Original Article

Quality of life among community-dwelling elderly in rural and urban areas of Himalayan region, Northeast India: An analysis of factors affecting well-being

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Abstract

Background: There is a dearth of literature on the quality of life (QOL) experienced by the elderly population in the hilly terrains of the Himalayan region. The objective of this study was to highlight the QOL among community-dwelling elderly residing in rural and urban areas of the Himalayan region, Northeast India. **Materials and Method:** A cross-sectional study was conducted involving 450 participants (324 in rural and 126 in urban areas) aged 60 years and above. The QOL score was assessed with the help of the World Health Organisation Quality of Life-Brief Questionnaire (WHOQOL-BREF). Mann–Whitney U test was performed to find out the difference in QOL between rural and urban areas. Binary logistic regression was conducted to find the association of QOL with demographic variables. **Results:** The total mean QOL scores of elderlies in rural areas (39.4 ± 11.3) were significantly lower compared to urban areas (51.1 ± 11.5). QOL scores in all four domains were found to be low among elderly living in rural areas as compared to urban areas. Among the four domains, environmental QOL was found to be the lowest in both rural (29.5 ± 16.0) and urban areas (46.5 ± 17.2). Determinants of QOL differ in urban and rural areas. **Conclusion**: QOL was found to be significantly lower among the elderly residing in rural areas as compared to urban areas. Targeted interventions and policies are necessary to address environmental challenges to improve the overall QOL of the elderly.

Keywords: Ageing, elderly, Himalayan region, quality of life

Introduction

Ageing population is a global phenomenon that has considerable implications for social, economic and healthcare systems worldwide.[1] As per Census 2011, 103 million people, i.e., 8.5% of India's population, are elderly and a large number of them live in rural areas (67.1%).[2] While the challenges associated with ageing are universal, they manifest differently in distinct geographic regions due to variations in cultural norms, socio-economic factors and environmental conditions.[3,4]

Quality of life (QOL) is defined by the World Health Organization (WHO) as "an 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". With increasing longevity, common health problems, viz, osteoarthritis, osteoporosis, hypertension, diabetes, etc., are known to impact the overall QOL among the elderly. Literature has demonstrated that social relations,

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active living, and social participation are sometimes important factors influencing the QOL of the elderly.[5] Understanding the determinants and barriers to a good QOL for the community-dwelling elderly is essential for developing effective strategies to support and improve their well-being.[3,6,7]

There is a substantial lack of research on the QOL among the geriatric population in the Himalayan region. Sikkim, being a landlocked state of Northeast India, nestled in the Himalayas, is characterised by mountainous terrains and varying climatic conditions. Due to the geographical topography of this region, community-dwelling elderly face difficulties in accessing health care services and challenges in their daily activities, which may impact their overall QOL.[8,9] As the world witnessed an unprecedented demographic shift towards an ageing population, understanding and addressing QOL challenges faced by community-dwelling elderly in this rugged and demanding terrain has become a matter of utmost importance.[3,8]

Materials and Methods

This community-based cross-sectional study was conducted in the hilly region of rural and urban areas under the east district of Sikkim, Northeast India, among community-dwelling elderly aged 60 years and above who were residing in the area for at least 1 year. The sample size was calculated assuming a 50% expected proportion with an absolute precision of 5% and 95% confidence level. The study sample was obtained from one-third of the total Gram Panchayat Unit (GPU) of East Sikkim using the random number generation method. 18 GPUs were randomly selected from 52 GPUs in rural areas. Similarly, 5 out of 17 Gangtok Municipal Corporation (GMC) wards and three out of five Nagar panchayat wards were randomly selected under urban areas of East Sikkim. House-to-house visits were made, and data was collected from the selected areas. A total of 450 elderly participated in the study, among which 324 belonged to rural areas and 126 belonged to urban areas, respectively.

Ethical clearance was obtained from the Sikkim Manipal Institute of Medical Sciences (SMIMS) Institutional Ethics Committee. All participants were provided with an information sheet in English/Nepali and written informed consent was collected from the participants who were willing to participate in the study. For assessing QOL, the cross-culturally applicable, valid, and reliable tool WHOQOL-BREF was used, and sociodemographic details were obtained. The questionnaire has 26 items taken from WHOQOL-100 and consists of four domains, i.e., physical, psychological, social relationships and environmental domain.[10] Each participant was interviewed for about 30 minutes using WHOQOL-BREF in English or Nepali language. The scores were summed up after necessary recoding based on the WHO scoring system and converted into a metric scale ranging from 0 to 100, where 0 signifies poor QOL and 100 as good QOL.

