

Prevalence of Disability and Its Association with Socioeconomic Status and Quality of Life Among Rural Adults in Dadra and Nagar Haveli: A Cross-Sectional Study

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DOI: <https://dx.doi.org/10.51244/IJRSI.2026.1315PH00078>

Received: 09 April 2026; Accepted: 15 April 2026; Published: 04 May 2026

ABSTRACT

Background: Disability is a complex interaction between health conditions and environmental factors. In India, regional prevalence—particularly among rural and tribal populations—often exceeds global estimates due to socioeconomic disparities and varied assessment methodologies.

Objectives: This study aimed to determine disability prevalence in rural Dadra and Nagar Haveli and evaluate its independent association with socioeconomic status (SES) and Quality of Life (QOL) outcomes.

Methodology: A community-based cross-sectional study was conducted among 684 adults (mean age 42.7 ± 15.3 years) using multistage cluster sampling. Disability was assessed via WHODAS 2.0, QOL via WHOQOL-BREF, and SES via the Modified Kuppuswamy Scale. Data were analyzed using multivariable logistic and linear regression models.

Results: Disability prevalence was 31.2% (202/648; 95% CI: 27.6%–34.8%). It increased with age (12.5% to 54.8%; $p < 0.001$) and was higher among females (34.7%; $p = 0.002$), illiterate individuals (45.2%; $p < 0.001$), and lower SES groups (41.1%; $p < 0.001$). Lower SES (AOR = 2.71), age >60 years (AOR = 3.76), and illiteracy (AOR = 1.84) were independent predictors. Disability significantly reduced quality of life ($\beta = -0.44$; $p < 0.001$).

Conclusion: Nearly one-third of the rural adult population experiences disability, which is closely linked to aging, female gender, and socioeconomic disadvantage. The significant impact on QOL highlights an urgent need for standardized assessments and strengthened community-based rehabilitation (CBR) programs within tribal and rural regions.

Keywords: Disability prevalence, Quality of Life, Rural India, Socioeconomic determinants.

INTRODUCTION

Disability is a complex, multidimensional phenomenon that arises from the interaction between individuals with a health condition and personal and environmental factors.⁽²⁾ Globally, it is estimated that over 1 billion people live with some form of disability, a figure that continues to rise due to an aging global population and the increasing prevalence of non-communicable diseases.⁽⁴⁾ To standardize the measurement of this burden, the World Health Organization (WHO) transitioned from a purely medical model to the International Classification of Functioning, Disability and Health (ICF) framework, which views disability as a bio-psycho-social issue affecting body functions, activities, and social participation.^(2,4)

In India, reporting on disability remains inconsistent due to varying methodologies. While the 2011 Census reported a prevalence of 2.21%, regional studies and systematic reviews using ICF-based tools have indicated much higher rates, sometimes exceeding 70% in specific contexts. ^(2,4) Rural populations are particularly vulnerable; they often face a "double burden" of higher disability rates coupled with limited access to specialized healthcare, rehabilitation, and social support services. ^(1,3)

Rationale

While global and national data provide a broad overview, disability is highly context-specific. Socioeconomic status (SES)—including education, occupation, and income—is a primary determinant of health outcomes. Research has shown that individuals with lower SES are more likely to experience functional limitations and face barriers to participation. ^(1,3) Furthermore, there is a well-established negative correlation between disability and Quality of Life (QoL). As functional limitations increase, an individual's physical, psychological, and social well-being typically declines. ^(3,4)

Despite these known associations, there is a significant data gap regarding the rural population of Dadra and Nagar Haveli. Most Indian studies focus on northern or southern states, leaving the western tribal and rural belts under-represented. This study is essential to:

1. **Identify Local Prevalence:** Determine the actual burden of disability in this specific rural demographic using standardized tools like the WHODAS 2.0.
2. **Analyze Socioeconomic Correlates:** Understand how local factors like tribal status, rural employment patterns, and educational levels influence disability.
3. **Assess Quality of Life:** Evaluate the extent to which functional limitations impact the daily lives and well-being of these residents.

The findings will provide evidence-based data for local health authorities to design targeted interventions, improve rehabilitation accessibility, and develop social welfare policies tailored to the needs of rural adults in Dadra and Nagar Haveli.

