ORIGINAL ARTICLE

# Quality of Life among Patients with Lymphatic Filariasis in Northern India: A Case-Control Study

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## Abstract

**Background:** Lymphatic filariasis (LF) is a neglected tropical disease and the second most common vector-borne disease after malaria, with 790 million people at risk globally, and nearly 20 million people suffer from chronic morbidity. Uttar Pradesh is the largest state of India, in which 112 million (95 million in rural areas & 17 million in urban areas) people are living in LF endemic areas, where lymphatic filariasis significantly impairs quality of life. Objectives: To assess the socioeconomic profile and quality of life among LF patients in Kanpur Nagar. **Material & Methods:** A community-based case-control study was conducted, and 628 participants (314 cases and 314 controls) were selected from a line listing provided by the district malaria officer. Controls were frequency-matched for age and sex and were selected from the neighborhood of the case from August 2024 to July 2025. Data were collected using a structured questionnaire and the WHOQOL-BREF scale. Statistical analysis was performed using SPSS software version 30. Associations were assessed using the Chi-square test, and mean QoL scores were compared using the independent sample t-test. **Result:** LF cases were significantly associated with lower educational status, lower socioeconomic status, nuclear family structure, and unemployment compared to controls ($p < 0.05$). QoL scores were significantly lower among cases in the physical (36.40±15.18 vs. 64.65±8.51), psychological (53.86±15.62 vs. 70.96±7.45), and social relationship domains (58.44±9.04 vs. 66.85±8.47) compared to controls ($p < 0.001$), while environmental domain scores showed no significant difference ($p = 0.412$). Among cases, males demonstrated significantly higher physical and psychological quality of life scores than females ($p < 0.05$). **Conclusion:** Lymphatic filariasis significantly impairs quality of life, particularly in physical, psychological, and social domains, while also being strongly associated with socio-demographic vulnerabilities. Strengthening health education, socioeconomic upliftment, early diagnosis, and morbidity management strategies is essential to improve the well-being of affected individuals in endemic regions.

**Keywords:** Lymphatic filariasis, QoL, WHOQOL-BREF, Case-control study, Socio-demographic determinants, Uttar Pradesh.

## Introdution

Lymphatic filariasis (LF) is a leading morbidity-causing parasitic disease and the second most common vector-borne disease after malaria[1,2] It is widespread in the tropics and subtropics, with 790 million people at risk and 20 million people suffering from chronic morbidity.[3] This helminthic disease is caused by Wuchereria bancrofti, which accounts for 91% of the world's infection, and the remaining is caused by Brugia malayi and Brugia timori.[4] Several species of mosquitoes were responsible for this disease transmission in different countries, and Culex quinquefasciatus is the primary vector, which accounts for 99.4% of infection in India.[5,6] Lymphatic filariasis (LF) is one of the neglected tropical diseases of India. India accounts for 40% of the global burden of disease.[7,8] Uttar Pradesh is the largest state of India, in which 112 million (95 million in rural areas & 17 million in urban areas) people are living in LF endemic areas.[9] Quality of life is defined as an individual's perception of one's position in life in the context of value systems and culture, and in relation to one's goals, standards, expectations, and concerns.[10,11] WHO defines health as not only the absence of disease and infirmity but also the complete state of physical, mental, and social well-being.[12,13] The present study was conducted with the objective to assess the quality of life of lymphatic filariasis patients of Kanpur Nagar district.

## Material & Methods

### Study Type And Study Design

A case-control study was conducted to assess the socio-demographic profile and quality of life among study participants.

### Study Setting

The study was carried out at Kanpur Nagar by the Department of Community Medicine, Ganesh Shankar Vidyarthi Memorial

Medical College (GSVMMC), Kanpur, Uttar Pradesh.

### Study Population

For the selection of cases, a line listing of diagnosed cases of lymphatic filariasis was provided by the district malaria officer, and controls were frequency-matched for age and sex in a 1:1 ratio with cases, selected from the neighbourhood of Lymphatic filariasis patients.

### Study Duration

The duration of the study was from August 2024 to July 2025

### Sample Size Calculation

The sample size was calculated using the formula for an unmatched case-control study based on an assumed odds ratio (OR) of 1.57, 95% confidence level ($Z\alpha$ = 1.96), and 80% power ($Z\beta$ = 0.842), equal allocation ratio (1:1), and expected proportion of 0.5.[14]

The calculated sample size was 628 participants, comprising 314 cases of lymphatic filariasis and 314 controls.

### Inclusion Criteria for cases

1. Patients diagnosed with lymphatic filariasis residing in the Kanpur Nagar district.
2. Individuals who were willing to participate in the study and provided written informed consent.

### Inclusion criteria for control

1. Individuals without lymphatic filariasis residing in the same village or mohalla.
2. Controls were selected to achieve similar age and sex distribution as cases.