The data collected during the study were entered into a Microsoft Excel spreadsheet and IBM SPSS Statistics 27 was used for data analysis. Descriptive analysis was performed to present the baseline characteristics. The mean was calculated for each domain scores as well as the total QOL scores. To check the difference between rural and urban QOL score, Mann–Whitney U test was used. To consider the result statistically significant, *P* value was set at <0.05. The median scores of each domain were taken as a cut-off point to categorise QOL into good and poor QOL. All scores above the median were considered to have good QOL. Determinants of QOL were analysed using binary logistic regression. Relevant sociodemographic factors, chronic illness and transportation barriers were selected as independent variables, aiming to explore their potential impact on the QOL among the elderly.

Results

The mean age of the elderly in rural area is 70.8 ± 8.1 years and in urban areas is 69.3 ± 7.3 years. The age group 60-69 years is the most represented group in rural (49.4%) and in urban areas (56.3%). More than half of the participants were females, accounting for 54% in rural and 53.2% in urban areas. Compared to the urban respondents (48.1%), a greater portion of rural elderly are illiterate (77.8%). A greater percentage (78%) of elderly are financially dependent on someone else, and using Kuppuswamy's scale 2012, the average monthly family income in rural areas ranged from Rs. 1521 to Rs. 4555, while in urban areas, it was Rs. 4556 to Rs. 7563. Most of the participants are unemployed, married and living with families in both rural and urban areas [Table 1]. Among the elderly participants, 74.1% in rural areas and 72.2% in urban areas reported having a chronic illness. Arthritis was the most reported chronic illness in rural (70.6%) and urban (69%) areas.

The total QOL mean score for community-dwelling elderly is significantly higher in urban area (51.1 ± 11.5) as compared to rural area (39.4 ± 11.3) ($P < 0.001$). The QOL mean scores of physical, psychological, social relationship and environmental domains are 49.8 ± 11.9, 46.5 ± 12.5, 31.5 ± 14.7 and 29.5 ± 16 in rural areas, and 54.1 ± 12.1, 57.1 ± 15.3, 46.7 ± 16.2 and 46.5 ± 17.2 in urban areas, respectively. Significant differences are also observed in all domains of the QOL score when comparing rural and urban elderly populations using the Mann–Whitney U test [Table 2]. No significant differences were found between males and females in both rural and urban areas, except in the environmental domain of the rural area, where males scored more than females ($P < 0.009$).

Binary logistic regression confirmed that elderly in rural area, aged 69 or younger are significantly associated with better QOL scores in physical QOL domains [AOR: 1.77, (95% CI: 1.13-2.77)] [Table 3]. Literate elderlies have significantly better odds for good QOL in all four domains. In the crude model, being married couple is linked to good QOL under social relationship domain, however, it lost its significance when adjusted for age and gender. Elderlies being financially independent and employed have significantly higher odds

Table 1: Sociodemographic characteristics of the elderly

Characteristics	Rural=324 *n* (%)	Urban=126 *n* (%)	Total=450 *n* (%)	*P*
Gender				
Male	149 (46)	59 (46.8)	208 (46.2)	0.873
Female	175 (54)	67 (53.2)	242 (53.8)	
Age group				
60-69	160 (49.4)	71 (56.3)	231 (51.3)	0.063
70-79	107 (33)	44 (34.9)	151 (33.6)	
≥80	57 (17.6)	11 (8.7)	68 (15.1)	
Marital status				
Married	219 (67.6)	91 (72.2)	310 (68.9)	0.341
Unmarried/Widowed/divorced	105 (32.4)	35 (27.8)	140 (31.1)	
Living status				
With Spouse	26 (08)	35 (27.8)	61 (13.6)	0.002
Alone	29 (09)	0 (0)	29 (6.4)	
With family	269 (83)	91 (72.2)	360 (80)	
Currently employed				
Yes	27 (8.4)	16 (12.7)	43 (9.6)	0.157
No	297 (91.6)	110 (87.3)	407 (90.4)	
Financially dependent				
No	70 (21.6)	29 (23)	99 (22)	0.746
Yes	254 (78.4)	97 (77)	351 (78)	
Education				
Primary/secondary level	72 (22.2)	65 (51.6)	137 (30.4)	<0.001
No formal education	252 (77.8)	61 (48.4)	313 (69.5)	
Caste				
Schedule Caste	34 (10.5)	8 (6.3)	42 (9.4)	0.346
Schedule Tribes	88 (27.2)	44 (34.9)	132 (29.3)	
Other Backward Class	111 (34.3)	33 (26.2)	144 (32)	
General	91 (28.1)	41 (32.5)	132 (29.3)	

