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Original research article

The impact of community-based elderly schools on quality of life and health literacy among older adults in Indonesia: a cross-sectional study

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Abstract
Objectives: This study aimed to evaluate the influence of participation in a community-based elderly school program on the quality of life (QoL) of older adults.
Methods: A cross-sectional analytical survey involved 303 adults aged ≥60 years from 10 sub-districts, selected through random sampling and grouped by elderly school attendance (≥4 sessions/12 months). Quality of life was assessed using the Indonesian WHOQOL-BREF (good ≥60; poor <60). Variables included education, ADL independence, and sociodemographic and health factors. Associations were analyzed using Chi-square tests and binary logistic regression.
Results: Overall, 79.2% reported good QoL. Elderly school attendance was strongly associated with good QoL (AOR 6.459; 95% CI: 3.078–13.557; $p < 0.001$), followed by ADL independence (AOR 4.894; $p < 0.001$), and higher education (AOR 2.333; $p = 0.020$). The model showed good fit ($p = 0.995$; $R^2 = 0.268$).
Conclusion: Attending community-based elderly schools significantly enhances QoL among older adults, particularly by addressing literacy disparities and promoting functional independence. This integrated, empowerment-oriented model offers a scalable and cost-effective strategy for healthy aging in the context of developing countries.

Keywords: Community-based intervention; Elderly school; Functional independence; Health literacy; Older adults; Quality of life

Introduction

The global population is experiencing an unprecedented demographic transition, marked by a rapid increase in the number of older adults. By 2050, one in six people worldwide is projected to be over 60 years old (Keating, 2022). This demographic shift presents substantial public health challenges. Aging is associated with multidimensional decline, including physiological deterioration and a higher prevalence of chronic diseases that impair mobility and independence (Maresova et al., 2019; Rozario et al., 2011). In addition to physical vulnerability, psychosocial problems – such as anxiety, depression, and loneliness due to reduced social interaction – further compromise well-being in later life (Scazufca and Seward, 2024). Collectively, these conditions contribute to diminished quality of life (QoL) among older adults (Wister, 2024). Consequently, multidimensional and community-based strategies are increasingly recognized as essential for promoting healthy aging and improving QoL (Berg-Weger and Morley, 2020).

Literacy is a critical determinant of QoL in older populations (Aryankhesal et al., 2019). Literacy gaps encompass both functional literacy – reading, writing, and numeracy – and health literacy, defined as the ability to obtain, process, and understand essential health information for informed decision-making (Nutbeam, 1998). Older adults with limited literacy face considerable disadvantages (Sirisuwan et al., 2022). Restricted access to accurate health information impedes effective chronic disease self-management and reduces opportunities for social participation (Mehralian et al., 2023). These limitations exacerbate health inequities and further diminish QoL (Jacobs et al., 2024). The issue is particularly pressing in developing countries such as Indonesia, where historical inequities in formal education have resulted in lower literacy levels among the current elderly cohort compared to younger generations (Wulandari et al., 2025).

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Despite numerous initiatives aimed at promoting healthy aging, many remain fragmented and sector-specific, often addressing isolated dimensions such as physical or psychological health without integrating broader social, environmental, and educational determinants of QoL (Monteiro et al., 2024; Zheng et al., 2023). Such partial interventions tend to produce limited and unsustainable outcomes, as they fail to account for the complex interplay of factors influencing well-being in later life. Gerontological theories, including the selective optimization with compensation model, emphasize adaptation to age-related changes through selecting meaningful activities, optimizing remaining capacities, and compensating for functional losses (Baltes and Carstensen, 1996). Continuous learning and social engagement are therefore fundamental to maintaining well-being in older adulthood (Carpentieri et al., 2017). These perspectives highlight the need for holistic, evidence-based health promotion models that integrate educational, social, and functional components to achieve sustainable improvements in QoL (Holliday et al., 2024).

In response, Indonesia has developed the "Elderly School" program, a structured, multidimensional, community-based health promotion initiative (Sugiharti et al., 2021). Implemented through existing community organizations and routine social activities, the program provides non-formal education within local residential settings rather than formal institutions (Belete et al., 2022; Narushima et al., 2018). It is delivered through Elderly Family Development (EFD) groups and integrated with primary healthcare services such as Posyandu Lansia and community health centers (Puskesmas). Trained program managers and community cadres facilitate regular sessions combining structured education, practical skill-building, and peer support. This integrated approach ensures not only knowledge acquisition but also sustainable behavior change and strengthened social networks (Direktorat Bina Ketahanan Keluarga Lansia dan Rentan, 2021).