### Exclusion Criteria of cases & control

1. Individuals who refused to participate and did not give written consent
2. Individuals who were severely ill at the time of the data collection

### Strategy for Data Collection

Data were collected using semi-structured questionnaires, focusing on the socio-demographic profile, and the WHOQOL-BREF questionnaire was used to assess the QoL. The interviews were conducted by a door-to-door survey. Before the interview, the study participants were clearly informed of the purpose and objectives of the study, and informed consent was obtained.

### Ethical Issues and Informed Consent

Ethical approval was obtained from the Institutional Ethics Committee of GSVM Medical College, Kanpur, Uttar Pradesh (Ref. No. EC/383/Sept./2024). Informed consent was obtained from all participants prior to data collection, and confidentiality was maintained.

### Data Analysis

Data were entered into Microsoft Excel and analysed using the Statistical Package for Social Sciences (SPSS) version 30 software. Categorical descriptives were expressed as frequencies and percentages. Continuous descriptives were expressed as mean and standard deviation. Associations were assessed using the Chi-square test and the independent sample t-test was used for comparison of mean QoL scores. A p-value of less than 0.05 was considered statistically significant.

## Results

**Table 1: Distribution of Study Subjects according to biosocial profile (N=628)**

| | Case (314) | Control (314) | p value |
|---|---|---|---|
| **Age** | | | |
| Child (0 -12) | 06 (1.9) | 06 (1.9) | 1.000 |
| Adolescent (13 -19) | 08 (2.5) | 08 (2.5) | |
| Adult (20 -60) | 236 (75.2) | 236 (75.2) | |
| Elderly (>60) | 64 (20.4) | 64 (20.4) | |
| **Gender** | | | |
| Male | 191(60.8) | 191(60.8) | 1.000 |
| Female | 123(39.2) | 123(39.2) | |
| **Religion** | | | |
| Hindu | 295 (93.9) | 290 (92.4) | 0.430 |
| Muslim | 19 (6.1) | 24 (7.6) | |
| **Educational status** | | | |
| Graduate | 13(4.1) | 23(7.3) | **<0.001** |
| Intermediate | 35(11.1) | 56(17.8) | |
| High school | 42(13.4) | 67(21.3) | |
| Primary school | 84(26.8) | 78(24.8) | |
| Illiterate | 140(44.6) | 90(28.7) | |
| **Occupation** | | | |
| Businessmen | 12(3.8) | 28(8.9) | **0.007** |
| Clerks/shopkeepers | 22(7.0) | 26(8.6) | |
| Service (govt/pvt) | 75(23.9) | 96(30.6) | |
| Farmer | 91(29.0) | 78(24.8) | |
| Unemployed/housewife/student | 114(36.3) | 86(27.4) | |
| **Family type** | | | |
| Nuclear | 158 (50.3) | 121 (38.5) | **0.003** |
| Joint | 156 (49.7) | 193(61.5) | |
| **Socio-economic status** | | | |
| Upper class | 03 (1.0) | 01 (0.3) | **0.025** |
| Upper Middle Class | 50 (15.9) | 43 (13.7) | |
| Middle Class | 126 (40.1) | 166 (52.9) | |
| Lower Middle class | 52 (16.6) | 42 (13.4) | |
| Lower class | 83 (26.4) | 62 (19.7) | |

Table 1 presents the distribution of study subjects according to biosocial profile. The majority of study subjects in both groups belonged to the adult age group (20-60 years), accounting for 75.2%. Sociodemographic variables, i.e., age, gender, and religion, were not statistically significant between the groups. Most participants in both groups were married, accounting for 92.4% of cases and 87.9% of controls. Illiteracy was substantially higher among cases (44.6%) compared to controls (28.7%), while graduate participants were more common among controls (7.3%) than cases (4.1%). Regarding occupation, the majority of cases (36.3%) and controls (27.4%)

were unemployed/ housewives/ students. A significant difference was observed in educational status (p < 0.001) and occupation (p = 0.007). Nuclear family structure was more common among cases (50.3%) as compared to controls (38.5%) (p = 0.003). The lower class participants were the majority among cases (26.4%) compared to controls (19.7%), whereas the participants of the middle class were more common among controls (52.9%) than cases (40.1%). Socioeconomic status was significantly associated with lymphatic filariasis between the groups (p = 0.025).