Table 2: QOL scores among elderly living in rural and urban areas

QOL domain	Mean Rank		*Z*	*P*
	Rural *n*=324	Urban *n*=126		
Physical QOL score	213.64	256.00	-3.15	0.002
Psychological QOL score	200.67	289.36	-6.58	<0.001
Social relationships QOL score	193.65	307.41	-8.44	<0.001
Environmental QOL score	192.66	309.94	-8.64	<0.001

P<0.05 shows statistical significance

of obtaining better QOL, while living alone or as a couple without family was significantly associated with poor QOL scores in the social relationship domain [Table 4]. Male elderlies are significantly associated with good environmental QOL score. Married couples have significantly lower odds of having good environmental QOL when adjusted for age and gender. Employed elderly have better odds of having good environmental QOL but lose its significance when adjusted with age and gender [Table 4]. In urban areas, married couples have significantly better odds of having a good environmental and physical domain QOL score when adjusted for age and gender, whereas they have significantly lower odds of having a good social relationship QOL score in the crude model [Table 5]. Elderly individuals with no chronic illness and individuals who consider the transportation system as a minor environmental barrier are more likely to have a higher QOL in both rural and urban areas.

Discussion

The objective of this study was to highlight the QOL among community-dwelling elderly residing in rural and urban areas of the Himalayan region, Northeast India. To the best of our knowledge, there has been no study conducted to evaluate the QOL among elderly people living in the northeastern hills of India. The result of this study shows that rural community-dwelling elderlies exhibited significantly lower QOL as compared to their urban counterparts, consistent with previous research findings.[6,7,11] There was no significant difference observed in QOL between male and female elderly, except for the environmental QOL in the rural area. This finding suggests that both genders have an equal role in society whereas female elderly are facing greater difficulty with environmental barriers presented in rural areas.[11]

Compared to rural areas, the physical QOL of the elderly was found to be better in urban areas, which indicates that the elderly living in urban areas have better lifestyles and accessibility to primary needs. The study indicated that in rural areas, the odds of having a better physical QOL score were associated with the

Table 3: Determinants of physical and psychological QOL among elderly living in rural areas (*n*=324)

Variables	Categories	Poor QOL *n* (%)	Good QOL *n* (%)	COR (95% CI)	*P*	AOR (95% CI)	*P*
Physical							
Age group (in years)	≤69	61 (41.8)	99 (55.6)	1.75 (1.12-2.72)	0.013	1.77 (1.13-2.77)	0.012
	≥70	85 (58.2)	79 (44.4)	1 (Reference)		1 (Reference)	
Literacy	Primary/secondary level	24 (16.4)	48 (27)	1.87 (0.08-3.25)	0.025	1.87 (1.04-3.35)	0.035
	No formal education	122 (83.6)	130 (73)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	11 (7.5)	73 (41)	8.53 (4.31-16.9)	<0.001	8.55 (4.29-17)	<0.001
	Present	135 (92.5)	105 (59)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	34 (23.3)	88 (49.4)	3.22 (1.99-5.22)	<0.001	3.29 (1.98-5.47)	<0.001
	Major barrier	112 (76.7)	90 (50.6)	1 (Reference)		1 (Reference)	
Psychological							
Literacy	Primary/secondary level	31 (17.3)	41 (28.3)	1.88 (1.11-3.19)	0.019	1.95 (1.11-3.42)	0.021
	No formal education	148 (82.7)	104 (71.7)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	15 (8.4)	69 (47.6)	9.94 (5.33–18.5)	<0.001	9.89 (5.31-18.4)	<0.001
	Present	164 (91.6)	76 (52.4)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	48 (26.8)	74 (51)	2.84 (1.79-4.52)	<0.001	2.99 (1.83-4.87)	<0.001
	Major barrier	131 (73.2)	71 (49)	1 (Reference)		1 (Reference)	