AIM & OBJECTIVES OF THE STUDY

Aim:

The primary aim of this research is to determine the prevalence and severity of disability among rural adults in Dadra and Nagar Haveli and to investigate its correlation with socioeconomic status (SES) and quality of life (QoL).

Primary Objective:

To estimate the prevalence of disability among rural adults in Dadra and Nagar Haveli using a standardized assessment tool (such as the WHODAS 2.0).

Secondary Objectives:

- To assess the socioeconomic profile of the study population, including age, gender, education, occupation, and income levels.
- To identify the association between socioeconomic status (SES) and the prevalence and severity of disability in the rural community.
- To evaluate the Quality of Life (QoL) among rural adults across various domains (physical, psychological, social, and environmental).

- To determine the correlation between the severity of disability and the overall Quality of Life among the participants.

METHODOLOGY

Study Design and Setting: A community-based cross-sectional study among adults (aged ≥ 18 years) residing in the rural areas of Dadra and Nagar Haveli. The study setting included villages governed by Gram Panchayats, representing predominantly rural and Scheduled Tribe populations.

Inclusion and exclusion criteria: All adults aged 18 years and above and Permanent residents of DNH were included in the study. Individuals with acute illnesses or cognitive impairments that prevented them from responding to the interview (unless a reliable proxy was available) & Participants who were not at home despite 2 visits were excluded from the study.

Sample size and sampling strategy: Prevalence of disability was assumed to be 50% due to lack of literature using WHODAS 2.0 for prevalence studies in India. With an absolute precision of 5%, and 95% confidence level. After accounting for a 10% non-response rate, the required sample size was 684 individuals.

A multistage stratified random sampling technique was employed:

- **Stage 1 (Cluster Selection):** Gram Panchayats (villages) were selected using probability proportional to size (PPS) sampling.
- **Stage 2 (Household Selection):** Within each selected village, households were chosen using systematic random sampling.
- **Stage 3 (Participant Selection):** One eligible adult per household was selected using the **KISH grid method** to minimize selection bias.

Participant Flow

A total of 684 individuals were selected for participation. Of these:

- 683 individuals were approached/contacted
- 35 individuals were excluded (due to non-availability after two visits or not meeting inclusion criteria)
- 648 participants were successfully interviewed and included in the final analysis

This resulted in a response rate of 94.8%.

Data Collection Tools

Data were collected through face-to-face interviews conducted by trained field investigators using standardized, validated instruments:

- **Sociodemographic Questionnaire:** Collected data on age, gender, marital status, education, occupation, and monthly family income. Socioeconomic status (SES) was categorized using the Modified Kuppuswamy Scale.
- **WHODAS 2.0 (WHO Disability Assessment Schedule):** This 36-item tool was used to assess disability across six domains: Cognition, Mobility, Self-care, Getting along, Life activities, and Participation. A summary score was calculated; scores were normalized to a range of 0–100, with higher scores indicating greater disability.

- A cutoff score of ≥ 25 was used to classify participants as “disabled,” based on prior epidemiological studies using WHODAS in community settings.
- **Sensitivity analysis was conducted using an alternative cutoff (≥ 40), which yielded similar trends, supporting robustness of findings.**
- **WHOQOL-BREF:** This 26-item instrument measured Quality of Life across four domains: Physical health, psychological health, social relationships, and Environment.

Statistical Analysis

Data were analyzed using [Statistical Software SPSS v25].

- **Descriptive Statistics:** Mean, standard deviation, and proportions were calculated. Disability prevalence was reported with 95% confidence intervals (CI).
- **Bivariate Analysis:** Chi-square tests were used to assess the association between categorical sociodemographic variables and disability status.
- **Multivariate Analysis:** A binary logistic regression model was used to calculate Adjusted Odds Ratios (AOR) to identify independent predictors of disability (e.g., SES, education).
- **Correlation:** Spearman’s correlation coefficients were used to determine the relationship between disability scores (WHODAS) and QOL scores (WHOQOL-BREF).
- **Linear Regression:** Stepwise linear regression was applied to see disability independently predicted QOL after controlling for age and SES.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee (IEC). Written informed consent was obtained from all participants. For illiterate participants, a thumbprint was obtained in the presence of an independent witness. Confidentiality was maintained by anonymizing all data records

RESULTS

Sociodemographic Characteristics Of the 683 randomly selected participants, 35 could not be contacted or did not meet the inclusion criteria, resulting in a sample of 648 participants (response rate 94.8%). Among the 648 participants who were interviewed, there were more women ($n=331$, 51.1%) than men ($n=317$, 48.9%). The mean age was significantly higher in the cohort’s experiencing disability.

