

Quality of Life and its Associated Factors Among the Elderly Community Dwellers in Rural Bihar – A Community-Based Cross-Sectional Study from Eastern India

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ABSTRACT

Background: Aging, longevity, advanced health care, and demographic transition have altered the quality of life (QOL) among the elderly. This study was planned to assess the QOL among the elderly and the associated factors in rural Bihar.

Methods: This community-based cross-sectional study among 395 elderlies residing in rural Bihar adopted a multistage sampling technique and a standard WHO-QOL BREF tool to assess the QOL. A multivariable linear regression analysis was performed and an adjusted beta-coefficient was reported to determine the factors determining the QOL.

Results: A total of 33 [8.4% (95% CI: 6-11.5%)] out of 395 elderlies had poor QOL. Age [adjusted B= -0.19 (-0.3 to -0.07)], Females [adjusted B= -1.89 (-3.5 to -0.25)], No. of drugs consumed [adjusted B=1.7 (0.4 to 2.99)], presence of any of the comorbidity [adjusted B=-5.9 (-10.8 to -1.1)], presence of Polymorbidity [adjusted B=-3.5 (-6.6 to -0.4)] were found to be independent correlates of QOL scores among elderly.

Conclusion: Almost one in ten elderlies had poor QOL. The physical domain of QOL was affected the most among all the domains. Increasing age, female gender, presence of any co-morbidity, presence of polymorbidity, and more drug consumption were associated with decreasing QOL scores among the elderly.

Keywords: Quality of life, Geriatrics, Frail Elderly, Co-morbidity, Longevity of life

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INTRODUCTION

Quality of life (QOL) among the elderly is an important area of concern that reflects this vulnerable population's health status and well-being. Elderly accounted for 8.6% of the total Indian population.¹ The share of the elderly population is projected to further rise to 19.5% by 2050.¹ Longer life expectancies have not always been associated with healthy aging. World Health Organization (WHO) defines healthy aging as "the process of developing and maintaining the functional ability that enables wellbeing in older age." Functional ability is about having the capabilities that enable all people to be and do what they have reason to value.² Rural elderly people in India confront additional barriers to accessing healthcare due to the unequal distribution and urban bias of the country's health resources and access to them.³ The changing social structure and existing health systems perpetuate the challenges faced by older persons and along with this, the age-associated depressive symptoms and the emotion-based coping mechanism may adversely affect their QOL.⁴

Quality of life (QOL) is defined by the WHO as 'individuals' perception of their position in life in the context of the culture and value systems in which they live, and concerning their goals, expectations, standards, and concerns.⁵ Previous studies showed that around one-fourth (24 %) elderly had a poor quality of life.⁶ A systematic review concluded that lower QOL scores were associated with higher frailty.⁷ The significant predictors of the overall QOL index were physical health problems, stress in life, involvement in social activities, age group, caste/ethnic group, abuse, living arrangements, involvement in decision-making in the family, household size, and land/property ownership.⁸ Another study showed that QOL was significantly low among those with no schooling, nuclear family, not receiving a pension, not with a partner, and impaired activities of daily living groups.⁹

The increasing burden of chronic morbidity conditions due to population aging is a significant challenge, necessitating effective community-level measures to improve the QOL. With this background, the present study was planned with aims to assess the quality of life of elderly persons in rural Bihar, focusing on factors associated with their QOL.

METHODOLOGY

Study design & duration: A community-based cross-sectional study design was adopted for this study and was done for a duration of six months (February to July 2022).

Study setting: This study was conducted in Naubatpur block, a rural block of Patna district of Bihar. The rural field practice area of an Institute of National Importance (INI) in Patna, Bihar under the De-

partment of Community and Family Medicine (CFM) is in this block. The field practice area covers a population of 15000 spread across five villages with an average population of 3000 per village with an average of 400-500 houses per village.