Over the past five years, elderly schools have been piloted in the Special Region of Yogyakarta Province (Dawam et al., 2021), which has the highest proportion of older adults in Indonesia (16.75%) (BPS-Statisticts Indonesia, 2024). The curriculum is structured into basic, intermediate, and advanced levels. It covers seven well-being dimensions: physical, psychological, cognitive, spiritual, social, vocational, and environmental (Hariastuti et al., 2024). Monthly 100-minute sessions use interactive methods such as lectures, preventive therapy practice, group discussions, and reflective activities. Beyond education, the program fosters active participation, social bonding, and independence (Kurniasih et al., 2022). By strengthening functional and health literacy, it empowers older adults – particularly those with limited formal education – to manage their health and navigate social systems more effectively (Argus-Calvo et al., 2024; Brodie et al., 2021).

Although operational for five years, quantitative evidence evaluating the program's effectiveness in enhancing QoL and reducing literacy disparities remains limited. Therefore, this study examines the influence of participation in community-based elderly schools on QoL among older adults in Yogyakarta, focusing on literacy gaps within EFD groups. We hypothesize that active participation improves QoL through enhanced literacy and social engagement, consistent with the program's holistic design that integrates education, emotional support, and community involvement (Dumbuya, 2023). This study represents one of the first quantitative analyses in Indonesia employing logistic regression to model this association. Its findings are expected to inform adaptive, sustainable, and community-based health promotion policies addressing population aging in developing countries.

Materials and methods

Study design and setting

This study adopted a quantitative analytical survey design with a cross-sectional approach to examine the relationship between participation in elderly schools and the quality of life (QoL) among older adults. The research was conducted across 10 sub-districts in the Special Region of Yogyakarta Province, Indonesia. This area was selected due to its high proportion of older residents and the established presence of community-based Elderly Family Development (EFD) groups, which facilitate elderly school activities.

Research participants

The study included 303 older adults affiliated with EFD groups in the selected sub-districts. The sample size was determined using statistical power analysis, referencing previous similar studies, and adopting the largest required sample to ensure sufficient analytical power. A random sampling technique was applied within each EFD group to include both elderly school participants and non-participants (Suppl. Fig. S1). Inclusion criteria were: (1) aged 60 years, or (2) registered as a member of an EFD group where elderly school activities are conducted, and (3) willingness to provide informed consent. For the elderly school subgroup, an additional criterion was active participation in at least four sessions during the year preceding data collection. Exclusion criteria comprised bedridden individuals or those whose families declined their participation.

Participation in the elderly school program was determined based on attendance records maintained by community cadres or program administrators over the preceding 12 months. A participant was defined as an older adult who attended at least four of the eight sessions conducted within these 12 months. Each session lasted approximately 100 minutes and focused on a single thematic module. Following the identification of eligible individuals by the health cadres, structured interviews were conducted to verify their history of participation in elderly school activities. This verification process was undertaken to ensure the accuracy and consistency of participation data obtained from attendance records.

Data collection

Data were collected in April 2025 through structured face-to-face interviews conducted by trained research assistants, involving both elderly school participants and non-participants. Quality of life (QoL) was assessed using the Indonesian version of the WHOQOL-BREF, which measures physical, psychological, social, and environmental domains. Total scores were transformed to a 0–100 scale and categorized as good (≥60) or poor (<60) (Silva et al., 2014). This approach aligns with the WHOQOL-BREF validation framework, which supports transformed domain scores for group comparisons and analytical classification (Skevington et al., 2004; WHOQOL Group, 1998). The use of quantitative cut-off points to identify populations at risk for clinical and public health decision-making is further supported by Saxena et al. (1997).

Additional information was obtained through a structured questionnaire capturing demographic characteristics (age, gender, education, employment, and income), functional independence (Activities of Daily Living [ADL] and Instrumental Activities of Daily Living [IADL]), and health status (degener-

ative diseases). Education was categorized as low or high and used as a proxy for literacy. ADL independence was assessed using the Barthel Index (Sainsbury et al., 2005). Degenerative diseases were identified based on self-reported physician diagnoses within the previous six months.