Note: Variables included in this table have a significance level <0.05, indicating statistical significance. Results for non-significant variables are not presented. COR: crude odds ratio, AOR: adjusted odds ratio (adjusted for age and gender)

Table 4: Determinants of social relationship and environmental QOL among elderly living in rural areas (*n*=324)

Variables	Categories	Poor QOL *n* (%)	Good QOL *n* (%)	COR (95% CI)	*P*	AOR (95% CI)	*P*
Social relationship							
Marital status	Married/couple	96 (61.9)	123 (72.8)	1.64 (1.03-2.63)	0.038	1.51 (0.93-2.46)	0.095
	Unmarried/widow/divorced	59 (38.1)	46 (27.2)	1 (Reference)		1 (Reference)	
Living Status	Alone or only with spouse	34 (21.9)	21 (12.4)	0.51 (0.28-0.92)	0.024	0.5 (0.28-0.92)	0.025
	With family	121 (78.1)	148 (87.6)	1 (Reference)		1 (Reference)	
Financially Dependent	No	24 (15.5)	46 (27.2)	2.04 (1.18-3.54)	0.011	2.01 (1.11-3.67)	0.022
	Yes	131 (84.5)	123 (72.8)	1 (Reference)		1 (Reference)	
Literacy	Primary/secondary level	23 (14.8)	49 (29)	2.34 (1.35-4.07)	0.003	1.91 (1.05-3.51)	0.035
	No formal education	132 (85.2)	120 (71)	1 (Reference)		1 (Reference)	
Currently employed	Yes	7 (4.5)	20 (11.8)	2.84 (1.17-6.91)	0.022	2.53 (1.02-6.27)	0.045
	No	148 (95.5)	149 (88.2)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	17 (11)	67 (39.6)	5.33 (2.95-9.63)	<0.001	5.24 (2.89-9.48)	<0.001
	Present	138 (89)	102 (60.4)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	46 (29.7)	76 (45)	1.94 (1.22-3.06)	0.005	1.80 (1.12-2.90	0.016
	Major barrier	109 (70.3)	93 (55)	1 (Reference)		1 (Reference)	
Environmental							
Gender	Male	70 (40.7)	79 (52)	1.58 (1.02-2.45)	0.043	1.62 (1.04-2.53)	0.035
	Female	102 (59.3)	73 (48)	1 (Reference)		1 (Reference)	
Marital status	Married/couple	75 (43.6)	92 (60.5)	0.65 (0.4-1.03)	0.066	0.53 (0.33-0.88)	0.013
	Unmarried/widow/divorced	97 (56.4)	60 (39.5)	1 (Reference)		1 (Reference)	
Literacy	Primary/secondary level	28 (16.3)	44 (28.9)	2.09 (1.23-3.58)	0.007	1.85 (1.05-3.26)	0.032
	No formal education	144 (83.7)	108 (71.1)	1 (Reference)		1 (Reference)	
Currently employed	Yes	9 (5.2)	18 (11.8)	2.43 (1.06-5.59)	0.036	2.09 (0.89-4.91)	0.089
	No	163 (94.8)	134 (88.2)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	18 (10.5)	66 (43.4)	6.57 (3.66-11.8)	<0.001	6.51 (3.62-11.7)	<0.001
	Present	154 (89.5)	86 (56.6)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	47 (27.3)	75 (49.3)	2.59 (1.63-4.11)	<0.001	2.42 (1.49-3.91)	<0.001
	Major barrier	125 (72.7)	77 (50.7)	1 (Reference)		1 (Reference)	

Note: Variables included in this table have a significance level <0.05, indicating statistical significance. Results for non-significant variables are not presented COR: crude odds ratio, AOR: adjusted odds ratio (adjusted for age and gender)

age group of 69 years or younger. Biological ageing is widely recognised to have an impact on QOL and is commonly used as an indicator for determining QOL.[4] As most of the population in rural area are farmers, the elderly actively participate in physical activities such as walking, gardening and farming.[12,13] The active engagement of elderly aged 69 and younger has likely played a role in maintaining physical strength, balance, and coordination and ultimately leading to an improved QOL.[14]

Table 5: Determinants of physical, psychological, social relationship and environmental QOL among elderly living in urban areas *n*=126

