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Comparative Epidemiological Assessment of Quality of Life (AQoL) Among Geriatric Population in Rural and Urban Satara During the COVID-19 Pandemic

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ABSTRACT

Background: Aging is a natural and progressive biological process characterized by a decline in physiological and mental capacities, increasing susceptibility to diseases and mortality. The World Health Organization emphasizes the growing proportion of the elderly population worldwide, driven by reduced birth rates and improved healthcare systems. This demographic shift necessitates a better understanding of the elderly's health status and quality of life, particularly across diverse settings.

Objectives: The study aimed to: (1) estimate the proportion of the elderly population in urban and rural areas; (2) analyze and compare their morbidity status and its association with socio-demographic variables; (3) evaluate and contrast their quality of life; and (4) recommend strategies for improving elderly health in different environments.

Methodology: A community-based cross-sectional study was conducted in the Satara District of Maharashtra, India. Using a multistage sampling technique, 3,300 elderly individuals (aged ≥60 years) from both urban and rural areas were included, targeting a 90% response rate. Data were collected using pre-validated tools after obtaining informed consent. Both descriptive and inferential statistics, including independent t-tests and Mann-Whitney U tests, were applied for analysis.

Results: Most participants were aged 60–69 years with no significant age or gender variation between urban and rural areas. Quality of life was significantly better among the rural elderly, especially in mental health and social domains. Gender differences were significant only in the "Senses" domain ($p = 0.043$).

Conclusion: Socioeconomic conditions and family support significantly influence the quality of life among the elderly, with rural populations faring better than urban counterparts.

Keywords: *Quality of Life (QoL / AQoL), Geriatric, Rural Area, Urban Area, COVID-19 Pandemic,*

1. INTRODUCTION

Aging is an intrinsic and irreversible biological phenomenon marked by a progressive decline in physiological and cognitive functions. According to the World Health Organization (WHO), it entails a continuous accumulation of molecular and cellular changes over time, leading to reduced physical and mental capacities, heightened susceptibility to illness, and ultimately, mortality (WHO, 2020). Globally, the demographic profile is shifting toward an aging population due to declining fertility rates, enhanced life expectancy, and advancements in medical care (1).

The global elderly population—those aged 60 years and above—is projected to increase from 1 billion in 2020 to 2.1 billion by 2050, with a majority residing in low- and middle-income countries. This demographic trend poses substantial challenges to healthcare systems, given the higher prevalence of chronic illnesses, frailty, and disabilities among older adults. Additionally, it brings socioeconomic concerns such as increased healthcare costs, a growing dependency ratio, and a pressing need for age-friendly policy interventions (2,3).

While developed nations have structured healthcare and social systems to support aging populations, developing countries, including India, often lack adequate infrastructure and social safety nets. Addressing the implications of aging in these diverse socioeconomic settings is critical for shaping effective healthcare and social policies (4,5). In India, the elderly population is rising rapidly, expected to grow from 10.1% in 2021 to 19.5% by 2050, as per the Longitudinal Aging Study in India (LASI) (6). Nearly 70% of this demographic resides in rural regions, where healthcare access remains limited and economic insecurity is prevalent. In contrast, urban elderly often experience social isolation amid nuclear family structures and youth

migration (7).

Older adults in India frequently encounter challenges such as financial dependence, inadequate healthcare services, and an increasing burden of non-communicable diseases like diabetes, hypertension, and cardiovascular conditions. Mental health concerns, particularly depression and anxiety linked to loneliness and reduced social interaction, are also common, underlining the need for comprehensive, targeted interventions (8–10).

The COVID-19 pandemic further exposed the vulnerability of the elderly, who were disproportionately affected due to immunosenescence and underlying comorbidities. Mortality rates were notably higher among older adults, especially those with pre-existing chronic conditions, highlighting the urgent need for inclusive health strategies (11–13).

2. METHODOLOGY

A community-based cross-sectional study was undertaken in Satara District, Maharashtra, over a three-year period from January 2022 to December 2024. The study population comprised elderly individuals aged 60 years and above residing in both urban and rural areas. A multistage sampling strategy was employed to ensure representativeness. From each of the 11 talukas in the district, one sub-centre village and one municipal ward were randomly selected.

The total sample size included 3,300 participants, with 2,750 from urban wards and 550 from rural villages. Data collection was carried out through face-to-face interviews using a pre-tested, structured questionnaire. Prior to participation, informed written consent was obtained from all respondents.

A dedicated team of 22 trained field investigators conducted household visits, supervised in real-time by a central monitoring unit. A rigorous three-tier quality assurance mechanism was implemented, which included daily field-level validation, centralized data checks, and supervisory reviews. Data were compiled and managed using Microsoft Excel and underwent regular validation for accuracy and completeness.