Data analysis

Univariate analysis described respondents' characteristics, including age, sex, education, employment, income, degenerative diseases, functional independence (Activities of Daily Living [ADL] and Instrumental Activities of Daily Living [IADL]), elderly school participation, and quality of life (QoL), presented as frequencies and percentages. Bivariate associations between independent variables and QoL were examined using the Chi-square test. Odds ratios (ORs) with 95% confidence intervals (95% CIs) quantified the strength of associations. QoL was treated as a dichotomous dependent variable (good = 1; poor = 0), based on the WHOQOL-BREF total score transformed to a 0–100 scale, with ≥60 indicating good QoL and <60 poor QoL. ORs were interpreted relative to predefined reference categories.

Multivariate analysis employed binary logistic regression to identify independent predictors of good QoL. Variables were selected based on bivariate results ($p < 0.25$) and conceptual relevance, including potential confounders such as age, education, and functional status. A purposeful selection approach was applied to obtain a parsimonious final model (Bursac et al., 2008). The final model included elderly school participation, educational level, and ADL independence. Model fit was assessed using the Omnibus test, Hosmer–Lemeshow test, and Nagelkerke R^2. Multicollinearity was evaluated using tolerance (>0.10) and VIF (<10). Analyses were performed using IBM SPSS Statistics version 26.0, with no missing data.

Results

Table 1 presents the sociodemographic and health characteristics of the respondents. The majority were aged 60–74 years (84.5%) and female (78.5%). Most respondents had a low level of education (63.4%) and were not employed (72.9%). More than half reported a monthly income of less than IDR 1,000,000 (59.7%). In terms of functional status, most respondents were independent in Activities of Daily Living (ADL) (89.1%) and Instrumental Activities of Daily Living (IADL) (79.9%). The distribution of elderly school participation was relatively balanced, with 49.2% participants and 50.8% non-participants. Overall, 79.2% of respondents were classified as having a good quality of life.

Bivariate analysis (Table 2) identified several factors significantly associated with good quality of life among older adults. Participation in the Elderly School program was strongly associated with a good quality of life. Participants had 7.294 times higher odds of reporting good quality of life compared with non-participants (95% CI: 3.541–15.026; $p < 0.001$). ADL independence was also significantly associated with quality of life; independent respondents had 5.174 times higher odds of good quality of life compared with those who were ADL-dependent (95% CI: 2.437–10.984; $p < 0.001$). Educational attainment was likewise significantly associated with quality of life ($p = 0.008$). In contrast, age, sex, employment status, income level, IADL independence, and degenerative disease status were not significantly associated with quality of life in the bivariate analysis.

Multivariate analysis was conducted using binary logistic regression to identify independent predictors of good quality of life. The final model (Table 3) was statistically significant (Omnibus test $p < 0.001$) and demonstrated good model fit (Hosmer–Lemeshow test $p = 0.995$). The Nagelkerke R^2 value of 0.268 indicates that the model explained 26.8% of the variance in quality of life. Prior to interpreting the regression coefficients, multicollinearity among predictors in the final model was assessed. No evidence of significant multicollinearity was observed, with tolerance values ranging from 0.969 to 0.985, and Variance Inflation Factor (VIF) values ranging from 1.015 to 1.032. Specifically, educational attainment had a tolerance of 0.985 and VIF of 1.015, ADL independence had a tolerance of 0.981 and VIF of 1.019, and elderly school participation had a tolerance of 0.969 and VIF of 1.032 (Suppl. Table S1).

After adjustment, three variables remained statistically significant predictors of a good quality of life. Participation in the Elderly School program emerged as the strongest predictor, with an adjusted odds ratio (AOR) of 6.459 (95% CI: 3.078–13.557; $p < 0.001$). ADL independence also significantly increased the odds of a good quality of life (AOR 4.894; 95% CI: 2.116–11.319; $p < 0.001$). Higher educational attainment remained independently associated with good quality of life (AOR 2.333; 95% CI: 1.144–4.758; $p = 0.020$).