Study Population: The study included the elderly population (>60 years) in the selected villages who were willing to participate in the study and gave written informed consent. Critically ill, self-reported psychiatric illness and inability to comprehend were excluded from the study. A total of 5 elderly were excluded. (four for hard of hearing and one for severely ill and bed ridden status)

Sample Size Estimation & Sampling Technique: Considering the mean (SD) QOL scores in the social domain among elderly people residing in a rural area of eastern India as 67.3 (15.3)¹⁰ We required a minimum sample size of 388 elderly people at 95% confidence intervals and a margin of error of 1.5. The sample size was calculated using an online sample size calculator, Statulator.¹¹

We adopted a multistage sampling strategy to recruit the participants. In the first stage, Naubatpur block was conveniently chosen and in the second stage, five villages were randomly selected from the selected block. In the third stage, around 80 houses were selected from each village using systematic random sampling techniques to achieve the total number of households. In the final stage, one eligible elderly candidate was selected as per inclusion criteria. If more than one eligible elderly participant was present, a chit system was used to select only one elderly person from one household. If the selected house does not have any eligible elderly participants, the next house was chosen for the study. A total of 400 elderly participants were approached in this method and the final sample size was 395. (A 98.5% response rate)

Study Tool and Procedure: The study tool included a pre-designed, semi-structured, standard questionnaire that was divided into various sections. Section A included the basic socio-demographic details of the participants, like age, gender, occupation, education, presence of spouse with them, and possession of public distribution system cards (ration cards), Section B comprised comorbidity(s) details including presence or absence of comorbidity, number of comorbidities, duration and whether they are currently on medications or not. Section C contained items about the QOL of the elderly using the standard WHOQOL -BREF questionnaire.¹² WHO-QOL BREF tool contains 26 items on a 5-point Likert scale and the scoring ranges from 0-100 after conversion. The highest scores represent a better quality of life. The scale measures the physical, Psychological, social, and Environmental domains of QOL. For analysis purposes, a score of ≤ 45 was taken as poor QOL.¹³ The scale is validated in an Indian setting with good internal consistency (0.86).¹⁴ Section D comprised questions related to frailty using the Edmonton Frail-

ty Scale.^{15,16} The Edmonston frail scale contains 9 different domains, each domain has 1 item, and scores for each item range from 0 points to 2 points, the total score is calculated by adding the score for each item. The total score lies between 0 and 17. A score of ≤ 5 is taken as no frailty. Cronbach's α for the Edmonston frail scale was 0.75.¹⁷ This scale is used in the Indian setup.^{18,19} Section E included the Morisky Medication Adherence Scale-8 for checking the medication adherence of the elderly.²⁰ The total score varies from 0-8 and a score of <6 denotes poor medication adherence.

The study tool was developed using Google Forms in English, and the items were administered via face-to-face interviews in the local language (Hindi). The responses were collected after receiving written informed consent from the participants and were back-translated according to WHO standards for translation. The WHOQOL BREF questionnaire, which is available in Hindi, was used to collect information from the participants. The data was collected by junior residents of the department of CFM after training by the principal investigator regarding the administration of the study tool. The quality assurance of the data was maintained by regular data entry checking and interim analysis by the principal and co-investigators.

Statistical Analysis: The data collected in Google form was imported into MS Excel and was cleaned, coded for possible statistical analysis. The statistical analysis was done using IBM SPSS version 22. The results were tabulated and shown as figures or charts wherever necessary. The socio-demographic variables like age, gender, education, and occupation were expressed as frequency and percentage. The QOL scores were expressed as mean and standard deviation (SD). A box-whisker plot was made to show the domain-wise QOL scores with median and interquartile range (IQR). The association between various socio-demographic variables and overall QOL scores, domain-wise QOL scores were assessed by independent t-test and analysis of variance (ANOVA) wherever necessary after checking the normality.

A linear regression analysis was performed to find out the factors associated with overall QOL scores. Initially, univariable linear regression analysis was performed after meeting all the assumptions, and unadjusted beta (B) with 95% CI was reported later all the factors whose p-value <0.20 were imputed manually, and a multivariable linear analysis model was run, and adjusted B with 95% CI were reported. The overall statistical significance was attributed to $p < 0.05$.

Ethical considerations: This study was approved by the Institute Ethics Committee, AIIMS, Patna (AIIMS/Pat/IEC/2022/892 dated 21/05/2022). We adhered to the principles of ethics throughout the study and thereafter and performed following the principles of the Declaration of Helsinki.