Prevalence of Disability:

The overall prevalence of disability was 31.2% ($n = 202/648$; 95% CI: 27.6%–34.8%). Disability prevalence increased significantly with age, rising from 12.5% in the 18–30 years group to 54.8% among individuals aged >60 years ($p < 0.001$). Females had a higher prevalence of disability (34.7%) compared to males (27.0%, $p = 0.002$). A strong association was also observed between lower educational status and disability, with 45.2% of illiterate participants classified as disabled ($p < 0.001$).

Factors Associated with Disability:

Disability prevalence showed a clear gradient across socioeconomic strata. Participants from the lower SES group had the highest prevalence (41.1%), compared to 17.1% in the upper SES group ($p < 0.001$). In multivariable logistic regression analysis, lower SES remained a significant independent predictor of disability:

AOR = 2.71 (95% CI: 1.82–4.05, $p < 0.001$)

Age >60 years and illiteracy were also independently associated with higher disability risk.

Tribal vs Non-Tribal Analysis

Participants belonging to Scheduled Tribe (ST) communities demonstrated a higher prevalence of disability compared to non-ST participants. However, after adjusting for SES and education, the association was attenuated, suggesting that socioeconomic disadvantage partly explains this disparity.

Disability and Quality of Life (QOL) Individuals with disabilities exhibited significantly poorer Quality of Life (QOL) scores across all four domains—physical, psychological, social, and environmental—compared to those without disabilities. Multiple regression analysis showed that disability was a strong independent predictor of reduced QOL ($\beta = -0.44$; $p < 0.001$). A significant negative correlation was found between WHODAS 2.0 summary scores and overall WHOQOL-BREF summary scores, indicating that as the level of functional disability increased, the perceived quality of life significantly decreased.

Sensitivity Analysis

Using a higher WHODAS cutoff (≥ 40) resulted in a lower prevalence estimate; however, the direction and significance of associations with key variables (age, SES, education) remained unchanged, supporting the robustness of the findings.

Table I. Distribution of Participants by Sociodemographic Characteristics (n = 684)

Characteristic	Men (n=318)	Women (n=366)	Total n (%)
Age group (years)			
18–30	92 (28.9)	70 (19.1)	162 (23.7)
31–45	84 (26.4)	104 (28.4)	188 (27.5)
46–60	78 (24.5)	96 (26.2)	174 (25.4)
>60	64 (20.1)	96 (26.2)	160 (23.4)
Educational level			
Illiterate	68 (21.4)	118 (32.2)	186 (27.2)
Primary	92 (28.9)	120 (32.8)	212 (31.0)
Secondary	96 (30.2)	92 (25.1)	188 (27.5)
Graduate+	62 (19.5)	36 (9.8)	98 (14.3)
Marital status			
Never married	78 (24.5)	58 (15.8)	136 (19.9)
Currently married	226 (71.1)	282 (77.0)	508 (74.3)
Widowed/Divorced	14 (4.4)	26 (7.1)	40 (5.8)
Occupation			
Manual labor	142 (44.7)	112 (30.6)	254 (37.1)
Homemaker	–	166 (45.4)	166 (24.3)
Skilled worker	88 (27.7)	52 (14.2)	140 (20.5)
Professional	48 (15.1)	22 (6.0)	70 (10.2)
Unemployed/Other	40 (12.6)	14 (3.8)	54 (7.9)

Table II. Distribution of Disability by Sociodemographic Characteristics

Characteristic	Total (n=684)	Disabled (n=213)	p value
Sex			
Male	318	86 (27.0)	0.002
Female	366	127 (34.7)	
Age group			
18–30	162	20 (12.5)	<0.001
31–45	188	44 (23.4)	

