derive cross-culturally comparable instruments, yet researchers are still attempting to validate instruments across different settings through development of new validation techniques such as vignettes (32, 33). This article has not addressed the issue of comparability of our results to other settings. Further analyses that take the rich data on vignettes into account might provide better insights on how our data on older people's well-being can be compared to data from other settings.

We observed that there were considerably more positive responses of data obtained from the Likert-scale questions used in the study, and while this might reveal the true levels of health and QoL in our study population, it might also reflect how this rural population valued their health and life, regardless of the true levels of their health and QoL. Good protocols and periodic training of interviewers hopefully reduced the possibility of social desirability bias in our study.

Conclusion

Being female, old, unmarried and having a low education and socio-economic level are significant predictors of self-reported poor QoL and health status, and disability among older people in Purworejo District. This study shows the existence of geographic pockets of vulnerable older people in Purworejo District, and emphasises the need to take immediate action to address issues on older people's health and QoL. Lack of care and services for older people has to be addressed, and the Indonesian health system, through its Posyandu Lansia, should increase the balance of 'curing sick older people' and 'caring for healthy older people and promoting their health and well-being'.

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