RESULTS

Socio-demographic details of participants: A total of 395 subjects participated in the study. Table 1 shows all the socio-demographic details of the participants. The majority 90.6% (358) were in the 60-75 years age group. About 64.1% (253) of them were males. About 30.1% (119) of those with no formal schooling. The majority of the participant's spouses (88.6%, 350) were alive. About 222 (56.2%) of them were currently employed. Around three-fourths, 78% (308) of them possessed white ration cards as per the public health distribution system of India while only 20% (79) did not possess any of the ration cards. Participants with at least one comorbidity accounted for the majority [97.4%, (385)]. (Table 1)

Comorbidity details of the Participants: Out of 385(97.4%) who had comorbidity, 26.5% (104) had hypertension for a median (IQR) duration of 48 (24-81) months out of which 91.3% (95) were currently on treatment followed by 16.7% (66) had DM for a median period of 48 months (IQR-24-81) out of which maximum 93.9% (62) were currently on treatment. Nearly, 175(44%) of them had either hypothyroidism/ chronic gastritis/acid peptic disease with a median duration of 12 months (3.5-24) out of which a maximum of 94% on treatment. The rest of the subjects with comorbidity had cardiovascular diseases (9.6%), cerebrovascular diseases (1.3%), Chronic liver disease (4.8%), chronic kidney diseases (5.3%), and COPD (5.6%) (Table 2)

Table 1: Socio-demographic details of the participants (N=395)

Variable	Participants (%)	Overall QOL scores (Mean \pm SD)
Age (Years)*		
60-75	358(90.6)	55.9 \pm 7.6
≥ 75	37(9.4)	53 \pm 9.6
Gender		
Female	142(35.9)	54.7 \pm 8.7
Male	253(64.1)	56.1 \pm 7.3
Education#		
No schooling	119(30.1)	53.9 \pm 7.8
Up to class 10	163(41.3)	55.5 \pm 7.4
Beyond class 10	113(28.6)	57.6 \pm 7.7
Spouse		
Living	350(88.6)	55.7 \pm 7.3
Dead	45(11.4)	55.2 \pm 7.3
Occupation status		
Currently employed	222(56.2)	56.4 \pm 6.9
Not working	45(11.4)	55 \pm 8.5
Ration card		
Not possess	79(20)	56.6 \pm 8.4
Yellow (AAY)	8(2)	55.2 \pm 7.6
White (Annapurna)	308(78)	60.1 \pm 10.5
Presence of at least one comorbidity(s)*		
Yes	385(97.4)	55.4 \pm 7.8
No	10(2.6)	62 \pm 8.6

*Statistically significant for Overall QOL scores by Independent T test; #-Statistically significant for Overall QOL scores by one way ANOVA

Table 2: Comorbidity details of the participants (N=395)

Comorbidity	Participants (%) *	Duration of comorbidity (in months) [median (IQR)]	Currently on Treatment (%)
Hypertension	104(26.5)	48(24-81)	95(91.3)
Diabetes Mellitus (DM)	66(16.7)	48(24-84)	62(93.9)
Cardiovascular diseases	38(9.6)	48(24-60)	38(100)
Cerebrovascular diseases	5(1.3)	12(7-42)	4(80)
Chronic liver disease (CLD)	19(4.8)	24(24-36)	16(84.2)
Chronic Kidney disease (CKD)	21(5.3)	24(12-36)	20(95.2)
Chronic obstructive lung disease (COPD)	22(5.6)	30(9-102)	21(95.4)
Others#	175(44.3)	12(3.5-24)	165(94.2)

*Multiple response items #-Others include Hypothyroidism, Chronic gastritis, Acid peptic disease