Table 1. Sociodemographic and health characteristics of older adults (*N* = 303)

Variable and Category	*n*	%
Age (years)		
60–74	256	84.5
≥75	47	15.5
Gender		
Male	65	21.5
Female	238	78.5
Education level		
Low (Elementary-Junior High)	192	63.4
High (Senior High-College)	111	36.6
Work status		
Working	82	27.1
Not working	221	72.9
Monthly income (IDR)		
<1,000,000	181	59.7
≥1,000,000	122	40.3
ADL independence		
Dependent	33	10.9
Independent	270	89.1
IADL independence		
Dependent	61	20.1
Independent	242	79.9
Degenerative diseases		
Yes	204	67.3
No	99	32.7
Elderly school membership		
Non-participant	154	50.8
Participant	149	49.2
Quality of life		
Poor	63	20.8
Good	240	79.2

Note: Outcome definition used consistently across tables: Quality of life (Good = 1, Poor = 0)

Table 2. Bivariate analysis of factors associated with good quality of life (*N* = 303)

Variable and Category	QoL poor *n* (%)	QoL good *n* (%)	Crude OR (95% CI)	*p*-value
Age (years)				
60–74 (Ref)	49 (19.1)	207 (80.9)	1.00 (Ref)	0.098
≥75	14 (29.8)	33 (70.2)	0.558 (0.278–1.122)	
Gender				
Male (Ref)	16 (24.6)	49 (75.4)	1.00 (Ref)	0.391
Female	47 (19.7)	191 (80.3)	1.327 (0.694–2.538)	
Education level				
Low (Ref)	49 (25.5)	143 (74.5)	1.00 (Ref)	0.008
High	14 (12.6)	97 (87.4)	2.374 (1.243–4.536)	
Work status				
Working (Ref)	20 (24.4)	62 (75.6)	1.00 (Ref)	0.347
Not working	43 (19.5)	178 (80.5)	1.335 (0.730–2.443)	
Monthly income				
<1,000,000 (Ref)	36 (19.9)	145 (80.1)	1.00 (Ref)	0.637
≥1,000,000	27 (22.1)	95 (77.9)	0.874 (0.498–1.532)	
ADL independence				
Dependent (Ref)	17 (51.5)	16 (48.5)	1.00 (Ref)	<0.001
Independent	46 (17.0)	224 (83.0)	5.174 (2.437–10.984)	
IADL independence				
Independent (Ref)	45 (18.6)	197 (81.4)	1.00 (Ref)	0.061
Dependent	18 (29.5)	43 (70.5)	0.546 (0.288–1.033)	
Degenerative diseases				
No (Ref)	19 (19.2)	80 (80.8)	1.00 (Ref)	0.633
Yes	44 (21.6)	160 (78.4)	0.864 (0.473–1.576)	
Elderly school membership				
Non-participant (Ref)	53 (34.4)	101 (65.6)	1.00 (Ref)	<0.001
Participant	10 (6.7)	139 (93.3)	7.294 (3.541–15.026)	

Outcome: Good QoL (1) vs Poor QoL (0). Reference categories are indicated as (Ref). OR > 1 indicates higher odds of good QoL relative to the reference. *Notes:* Percentages are row percentages; *p*-values are from Chi-square tests.

Table 3. Multivariable logistic regression for predictors of good quality of life (final model)

Predictor	Adjusted OR	95% CI	*p*-value
Elderly school membership (Participant vs Non-participant)	6.459	3.078–13.557	<0.001
ADL independence (Independent vs Dependent)	4.894	2.116–11.319	<0.001
Education level (High vs Low)	2.333	1.144–4.758	0.020

Model fit: Omnibus test $p < 0.001$; Hosmer–Lemeshow $p = 0.995$; Nagelkerke $R^2 = 0.268$

Discussion

This study demonstrates that participation in a community-based elderly school program, higher educational attainment, and independence in Activities of Daily Living (ADL) are significant determinants of quality of life (QoL) among older adults in Yogyakarta, Indonesia. Elderly school participants were more than six times as likely to report good QoL compared with non-participants, even after adjustment for confounders. These findings are consistent with evidence that structured community-based interventions improve older adults' well-being (Boyacıoğlu and Kutlu, 2017). They align with Active Aging and Healthy Aging frameworks that emphasize social participation, functional capacity, and broader social determinants (WHO, 2002, 2015).

Participation in the program emerged as the strongest predictor of good QoL (AOR 6.459). Higher educational attainment was also positively associated with QoL, corroborating global evidence (Zhou et al., 2023). As a proxy for literacy, education enhances the capacity to access, process, and understand health information, thereby supporting informed decision-making (Piccolo, 2024). Improved health literacy facilitates chronic disease self-management, preventive behaviors, and effective healthcare navigation (Silbersweig et al., 2025). Education, therefore, helps bridge literacy gaps, sustain cognitive engagement, and strengthen adaptive coping in later life. Similarly, ADL independence remains a robust predictor of QoL (Beltz et al., 2022; Kim et al., 2020). Functional autonomy reinforces self-efficacy, preserves dignity, and sustains independence – central elements of subjective well-being (Toledano-González et al., 2019). Evidence from Europe and Asia further indicates that community engagement and lifelong learning are associated with better QoL and mental health outcomes (Melchiorre et al., 2025).