To ensure methodological integrity, photographic evidence and periodic monitoring visits were utilized to confirm compliance with study protocols. The primary aim of the study was to evaluate and compare the quality of life among the elderly across rural and urban settings and to explore associations with socio-demographic variables and morbidity patterns, particularly in the context of the COVID-19 pandemic.

Data Collection Tools

The study employed a combination of standardized and structured tools to gather comprehensive information from the elderly participants across both urban and rural settings:

1. **Demographic Information Form:** A structured form designed to collect essential socio-demographic details such as age, gender, level of education, occupation, monthly income, marital status, type of family, and area of residence (urban/rural).
2. **Personal and Medical History Questionnaire:** This tool was used to document the participants' health background, including the presence of chronic diseases (e.g., diabetes, hypertension), functional impairments in activities of daily living (ADLs), and **lifestyle behaviors such as smoking, alcohol consumption, and physical activity patterns.**
3. **Assessment of Quality of Life (AQoL) – Version 1:** A validated 15-item instrument used to evaluate quality of life across five domains:
    - Illness
    - Independence
    - Social Relationships
    - Sensory Function
    - Mental Health
4. **Assessment of Quality of Life (AQoL) –** 8 Dimensions: A more detailed 35-item tool assessing quality of life across eight domains:
    - Physical Health
    - Mental Health
    - Independence
    - Social Relationships
    - Sensory Function
    - Pain and Discomfort
    - Self-Worth
    - Coping Ability

Statistical Analysis

Data were analyzed using IBM SPSS Statistics software. Descriptive statistics—including mean, standard deviation (SD), frequencies, and percentages—were used to summarize socio-demographic characteristics and health-related information. To compare outcomes between rural and urban elderly populations, appropriate inferential tests were applied: the independent t-test for normally distributed continuous variables, the Mann-Whitney U test for non-normally distributed data,

and the chi-square test for categorical variables.

Multivariate linear regression analysis was conducted to identify significant predictors of health-related quality of life (HR-QoL). Receiver Operating Characteristic (ROC) curves were used to evaluate the sensitivity and specificity of key predictors. A p-value of less than 0.05 was considered statistically significant. Findings were illustrated using bar charts and scatter plots for clearer interpretation and comparison of trends across study groups.

Ethical Considerations

This study was conducted in accordance with established ethical standards for research involving human participants. Written informed consent was obtained from all study participants prior to data collection. Participants were informed about the study's purpose, assured of the confidentiality of their information, and informed of their right to withdraw from the study at any point without any consequences.

The research protocol received approval from both the Protocol Committee and the Institutional Ethics Committee of the affiliated institute, ensuring adherence to ethical principles and guidelines.

3. RESULTS AND DISCUSSION

The study identified significant urban–rural differences in several socio-demographic variables and quality of life indicators among elderly populations. Rural elderly consistently reported better outcomes across most domains, including health perception, mental well-being, social support, and happiness. These findings underscore the influence of socio-environmental factors such as family structure and community cohesion. Conversely, urban participants showed slightly higher self-worth, potentially reflecting greater economic independence. Overall, gender, age, BMI, and marital status had limited influence on QoL. However, addiction and comorbidities emerged as important negative predictors, particularly affecting mental health and coping abilities in urban settings.

Table 1: Summary of Urban-Rural Comparisons on Key Domains

Domain	Significant Difference	p-Value	Key Finding
Age	No	0.803	Similar age distribution across settings
Gender	No	0.647	Majority male; no gender disparity
BMI	Yes	<0.05	Obese I higher in urban; Normal BMI higher in rural
Family Structure	Yes	<0.001	More joint/separated families in rural
Education	Yes	<0.001	Higher illiteracy in rural areas
Socioeconomic	Yes	<0.001	Upper class higher in urban; lower in rural
Employment	No	0.448	No significant employment differences
Financial Dependency	Partial	0.041	Pain lower in financially dependent rural elderly
Comorbidities	Partial	0.041	Lower mental health in urban with comorbidities
Addiction	Partial	0.041 / 0.020	Lower MH in urban; lower coping in rural