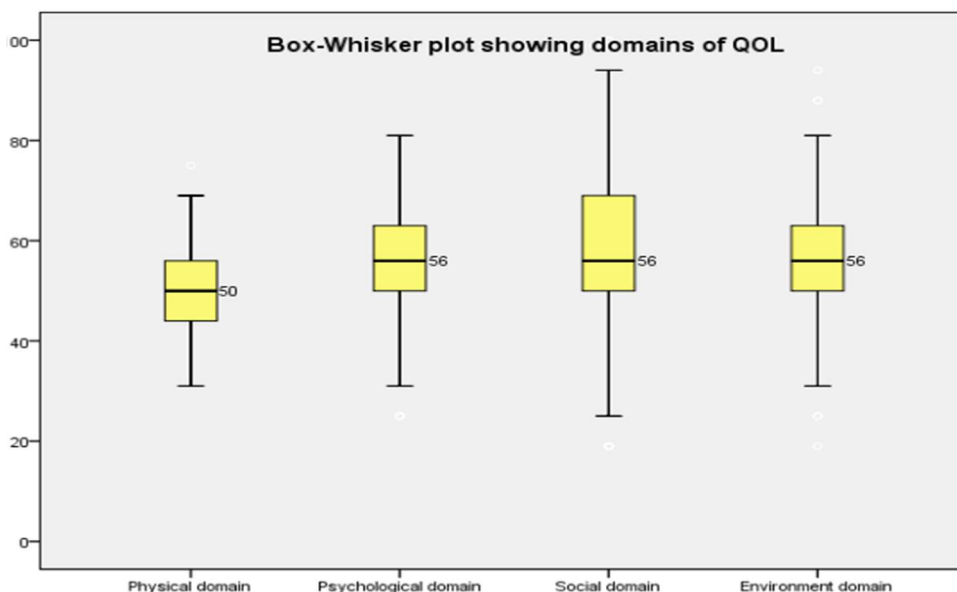


Figure 1: Box-Whisker plot showing domains of QOL among the participants

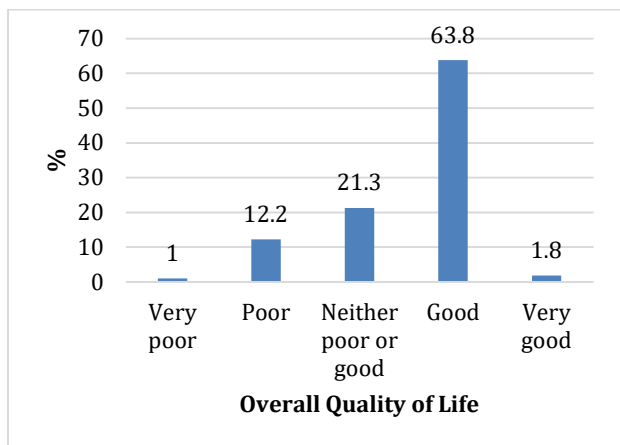


Figure 2: Overall QOL of the participants (N=395)

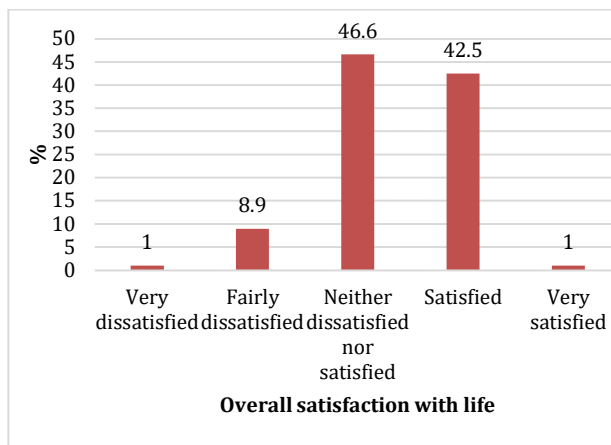


Figure 3: Overall satisfaction with life among the participants (N=395)

Quality of life among elderly: Overall, a total of 33, 8.4% [95% CI: 6-11.5%] had poor QOL. The overall QOL mean (SD) score was 55.6 (7.9). Overall domain-wise mean (SD) QOL scores were as follows, Physical domain: 51.2 (8.2), psychological domain 56.2(10.6), social and environmental domains: 55.8(13.7) and 59.1(11.3) respectively. The Box-whisker plot graph shows the median (IQR) domain-wise scores of QOL among the elderly. (Figure 1)

Overall QOL of the participants: Assessment of overall QOL among the elderly was scaled and classified as very poor, poor, neither poor nor good, good, and very good. It showed that the majority, 63.8%(252) had good overall QOL and 12.2%(48) of them had poor QOL. (Figure 2)

Overall satisfaction with life: Overall satisfaction with life was classified into 5 categories scaled from

very dissatisfied to very satisfied. The majority 46.6% (184) of them were neither dissatisfied nor satisfied, 42.5% (168) of them were satisfied with

their life, only 1% (4) of them were Very dissatisfied and only 1% (4) of them were very satisfied with their life. (Figure 3)