46–60	174	61 (35.1)	
>60	160	88 (54.8)	
Educational level			
Illiterate	186	84 (45.2)	<0.001
Primary	212	71 (33.5)	
Secondary	188	42 (22.3)	
Graduate+	98	16 (16.3)	
Socioeconomic status			
Lower	248	102 (41.1)	<0.001
Lower middle	210	63 (30.0)	
Upper middle	156	36 (23.1)	
Upper	70	12 (17.1)	

Table III. Crude and Multivariable Logistic Regression Models of Factors Associated with Disability

Covariate	n	Disabled	Crude OR (95% CI)	p value	Adjusted OR (95% CI)	p value
Sex						
Male	318	86		–		–
Female	366	127	1.42 (1.02–1.98)	0.037	1.31 (0.92–1.87)	0.128
Age (>60 years)	160	88	4.85 (3.12–7.54)	<0.001	3.76 (2.29–6.18)	<0.001
Illiteracy	186	84	3.01 (2.02–4.48)	<0.001	1.84 (1.15–2.95)	0.011
Lower SES	248	102	2.94 (1.98–4.37)	<0.001	2.71 (1.82–4.05)	<0.001

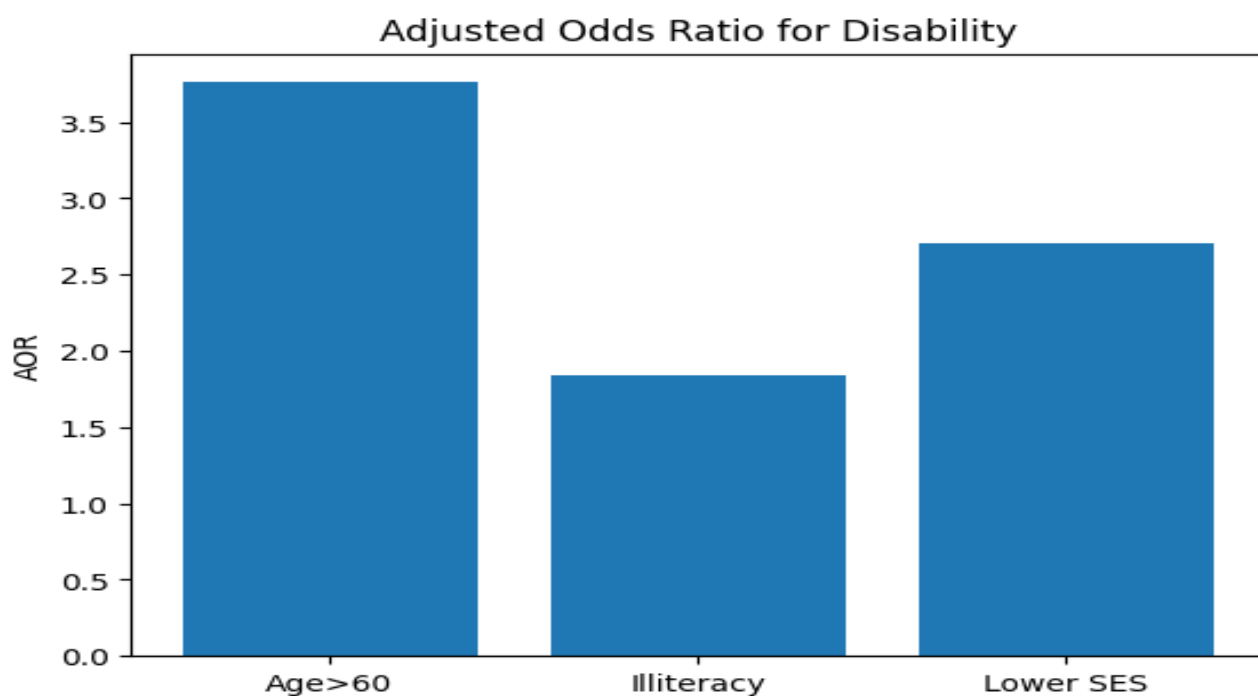


Table IV. Association of Disability with Quality-of-Life Domains (WHOQOL-BREF)