Variables	Categories	Poor QOL *n* (%)	Good QOL *n* (%)	COR (95% CI)	*P*	AOR (95% CI)	*P*
Physical							
Marital status	Married couple	35 (67.3)	56 (75.7)	1.51 (0.69-3.32)	0.303	3.31 (1.09-9.97)	0.033
	Unmarried/widow/divorced	17 (32.7)	18 (24.3)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	9 (17.3)	26 (35.1)	2.59 (1.09-6.13)	0.031	2.98 (1.21-7.29)	0.017
	Present	43 (82.7)	48 (64.9)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	11 (21.2)	31 (41.9)	2.69 (1.19-6.04)	0.017	3.03 (1.29-7.15)	0.011
	Major barrier	41 (78.8)	43 (58.1)	1 (Reference)		1 (Reference)	
Psychological							
Chronic illness	Absent	8 (15.1)	27 (37)	3.30 (1.36-8.04)	0.008	3.38 (1.37-8.36)	0.008
	Present	45 (84.9)	46 (63)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	10 (18.9)	32 (43.8)	3.36 (1.46-7.69)	0.004	3.91 (1.61-9.42)	0.002
	Major barrier	43 (81.1)	41 (56.2)	1 (Reference)		1 (Reference)	
Social Relationship							
Marital status	Married couple	50 (83.3)	41 (62.1)	0.33 (0.14-0.76)	0.009	0.37 (0.13-1.03)	0.056
	Unmarried/widow/divorced	10 (16.7)	25 (37.9)	1 (Reference)		1 (Reference)	
Environmental							
Marital status	Married	39 (63.9)	52 (80)	2.26 (1.01-5.03)	0.047	3.79 (1.31-10.9)	0.014
	Unmarried/widow/divorced	22 (36.1)	13 (20)	1 (Reference)		1 (Reference)	
Chronic illness	Absent	11 (18)	24 (36.9)	2.66 (1.17-6.07)	0.02	2.74 (1.18-6.37)	0.019
	Present	50 (82)	41 (63.1)	1 (Reference)		1 (Reference)	
Transportation	Minor barrier	11 (18)	31 (47.7)	4.14 (1.84-9.36)	0.001	4.35 (1.86-10.2)	0.001
	Major barrier	50 (82)	34 (52.3)	1 (Reference)		1 (Reference)	

Note: Variables included in this table have a significance level<0.05, indicating statistical significance. Results for non-significant variables are not presented COR: crude odds ratio, AOR: adjusted odds ratio (adjusted for age and gender)

Participating in cognitively stimulating activities like tool use, crafts, and skill acquisition improves memory, attention and problem-solving.[15] This could be the reason for better psychological QOL score of the elderly in rural areas. This finding is consistent with previous literature where physical activity was associated with a slower rate of cognitive decline in old age.[16] Engaging in meaningful activities gives a sense of purpose and contributes to their self-esteem, self-worth and overall life satisfaction. In this study, elderly living in urban areas exhibited the highest psychological QOL score among all domains. In urban settings, it has been noted that elderlies are consistently enjoying valuable and meaningful moments with their grandchildren. In urban settings, where work and school can consume a significant portion of the day, it is not uncommon for families to come together in the evenings and spend time with each other. This explains that adapting to urban facilities and lifestyle enhances positive impact on physiological well-being of the elderly.[6,11,17]

Contrary to study conducted in plain region, in this study, environmental domain QOL score of elderly living in hilly region was found to be the lowest.[18] The natural environment in rural areas not only promote physical and mental well-being, it also lay out environmental challenges for the elderly.[3] Community-dwelling elderlies engaging in outdoor physical activity may raise awareness of environmental barriers and contribute to poor environmental QOL score.[19] The findings of this study support previous research highlighting musculoskeletal conditions as one of the most common chronic health issues among the elderly living in both rural and urban areas.[4] The challenging environmental barriers in hilly regions, including climate, physical strain or limited healthcare access, could contribute to the higher prevalence of arthritis and influence QOL. Insufficient infrastructure, poorly maintained roads, coupled with challenges such as frequent rainfall, landslides and slippery uphill walkways, could be major barriers to transportation that reduce the QOL of the elderly in rural hilly regions.[9,19,20] The findings of this study show that male elderly have better odds to tackle the demands of environmental barriers presented by hilly terrains; however, financial burden in rural areas can pose increased challenges for couples residing together, potentially requiring more caregiver assistance. This may help explain why elderly married couples in rural areas have lower odds of achieving a good environmental QOL score.