Table 3: Association of domains of QOL with various sociodemographic variables

Variables	Mean (SD) QOL Scores			
	Physical domain	Psychological Domain	Social Domain	Environmental domain
Age (in Years)^a				
60-75	51.5(7.9)	56.4(10.5)	56.2(13.5)	59.5(11)
>75	48.5(10.6)	55(12)	52.8(16.1)	55.8(13.9)
Gender				
Female	50.2(7.7)	55.1(11.5)	55.4(14.3)	57.9(12.1)
Male	51.8(8.5)	56.9(10.1)	56.1(13.5)	59.8(10.9)
Current employment status^{bd}				
Not working	50.5(8.1)	58.2(10.1)	56.4(14.7)	61.7(10.2)
Currently working	51.7(8.3)	54.7(10.8)	55.2(12.6)	57.1(11.8)
Education^{bcd}				
No schooling	50.7(7.5)	54.7(11.1)	53.4(13.6)	56.7(11)
Up to class 10	51.9(8.5)	55.9(9.9)	55.6(13.1)	58.5(11.5)
Beyond class 10	50.7(9.8)	58.4(10.9)	58.9(14.5)	62.5(10.8)
Spouse				
Dead	49.7(8.9)	56.1(10.4)	55.9(12.6)	59.2(11.7)
Alive	51.5(8.1)	56.3(10.7)	55.9(13.6)	59.1(11.3)
Any one of the comorbidity^{abd}				
No	45.8(11.6)	66.3(8)	63.8(15.6)	72.1(9.3)
Yes	51.4(8.1)	56(10.6)	55.7(13.7)	58.8(11.2)
Presence of Polymorbidity				
No	51.3(8.3)	56.5(10.9)	55.9(13.8)	59.3(11.5)
Yes	50.9(7.8)	54.6(9.2)	55.6(14)	58.3(10.8)
Drug adherence^a				
Low adherence	49.8(8.6)	57.3(10.3)	55.8(13.4)	60(10.8)
Medium adherence	51.5(7.8)	56(10.9)	55.7(13.4)	58.6(11.6)
High adherence	53.1(8.7)	55.2(10.4)	56.6(16)	59.4(11.9)
Presence of Frailty^{ac}				
No	52.8(7.5)	56.5(10.8)	58.3(13.4)	58.6(10.7)
Yes	50.7(8.5)	55.7(10.3)	55(13.8)	59.3(11.6)

a-Statistically significant for Physical domain by Independent t-test across age categories, presence of comorbidity, presence of frailty and by ANOVA across levels of drug/medication adherence;

b-statistically significant for Psychological domain by independent t-test across current employment status, presence of any comorbidity and by ANOVA across education status;

c- Statistically significant for Social domain by Independent t-test across Presence of frailty, by ANOVA across education status;

d- Statistically significant for environmental domain by independent t-test across current employment status, presence of any comorbidity, by ANOVA across education status

Table 4: Correlates of QOL scores among the participants(N=395)

Variable	Unadjusted B	95% CI	Adjusted B	95% CI
Age	-0.19	-0.3 to -0.07(p=0.002)	-0.19	-0.3 to -0.07(p<0.001)
Gender (Female)	-1.5	-3.1 to 0.13	-1.89	-3.5 to -0.25(p=0.02)
Occupation (Currently employed)	-1.4	-3 to 0.14	-	-
Education				
Up to class 10-No schooling	1.6	-0.24 to 3.44	-	-
Beyond class 10-No schooling	3.8	1.7 to 5.8	-	-
Spouse (Alive)	0.4	-1.9 to 2.92	-1.3	-3.8 to 1.2
No. of drugs consumed	0.7	-0.25 to 1.62	1.7	0.4 to 2.99(p=0.01)
Presence of any of the comorbidity	-6.5	-11.5 to -1.6	-5.9	-10.8 to -1.1(p=0.01)
Presence of Poly-morbidity	-0.9	-3.18 to 1.4	-3.5	-6.6 to -0.4(p=0.02)
Drug adherence				
Medium-low adherence	-0.26	-2.02 to 1.5	0.2	-1.5 to 1.9
High-low adherence	0.35	-2.1 to 2.8	1.3	-1.1 to 3.7
Presence of Frailty	-0.9	-2.2.7 to 0.8	-0.8	-2.6 to 0.9

F=3.37, df=9,385; P<0.001, R²=0.2

Association of domains of QOL with various sociodemographic variables: The overall QOL mean (SD) score was 55.6 (7.9). Very old age (>75 years), absence of any comorbidity, low drug adherence, and presence of frailty scored less mean (SD) QOL scores in the physical domain compared to their counterparts and it was statistically significant. Similarly, those elderly who are not working currently, with no basic schooling, or presence of any comorbidity scored less mean (SD) QOL scores in the psychological domain compared to their counterparts and this difference was statistically significant. Elderlies with no basic schooling and the presence of frailty scored statistically significantly less mean (SD) QOL scores in the social domain compared to their counterparts. Currently working, those with no schooling, and having any one of the co-morbidities scored statistically significantly less mean (SD) QOL scores in the environmental domain compared to their counterparts. (Table 3)

Correlates of QOL scores among the participants: On univariate analysis, age [unadjusted B = -0.19, 95% CI; -0.3 to -0.07], beyond class 10 of schooling [unadjusted B = 3.8, 95% CI; 1.7 to 5.8], presence of any of the comorbidity [unadjusted B = -6.5, 95% CI; -11.5 to -1.6] were found to be significant.