Age Distribution:The majority of participants (79.8%) belonged to the 60–69 years age group. A slightly higher proportion was observed in urban areas (80.6%) compared to rural areas (79.6%). However, this difference was not statistically significant (p = 0.803).
Gender Distribution: Males constituted the majority in both urban (72.2%) and rural (71.7%) populations, with no significant difference in gender distribution across the two settings (p = 0.647).
Body Mass Index (BMI):A substantial proportion of participants (43.0%) were classified as Obese Class II (BMI >30), with similar prevalence in urban (43.4%) and rural (42.9%) areas. Obese Class I was more prevalent in urban areas (25.2%), while normal BMI was more common in rural areas (28.3%). The difference in BMI distribution between urban and rural populations was statistically significant ($p < 0.05$).
Family Structure: Joint and separated family types were more prevalent in rural areas (33.7% and 52.6%, respectively), whereas nuclear families were more common in urban areas (36.6%). This difference was highly significant ($p < 0.001$).
Educational Status: Illiteracy was notably higher in rural participants (22.8%) compared to urban counterparts (15.0%). The difference was statistically significant ($p < 0.001$).
Socioeconomic Status: Urban residents had a greater representation in the upper socioeconomic class (30.6%), while rural participants were more concentrated in the lower class (29.1%). This urban–rural disparity was statistically significant ($p < 0.001$).
Employment and Financial Dependency: No significant differences were found between urban and rural participants regarding employment status ($p = 0.448$) or financial dependency ($p = 0.150$).
Comorbidities and Addiction: Comorbidity prevalence was similar across both settings ($p = 0.976$). Although addiction history did not significantly differ overall ($p = 0.362$), alcohol addiction was more prevalent in rural participants (37.9%) than in urban ones (32.2%) ($p = 0.015$).

Assessment of Quality of Life (AQoL)
llness Domain: Rural elderly reported significantly better health perception (mean score: 8.6) than urban elderly (7.6) ($p < 0.001$).
Independence: No significant differences were observed between urban (8.4) and rural (8.7) groups ($p = 0.097$).
Social Relationships: Higher scores were recorded among rural participants (8.6) than urban (7.2) ($p < 0.001$).
Physical Senses: Rural elderly had significantly better sensory function (8.8 vs. 7.7; $p < 0.001$).
Psychological Wellbeing: Rural elderly showed higher psychological health (8.7) than urban elderly (7.1) ($p < 0.001$).
Assessment of Quality of Life (AQoL) – 8 Dimensions
Independence: Rural participants had significantly better perceived independence (11.8 vs. 11.2; $p < 0.001$).
Pain: Urban elderly reported higher pain levels (10.5) than rural counterparts (8.3) ($p < 0.001$).
Senses: No significant differences were found (urban 9.0 vs. rural 9.3; $p = 0.107$).
Happiness: Rural elderly scored significantly higher in happiness (12.5 vs. 9.9; $p < 0.001$).
Mental Health: Better scores were observed among rural participants (22.4) than urban (17.6) ($p < 0.001$).
Coping: Rural participants showed stronger coping abilities (10.0 vs. 8.0; $p < 0.001$).
Relationships: Higher relationship scores were recorded in rural areas (19.4 vs. 17.0; $p < 0.001$).
Self-Worth: Urban elderly had slightly higher self-worth (10.9) than rural (9.5) ($p = 0.003$).

Additional Observations
Gender: No significant differences in quality of life were observed across most domains between genders, except for better sensory function among urban males ($p = 0.043$).
BMI Categories: No significant association was found between BMI and any QoL domains ($p > 0.05$).
Tobacco Use: Urban tobacco users had better sensory scores ($p = 0.043$), but no other domain was affected.
Alcohol Consumption: No significant differences in QoL were linked to alcohol use ($p > 0.05$).
Addiction: Addiction was associated with lower mental health scores in urban participants ($p = 0.041$) and reduced coping in rural participants ($p = 0.020$).
Comorbidities: Urban participants with comorbidities showed lower mental health ($p = 0.041$); other domains were unaffected.
Marital Status: No significant impact on QoL was observed based on marital status.
Employment: QoL domains were generally unaffected, except for lower pain and relationship satisfaction among unemployed rural elderly ($p = 0.002$, $p = 0.008$).
Financial Dependency: Only rural participants showed lower pain scores based on financial dependency ($p = 0.041$).
Socioeconomic Status: Urban upper-middle class participants reported poorer illness scores ($p = 0.045$), while urban middle-class individuals showed better mental health ($p = 0.031$).

4. CONCLUSION

The study identified significant urban–rural differences in several socio-demographic variables and quality of life indicators among elderly populations. Rural elderly consistently reported better outcomes across most domains, including health

perception, mental well-being, social support, and happiness. These findings underscore the influence of socio-environmental factors such as family structure and community cohesion. Conversely, urban participants showed slightly higher self-worth, potentially reflecting greater economic independence. Overall, gender, age, BMI, and marital status had limited influence on QoL. However, addiction and comorbidities emerged as important negative predictors, particularly affecting mental health and coping abilities in urban settings.

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