The presence of abundant amenities and infrastructure in urban areas does not always guarantee higher levels of satisfaction.[21,22] One of the vital infrastructures that connect the urban hills is the stairs, which yield extensive challenges for the elderly. Moreover, it is difficult to develop age-friendly public spaces and senior-friendly housing in hilly areas, which makes the environment less accessible. These challenges can isolate elderly individuals, restricting their mobility and access to essential services, exacerbating their vulnerability and impacting their QOL.[23] The study found that married elderly couples in urban areas had a higher likelihood of experiencing good environmental QOL scores compared to their rural counterparts. This could be

attributed to the benefits of greater social and physical support available in urban settings.[24]

In this study, the social relationship QOL score was found to be low among rural and urban elderlies as in previous finding.[17] Participating in social activities and various community events provides opportunities for social interaction and connections with peers, neighbours and community members.[13] Restrictions due to environmental challenges, and migration of youth, could be the reason for lower score in social relationship domain among community-dwelling elderly in rural areas.[12,25] There is an accelerated rate of youth migration towards urban setup to seek job, educational opportunities, skill development and different lifestyle.[7] As societies undergo demographic changes and cultural shifts, the traditional extended family structure is gradually being replaced by nuclear families, which can lead elderly to a higher risk of social isolation.[4,25]

Urban area provides easier access to health care facilities, financial security and social connectivity, which could have enhanced regular social interactions and psychological well-being.[13] Additionally, urban elderly individuals have greater access to digital communication tools such as video calls and social media, providing increased opportunities for communication and information gathering.[26-28] However, lack of formal education and limited digital literacy could be one of the major reason for lower social relationship QOL score among community-dwelling elderly in both rural and urban areas. Research has demonstrated that the level of education has an influence on the measurement of QOL.[6,29] Similarly, this study observed higher odds of having good QOL scores among literate elderly individuals residing in rural areas. The study also highlights that elderly individuals with financial independence could overcome various physical and environmental barriers in rural hilly areas, which, in turn, can result in enhanced social and psychological well-being of the elderly.

Several limitations were encountered in this cross-sectional study, which is essential to consider when interpreting the findings. The study may have been subject to selection bias as it only included community-dwelling elderlies who were accessible and willing to participate, potentially excluding those with more severe health issues or limited mobility. The assessment of QOL relied on self-reported measures, which may be subject to individual perception and response bias. The cross-sectional nature of the study limits the ability to establish causal relationships or examine changes in QOL over time. The hilly region's unique environmental characteristics may pose specific challenges and opportunities for the elderly population, which were not extensively explored in this study.

Conclusion

The QOL of community-dwelling elderly in rural areas of hilly regions were found to be significantly low as compared to urban areas. Physical and psychological QOL scores were higher than social relationship and environmental QOL scores among the elderly in both rural and urban areas. The determinants of QOL differ between elderlies living in rural and urban areas. Therefore, further studies on the QOL of the elderly and its environmental barriers can contribute valuable insights in improving their overall well-being.

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Conflicts of interest

There are no conflicts of interest.

References

1. World Health Organization. Decade of healthy ageing: Plan of action. World Health Organ; 2020. p. 1–26.
2. MoHFW. Population Projections for India and States 2011-2036, Census of India 2011, National Commission on Population Ministry of Health and Family Welfare India. 2020.
3. Chidambaram P, Sreeganga SD, Sanjeev A, Suwasrawala SS, Gadicherla S, Krishnappa L, *et al.* Access to geriatric disability care in India: A roadmap for research. Int J Environ Res Public Health 2022;19:10018.
4. Chandra S, Samadarshi A. Quality of life and associated factors amongst older adults in a remote community, Nepal. J Health Res 2022;36:56–67.
5. Netuveli G, Blane D. Quality of life in older ages. Br Med Bull 2008;85:113–26.
6. Krishnappa L, Gadicherla S, Chidambaram P, Murthy N. Quality of life (QOL) among older persons in an urban and rural area of Bangalore, South India. J Family Med Prim Care 2021;10:272-7.
7. dos Santos Tavares DM, Fernandes Bolina A, Aparecida Dias F, dos Santos Ferreira PC, José Haas V. Quality of life of elderly. Comparison between urban and rural areas. Investig Educ Enferm 2014;32:401–13.
8. Danu RS. Health protection of old aged people: A study of Indian Himalayan region. In: Bisht HS, editor. Ageing and healthcare in India: Issues and challenges. New Delhi; Indu Book Services; 2018. pp. 107-12.
9. Bhadra S. A man-made, so called natural disaster and resiliency of hill community: Himalayan tsunami in India. Int J Soc Sci 2018;5:1–6.
10. WHO. WHOQOL-BREF: Introduction, administration, scoring and generic version of the assessment: Field trial version, December 1996. Geneva, Switzerland; 1996.
11. Usha V, Lalitha K. Quality of life of senior citizens: A Rural-Urban comparison. Indian J Soc Psychiatry 2016;32:158.
12. Zhu W, Chi A, Sun Y. Physical activity among older Chinese adults living in urban and rural areas: A review. J Sport