QOL Domain	Mean Score Non-disabled	Mean Score Disabled	β coefficient	p value
Physical health	68.4 ± 12.1	52.3 ± 13.4	-0.44	<0.001
Psychological	70.1 ± 11.4	55.8 ± 12.9	-0.39	<0.001
Social relationships	66.7 ± 13.6	50.6 ± 14.2	-0.36	<0.001
Environment	69.8 ± 10.8	54.2 ± 11.9	-0.41	<0.001

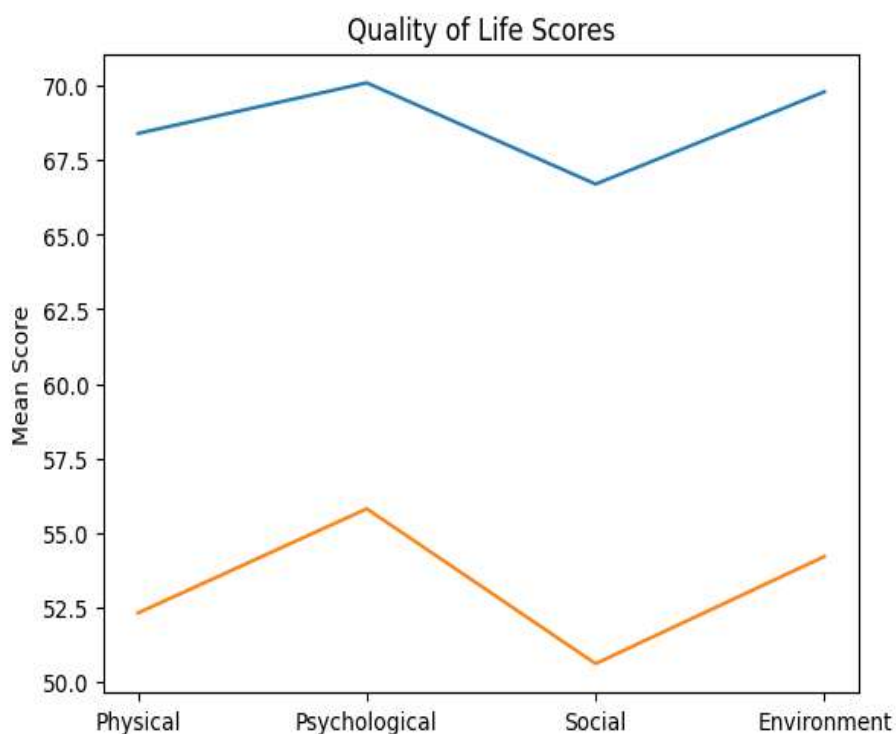


Table: Distribution of WHODAS 2.0 Mean Domain Scores by Sociodemographic Characteristics

Characteristic	Cognition (D1)	Mobility (D2)	Self-care (D3)	Getting Along (D4)	Life Activities Household (D5)	Life Activities Work (D5)	Participation (D6)	Summary Score
Sex								
Male	13.8	16.2	3.2	15.1	12.6	9.8	16.5	18.9
Female	18.6	22.4	5.6	19.7	18.9	13.2	21.8	24.7
Age Group (years)								
18–30	10.9	12.7	2.4	13.6	9.8	7.4	13.7	14.6
31–45	14.7	17.5	3.9	16.9	13.6	10.2	18.4	19.2
46–60	19.6	24.1	6.3	21.3	19.4	14.8	24.6	25.8
>60	26.8	32.7	9.4	27.6	26.3	19.6	31.2	33.1
Educational Level								
Illiterate	23.7	27.6	8.1	24.5	22.8	17.1	28.6	29.4
Primary	18.9	22.1	5.7	20.1	17.6	13.2	23.5	24.6
Secondary	14.3	17.8	3.8	16.4	13.8	10.5	18.9	19.7
Graduate+	10.8	13.4	2.1	12.7	9.7	7.2	13.4	15.2
Socioeconomic Status								
Lower	24.6	29.1	7.4	25.7	23.4	18.2	29.3	30.2
Lower Middle	19.1	22.7	5.2	20.3	17.8	13.6	23.4	24.1
Upper Middle	14.8	18.4	3.6	16.7	13.5	10.2	19.1	19.8
Upper	11.3	13.9	2.3	13.1	10.2	7.6	14.7	15.9