Multicomponent community-based programs that integrate health education, physical activity, and social participation have demonstrated improvements in physical and psychosocial outcomes (Ho et al., 2023; Lim et al., 2024). The Elderly School program likely operates through two complementary mechanisms: strengthening health literacy and promotive

behaviors, and enhancing social cohesion to reduce isolation, a major determinant of poor QoL (Holt-Lunstad et al., 2010). The substantial size of the observed effect suggests that such interventions may be cost-effective in developing countries with strong community networks.

Nevertheless, the cross-sectional design limits causal inference, as exposure and outcome were measured simultaneously, preventing temporal sequencing and allowing for possible reverse causality (Levin, 2006; Setia, 2016). Cross-sectional studies are also susceptible to selection bias and residual confounding and cannot capture changes in QoL over time. Longitudinal or cohort studies would better clarify causal pathways and temporal dynamics (Grimes and Schulz, 2002; Mann, 2003).

A major contribution of this study lies in clarifying mechanisms through which elderly schools may enhance QoL, particularly by addressing literacy disparities. These programs provide structured, age-appropriate educational opportunities targeting both functional and health literacy among individuals with limited formal education. Beyond knowledge acquisition, they foster social connectedness, reduce isolation, and strengthen community belonging (Chen et al., 2022; Tcymbal et al., 2022). Their comprehensive curriculum spans physical, psychological, cognitive, spiritual, social, vocational, and environmental domains, promoting holistic well-being (Hariastuti et al., 2024). Interactive pedagogical approaches further enhance empowerment and skill development, consistent with the World Health Organization's Community-Based Health Promotion framework, emphasizing participation and sustainability (Kendir and Breton, 2020). The biopsychosocial model of QoL similarly underscores the integration of psychological and social dimensions with physical health (Aw et al., 2019; Hildon et al., 2018).

These findings extend Active Aging theory by demonstrating how structured community-based education can foster cognitive vitality, social participation, and improved QoL in developing contexts (Derhun et al., 2022). By operationalizing lifelong learning and strengthening social capital (Hofstad, 2023; Zhang et al., 2022), elderly schools provide a practical model of successful aging, integrating health literacy and meaningful engagement (Estebsari et al., 2020).

Internationally, the Indonesian Elderly School model represents a distinctive hybrid approach. Senior Centers in the United States emphasize recreational engagement (Pardasani and Thompson, 2012), South Korean programs focus on digital literacy (Wu and Lim, 2024), and the European University of the Third Age promotes lifelong learning without an explicit health promotion component (Formosa, 2014). In contrast, Indonesian elderly schools integrate health education, social support, functional reinforcement, and relevant technology use within a unified curriculum. The quantitative evidence presented here highlights its effectiveness and adaptability in developing countries.

The program shows strong potential for integration into national health promotion policies in Indonesia and other low- and middle-income countries facing demographic aging (Dawam et al., 2021). As a scalable, cost-effective complement to formal healthcare systems, it prioritizes empowerment through education and social participation over resource-intensive clinical interventions. This shift toward empowerment-centered geriatric services reflects evolving aging paradigms (de la Luz Martínez-Maldonado et al., 2007; Llorente-Barroso et al., 2023). Nonetheless, disparities related to educational background require inclusive strategies to ensure equitable access (Kurniasih et al., 2022). Strengthened integration with primary healthcare platforms, such as Posyandu Lansia and Elderly Family Development groups, may further enhance reach and sustainability.

Conclusion

This study demonstrates that participation in a community-based elderly school program is a significant and independent predictor of quality of life (QoL) among older adults in Yogyakarta, Indonesia. After adjusting for educational attainment and functional status, participation remained the strongest determinant of good QoL, while higher education and independence in Activities of Daily Living were also positively associated with better outcomes. These findings highlight the importance of literacy, functional capacity, and integrated non-formal education in promoting healthy aging. However, the cross-sectional design precludes causal inference, and potential selection bias may have influenced the observed associations. Furthermore, generalizability may be limited to similar socio-cultural contexts. Despite these limitations, the results indicate that community-based, empowerment-oriented elderly schools are a scalable and cost-effective strategy to enhance well-being among older populations in developing countries.

Ethical aspects and conflict of interest

The authors have no conflict of interest to declare.

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