Upon multivariable analysis along with the above-mentioned variables and after adjustment with Gender, Spouse(alive/dead), presence of Polymorbidity and adherence to the drug, age[adjusted B=-0.19, 95% CI; -0.3 to -0.07]($p < 0.001$), Females [adjusted B=-1.89, 95% CI; -3.5 to -0.25]($p = 0.02$), No. of drugs consumed [adjusted B=1.7, 95% CI; 0.4 to 2.99]($p = 0.01$), presence of any of the comorbidity [adjusted B=-5.9, 95% CI; -10.8 to -1.1]($p = 0.01$), presence of Polymorbidity [adjusted B=-3.5, 95% CI; -6.6 to -0.4]($p = 0.02$) were found to be independent correlates of QOL among elderly. [Table 4]

DISCUSSION

This study was conducted among 395 subjects of the rural field practice area of an INI to find out the quality of life among the elderly population and the factors associated with it. It was observed that the overall mean (SD) QOL score was 55.6 (7.9). The mean QOL score [59.1] for the Environmental domain was the highest among all the domains of QOL. A similar finding was observed in previous studies conducted by Praveen et al²¹ (53.66) and Rajput M et al (62.72).²² Unlike this study, Karmarkar et al¹⁰ showed the highest mean QOL score in the social domain [67.32] and Thadathil et al²³ showed the highest mean QOL score in the physical Domain [42.44] of QOL. In our study, the physical domain [51.2] scored lowest amongst all domains in contrast to a study by Karmarkar et al where the psychological domain scored the lowest QOL scores among the participants.¹⁰ Increasing age is associated with frailty and physiological changes in the body. This may

explain why the physical domain of QOL was affected the most in our study. Aging is not just an increase in number but should be considered as an inevitable biological phenomenon.

In our study nearly two-thirds of the participants had good overall QOL, similar findings were observed in Qadri et al²⁴ and Kamra et al²⁵ but in a study by Shah et al²⁶ around half of the elderly had good overall QOL scores. This may be because the elderly in this area have a good cope up mechanism and manage their co-morbidity well and hence a good QOL.

In our study, 91% of participants were in the 60-75 years age group similar to previous studies done in Tripura, rural Punjab, and Kerala states of India.^{10,23,25} Also, the majority (64.1%) of them were males similar to studies done in Punjab and Tripura.^{10,25} We found that older age (>75 years) is associated with poor physical QOL. In our study, only 30 % of elderlies had no formal schooling like Karmarkar et al (26%) and Thadathil et al (33%).^{10,23} The majority (69.9%) of them were educated at least till 10th standard or beyond in contrast to previous studies by Rajput M et al²² (45.2% were illiterate), and Kamra et al (64% illiterate).²⁵ We found that those with better education had a better QOL score in all domains compared to others. In our study, the majority (88%) of the participant's spouses were alive and living with their partner similar to previous studies in India.^{10,22-25} Nearly half (56%) of them were currently employed and earn their livelihood themselves similar to the study by Qadri et al.²⁴ In contrast many other studies majority of participants were unemployed like in Thadathil et al.²³ This may be because this study was done in rural India where majorly due to the agricultural background, almost all the members of the family engage in the field works.

In this study participants belonging to the age group 60-75 years, males, and those with education beyond class 10 had better QOL scores compared to their counterparts. A similar was found in studies in various parts of India.^{9,25-27}

Also, we observed that those elderlies who were currently employed and had a partner and living with their spouses had better QOL scores which were also observed in other Indian studies like Thadathil et al²³ and Kumar et al.⁹

We also found that QOL scores were significantly lower in subjects with at least one comorbidity which was similar to studies done by Thadathil et al²³ and Singh et al.²⁸

The morbidity profile of our participants revealed that the majority (97.4%) of the participants had at least one comorbidity similar to previous studies by Durgawale et al²⁹, and Qadri et al.²⁴ In contrast, few studies like Rajput M et al²², Thadathil et al²³, Soren et al³⁰, and Parsuraman et al³¹ had nearly half the participants with at least one comorbidity. Hypertension and type 2 Diabetes were the major comor-

bid conditions in this study, Parsuraman et al reported that diabetes followed by defective vision were the most common comorbidities.³¹ In other studies like Khaje-Bishak et al, the majority (50%) had cardiovascular diseases followed by gastrointestinal diseases.³² R et al major comorbidity was musculoskeletal disorder (76%) followed by hypertension (24%) and Diabetes (20%) respectively.³³ This shows that problems due to the aging process like defective vision, hearing defects, and problems associated with long-term illness like degenerative diseases of the heart and blood vessels, diabetes, and Musculoskeletal system are common and vary according to various geo-spatial factors.