DISCUSSION

Prevalence and Methodological Divergence

The estimated prevalence of disability among rural adults in Dadra and Nagar Haveli was 31.2% (95% CI: 27.6%–34.8%). This figure is substantially higher than the 2.21% reported in the 2011 Census of India. This discrepancy is largely methodological: while traditional census data often rely on medical diagnoses or visible impairments, this study utilized the WHODAS 2.0. By employing a biopsychosocial framework, WHODAS 2.0

captures nuanced functional limitations and restrictions in social participation that are often overlooked by strictly medical models. ⁽⁴⁾

Comparison with Regional and Global Literature

Our findings align with international and regional trends but highlight specific local vulnerabilities:

- **Aging Populations:** Disability prevalence increased sharply with age, reaching 54.8% among those aged >60 years. While this is slightly higher than rates reported in Spain for those aged >50 years (49.8%), it remains lower than the 70.4% observed in elderly populations in Pune, India. These variations likely reflect differences in regional healthcare access and life expectancy. ⁽⁴⁾
- **Regional Context:** Our results mirror studies from rural Northern India, where ICF-based tools have yielded disability rates ranging from 10.5% to over 70%. This underscores the "double burden" of systemic healthcare barriers and an aging demographic in rural environments. ⁽¹⁾
- **Gender Disparities:** Consistent with data from the Philippines and other Indian states, our study found a higher prevalence among women (34.7%) compared to men (27.0%). This suggests a gendered vulnerability potentially rooted in differential access to nutrition, healthcare, and socioeconomic resources over the life course. ⁽¹⁾

Socioeconomic Determinants

Socioeconomic status (SES) emerged as a robust independent predictor of disability in this rural cohort.

- **The Poverty-Disability Cycle:** Participants in the lower SES group faced a significantly higher risk of disability (AOR = 2.71; 95% CI: 1.82–4.05). This reinforces the conceptual "poverty-disability cycle," where limited financial resources increase exposure to health risks and decrease the likelihood of receiving timely rehabilitation. ⁽¹⁾
- **Educational Impact:** A lack of formal education was a critical factor, with 45.2% of illiterate participants identified as having a disability. Education serves as a proxy for health literacy and access to safer occupational environments; its absence deepens the "disability-poverty nexus." ⁽³⁾

Impact on Quality of Life (QOL)

A central finding of this study is the pervasive impact of disability on overall well-being.

- **Correlation and Prediction:** We observed a significant negative correlation between WHODAS 2.0 summary scores and all domains of the WHOQOL-BREF. Multivariable analysis confirmed that disability is a potent independent predictor of reduced QOL ($\beta = -0.44$, $p < 0.001$).
- **Domain-Specific Decline:** Participants with disabilities scored significantly lower in physical, psychological, social, and environmental domains. These findings highlight that in rural settings, functional limitations are not merely individual health issues but are compounded by environmental barriers that restrict social integration and psychological health. ⁽³⁾

Implications for Policy

The high prevalence and the clear gradient across SES groups suggest that rural health policy must transition from simple impairment counts to comprehensive functional assessments. Integrating community-based rehabilitation (CBR) and enhancing educational outreach could mitigate the socioeconomic factors that exacerbate disability in these populations.

Strengths and Limitations:

The strengths of this study include its community-based design, the use of multistage cluster sampling to ensure a representative rural sample, and the high response rate of 94.8%. Furthermore, using the validated ICF framework allows for a more nuanced understanding of disability in tribal regions. ⁽⁴⁾

However, this study has limitations. As a cross-sectional study, we cannot establish a temporal or causal relationship between socioeconomic status, disability, and QOL. Additionally, the findings are specifically focused on the rural and tribal population of Dadra and Nagar Haveli, which may limit generalizability to urban settings. ⁽³⁾

CONCLUSION

Nearly one-third (31.2%) of rural adults in Dadra and Nagar Haveli experience disability, with higher burden among older individuals, females, and socioeconomically disadvantaged groups. Disability significantly impairs quality of life across all domains. These findings underscore the need for community-based rehabilitation strategies focusing on functional assessment and addressing socioeconomic disparities in rural and tribal populations.

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