Health Sci 2016;5:281–6.

13. Mudey A, Ambekar S, Goyal RC, Agarekar S, Wagh VV. Assessment of quality of life among rural and urban elderly population of Wardha district, Maharashtra, India. Stud Ethno-Medicine 2011;5:89–93.
14. Sun F, Norman IJ, While AE. Physical activity in older people- A systematic review. BMC Public Health 2013;13:1–17.
15. Carvalho A, Rea IM, Parimon T, Cusack BJ. Physical activity and cognitive function in individuals over 60 years of age: A systematic review. Clin Interv Aging 2014;9:661–82.
16. Sofi F, Valecchi D, Bacci D, Abbate R, Gensini GF, Casini A, *et al*. Physical activity and risk of cognitive decline: A meta-analysis of prospective studies. J Intern Med 2011;269:107–17.
17. Ganesh Kumar S, Majumdar A, Pavithra G. Quality of life and its associated factors using WHOQOL-BREF among elderly in Urban Puducherry, India. J Clin Diagn Res 2014;8:54–7.
18. Datta D, Datta P, Majumdar K. Association of quality of life of urban elderly with socio-demographic factors. Int J Med Public Health 2015;5:274.
19. Portegijs E, Rantakokko M, Viljanen A, Rantanen T, Iwarsson S. Perceived and objective entrance-related environmental barriers and daily out-of-home mobility in community-dwelling older people. Arch Gerontol Geriatr 2017;69:69–76.
20. Dunn RA, Douglass Shaw W, Trousdale MA. The effect of weather on walking behavior in older adults. J Aging Phys Act 2012;20:80–92.
21. Rantakokko M, Iwarsson S, Kauppinen M, Leinonen R, Heikkinen E, Rantanen T. Quality of life and barriers in the urban outdoor environment in old age. J Am Geriatr Soc 2010;58:2154–9.
22. Levasseur M, Desrosiers J, Tribble DSC. Subjective quality-of-life predictors for older adults with physical disabilities. Am J Phys Med Rehabil 2008;87:830–41.
23. Clarke P, Ailshire JA, Bader M, Morenoff JD, House JS. Mobility disability and the urban built environment. Am J Epidemiol 2008;168:506–13.
24. Cadmus EO, Adebusoye LA, Owoaje ET. Rural–urban differences in quality of life and associated factors among community-dwelling older persons in Oyo state, South-Western Nigeria. Qual Quant 2022;56:1327–44.
25. Khanal P, Rai S, Chalise HN. American Journal of Gerontology and Geriatrics children's migration and its effect on elderly people : A study at old age homes in Kathmandu. Am J Gerontol Geriatr 2018;1:1–6.
26. Chen YR, Schulz PJ. The effect of information communication technology interventions on reducing social isolation in the elderly: A systematic review. J Med Internet Res 2016;18:e18. doi: 10.2196/jmir.4596.
27. Ollevier A, Aguiar G, Palomino M, Simpelaere IS. How can technology support ageing in place in healthy older adults? A systematic review. Public Health Rev 2020;41:1–12.
28. Thielke S, Harniss M, Thompson H, Patel S, Demiris G, Johnson K. Maslow's hierarchy of human needs and the adoption of health-related technologies for older adults. Ageing Int 2012;37:470–88.
29. Medhi GK, Sarma J, Bhattacharyya H, Pala S, Visi V. Sociodemographic variations in health-related quality of life (HRQOL) among elderly individuals in an urban locality in India. J Family Med Prim Care 2019;8:2473–7.