This study showed that age, female gender, and presence of any of the comorbidities were found to be independent correlates of QOL among the elderly similar to the study by Singh et al²⁸, Kumar et al⁹, and Thadathil et al.²³ The number of drugs consumed, and the presence of Polymorbidity was also an independent correlate of QOL scores. This shows that polypharmacy and Polymorbidity will decrease the QOL of the elderly.

CONCLUSION AND RECOMMENDATIONS

Nearly one out of ten elderlies had poor QOL. The physical domain of QOL was affected the most compared to others. Almost everyone had at least one comorbidity. Hypertension and diabetes were the most common co-morbidity. The presence of frailty decreased the QOL scores in the physical and social domains compared to counterparts. Age, female gender, number of drugs consumed, presence of any of the comorbidities, and presence of were found to be independent correlates of QOL scores among the rural elderly. We recommend elderly-centric primary healthcare delivery models in rural areas. The healthcare model should address the health needs of the elderly at one end, and from the other end focus on futuristic holistic healthcare for the adult population so that when they turn elderly, the need for healthcare is minimized and their quality of life improves.

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REFERENCES

- lasi_india_report_2020.pdf [Internet]. Available from: https://lasi.hsph.harvard.edu/sites/hwpi.harvard.edu/files/lasi/files/lasi_india_report_2020.pdf?m=1610054498
- Healthy aging and functional ability [Internet]. 2022. Available from: <https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability>
- Krishnappa L, Gadicherla S, Chidambaram P, Murthy NS. Quality of life (QOL) among older persons in an urban and rural area of Bangalore, South India. *J Fam Med Prim Care*. 2021 Jan;10(1):272-7.
- Kim IH, Noh S, Chun H. Mediating and Moderating Effects in Ageism and Depression among the Korean Elderly: The Roles of Emotional Reactions and Coping Responses. *Osong Public Health Res Perspect*. 2015 Dec 12;7(1):3-11. Available from: <http://ophrp.org/journal/view.php?number=411>
- WHOQOL - Measuring Quality of Life | The World Health Organization [Internet]. 2022. Available from: <https://www.who.int/tools/whoqol>
- Raj D, Swain P, Pedgaonkar S. A study on quality-of-life satisfaction & physical health of elderly people in Varanasi: An urban area of Uttar Pradesh, India. *Int J Med Sci Public Health*. 2014 Apr 14;3:616-620.
- Crocker TF, Brown L, Clegg A, Farley K, Franklin M, Simpkins S, et al. Quality of life is substantially worse for community-dwelling older people living with frailty: systematic review and meta-analysis. *Qual Life Res*. 2019 Aug;28(8):2041-56. Available from: <http://link.springer.com/10.1007/s11136-019-02149-1>
- Joshi MR. Factors Determining Quality of Life of Elderly People in Rural Nepal. *Gerontol Geriatr Res*. 2020 ;9(3):1-7
- Kumar S. G, Majumdar A, G. P. Quality of Life (QOL) and Its Associated Factors Using WHOQOL-BREF Among Elderly in Urban Puducherry, India. *J Clin Diagn Res JCDR* . 2014 Jan ;8(1):54-7.
- Karmakar N, Datta A, Nag K, Tripura K. Quality of Life among Geriatric Population: A Cross-Sectional Study in a Rural Area of Sepahijala District, Tripura. *Indian J Public Health*. 2018;62(2).
- Singh ND and M. Sample Size Calculator for Estimating a Proportion [Internet]. Available from: <https://statulator.com/SampleSize/ss1P.html>
- WHOQOL-BREF | The World Health Organization [Internet]. Available from: <https://www.who.int/tools/whoqol/whoqol-bref>
- Bani-Issa W. Evaluation of the health-related quality of life of Emirati people with diabetes: integration of sociodemographic and disease-related variables. *East Mediterr Health J [Internet]*. 2011 Nov 1;17(11):825-30.
- Makkar JK, Goyal A, Sharma R, Kumar V, Ghai B, Prinja S, et al. Cross Cultural Adaptation and Validation of Hindi Version of WHOQOL-BREF in Patients With Chronic Low Back Pain. In Review; 2022 Jan.
- Edmonton Frail Scale (EFS) [Internet]. Available from: <https://edmontonfrailscale.org/>
- Rolfson DB, Majumdar SR, Tsuyuki RT, Tahir A, Rockwood K. Validity and reliability of the Edmonton Frail Scale. *Age Ageing [Internet]*. 2006 Sep 1;35(5):526-9. Available from: <https://doi.org/10.1093/ageing/af041>
- Aygör HE, Fadıloğlu Ç, Şahin S, Aykar FŞ, Akçiçek F. Validation Of Edmonton Frail Scale Into Elderly Turkish Population. *Arch Gerontol Geriatr*. 2018;76:133-7.
- Swain S, Chandra Mishra R. Multimorbidity and frailty in primary care patients aged 40 years or more in Odisha, India. *Clin Epidemiol Glob Health [Internet]*. 2019 Sep;7(3):331-6.
- Perna S, Francis MD, Bologna C, Moncaglieri F, Riva A, Morazzoni P, et al. Performance of Edmonton Frail Scale on frailty assessment: its association with multi-dimensional geriatric conditions assessed with specific screening tools. *BMC Geriatr [Internet]*. 2017 Jan 4;17:2. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5209899/>
- Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive Validity of a Medication Adherence Measure in an Outpatient Setting. *J Clin Hypertens* . 2008;10(5):348-54.

21. Praveen V, M AR. Quality of life among elderly in a rural area. *Int J Community Med Public Health*. 2016;3(3):754–7.
22. Rajput DrM, Pinki DP, Kumar DrS, Jaiprakash DrJ, Kumar DrT. Quality of life of geriatric population in rural block of Haryana. *Public Health Rev Int J Public Health Res*. 2019 Oct 31;6(5):192–9.
23. Thadathil SE, Jose R, Varghese S. Assessment of Domain wise Quality of Life Among Elderly Population Using WHO-BREF Scale and its Determinants in a Rural Setting of Kerala.
24. Qadri S, Ahluwalia S, Ganai A, bali shalender, Wani F, Bashir H. An epidemiological study on quality of life among rural elderly population of nothern India. *Int J Med Sci Public Health* [I. 2013;2(3):514.
25. Kamra D. A community based epidemiological study on quality of life among rural elderly population of Punjab. 2014;11(2).
26. Shah VR, Christian DS, Prajapati AC, Patel MM, Sonaliya KN. Quality of life among elderly population residing in urban field practice area of a tertiary care institute of Ahmedabad city, Gujarat. *J Fam Med Prim Care*. 2017;6(1):101–5.
27. Sivanantham P, Sahoo J, Lakshminarayanan S, Bobby Z, Kar SS. Profile of risk factors for Non-Communicable Diseases (NCDs) in a highly urbanized district of India: Findings from Puducherry district-wide STEPS Survey, 2019–20. *PLOS ONE* . 2021 Jan 12;16(1):e0245254.
28. Singh A, Palaniyandi S, Palaniyandi A, Gupta V. Health related quality of life among rural elderly using WHOQOL-BREF in the most backward district of India. *J Fam Med Prim Care* [Internet]. 2022 Mar;11(3):1162–8. /PMCID9051724/
29. Durgawale PM, Shinde M. Study of Assessment of Quality of Life in Elderly Residing in Rural Area. 2012;3(10).
30. Soren SK, Kumari AP, Kujur A, Sunderam S, Singh SB, Raj M. Predictors of quality of life among geriatric population in a tribal dominant state of India: A community based analytical study. *J Fam Med Prim Care*. 2022 Mar;11(3):918–26.
31. Parsuraman G, Vijayakumar P, Anantha Eashwar VM, Dutta R, Mohan Y, Jain T, et al. An epidemiological study on quality of life among elderly in an urban area of Thirumazhisai, Tamilnadu. *J Fam Med Prim Care*. 2021 Jun;10(6):2293–8.
32. Khaje-Bishak Y, Payahoo L, Pourghasem B, Asghari Jafarabadi M. Assessing the Quality of Life in Elderly People and Related Factors in Tabriz, Iran. *J Caring Sci*. 2014 Dec 1;3(4):257–63.
33. R S, S R, K K. A Cross sectional study about the quality of life among the elderly population in rural Puducherry. *Indian J Forensic Community Med*. 2019 Aug 28;6(2):86–92.