**Table 2: Comparison of QoL study subjects**

| Domain | Case (314) | Control (314) | p value |
|---|---|---|---|
| | Mean (SD) | Mean (SD) | |
| Physical | 36.40 (15.18) | 64.65(8.51) | **<0.001** |
| Psychological | 53.86 (15.62) | 70.96 (7.45) | **<0.001** |
| Social Relationship | 58.44 (9.04) | 66.85 (8.47) | **<0.001** |
| Environment | 48.46 (5.85) | 48.07 (6.00) | 0.412 |

Table 2 presents a comparison of quality-of-life (QoL) scores across the four WHOQOL-BREF domains between cases and controls. Cases scored significantly lower in the physical domain (36.40±15.18) compared to controls (64.65±8.51), indicating notably impaired physical health-related QoL among those with lymphatic filariasis. Similarly, the psychological domain scores were significantly lower in cases (53.86 ±15.62) than in controls (70.96±7.45). Mean scores of the social relationship domain were relatively lower among cases (58.44 ±9.04) in comparison to controls (66.85 ± 8.47). There was a statistically significant difference between the groups in physical, social relationship, and psychological domains (p < 0.001).

No statistically significant difference was found in the environment domain scores between cases (48.46±5.85) and controls (48.07±6.00) (p = 0.412), suggesting that environmental QoL was similarly perceived by both groups.

Overall, these findings indicate that lymphatic filariasis is significantly associated with impaired QoL, particularly in the physical, social, and psychological domains.

**Table 3: Comparison of QoL among cases**

| Domain | Male (191) | Female (123) | p value |
|---|---|---|---|
| | Mean (SD) | Mean (SD) | |
| Physical | 38.22 (16.53) | 33.57 (12.33) | **0.008** |
| Psychological | 55.38 (15.77) | 51.49 (15.13) | **0.031** |
| Social relationship | 59.01 (8.72) | 57.57 (9.49) | 0.168 |
| Environment | 48.49 (5.77) | 48.42 (5.99) | 0.918 |

Table 3 presents a comparison of QoL among the 314 cases; males (n = 191) had significantly higher mean QoL scores than females (n = 123) in the physical and psychological domains. The mean physical domain score was 38.22±16.53 among males compared to 33.57±12.33 among females (p = 0.008). Similarly, the psychological domain score was significantly higher in males (55.38±15.77) than in females (51.49±15.13) (p = 0.031). Although males also had slightly higher mean scores in the social relationship domain (59.01±8.72 vs 57.57±9.49) and environment domain (48.49±5.77 vs. 48.42±5.99), these differences were not statistically significant (p = 0.168 and p = 0.918, respectively).

## Discussion

The present study consisted of 60.8% male and 39.2% female subjects in the case group. Similarly, in the study done by Kumar S et al (2025),[15] 63.6% were male, and 36.4% were female in India. Whereas in the study by Ali O et al (2020)[16] females were (52.6%), males were (47.4%), and in the study by Asiedu SO et al (2021),[10] females were (74.19%), and males were (25.81%). In the present study, the higher number of males may be attributed to greater outdoor exposure and occupational risk, increasing contact with mosquito vectors.

Among educational status, in cases, 44.6% were illiterate, followed by 26.8% were from primary school. While in the study done by Singh V et al (2024)[17], 31.3% were educated up to primary school, followed by 27% illiterate, and in the study by Eneanya OA et al (2019)[18] 34.61% were educated up to primary education. Their study reported relatively lower educational attainment, suggesting geographical and socioeconomic variations in educational access among LF-affected populations.

In this study, among socioeconomic status in cases, 40.1% of subjects belonged to the middle class, followed by the lower class, i.e., 26.4. While in the study done by Singh V et al, 48.5% reported a predominance of the lower class, followed by 19.3% lower middle class.[17]

In our study, the mean physical domain score was significantly lower among cases, 36.40 ± 15.18. Similar observations have been reported in the study Seekles ML et al (2023)[19], the mean physical domain score among cases was 33.3 ± 16.7. This indicates poorer physical QoL among filariasis patients, likely due to chronic manifestations such as lymphoedema, pain, reduced mobility, and difficulty in performing daily activities.

In the psychological domain, the present study found that cases had a significantly lower mean score of 53.86 ±15.62. Similar observations in the psychological QoL have been reported among cases in the study Seekles ML et al (2023),[19] with a mean score of (49.4 ± 18.6). This suggests that filariasis adversely affects psychological well-being. Chronic illness, visible deformities, fear of disease progression, and social stigma may contribute to anxiety, depression, and emotional stress among cases.

In the social relationship domain, cases showed a lower mean score (58.44 ±9.04). This finding may possibly reflect stronger family support and care extended to affected individuals in the Indian sociocultural setting, which could partially offset the negative social consequences of the disease. Similar findings have been reported in the study by Seekles ML et al (2023),[19] with a mean score of 55.7 ± 19.6.

In the environmental domain, case mean scores were (48.46±5.85), while in the study Seekles ML et al (2023),[19] a mean score of (37.9 ± 14.0). The difference between the mean scores of studies may be due to socioeconomic disparities between the two countries.

## Conclusion

The present case-control study highlights that lymphatic filariasis remains a significant public health problem in Kanpur Nagar, with clear associations with socio-demographic determinants. Lower educational status, lower socioeconomic class, and nuclear family structure were significantly associated with lymphatic filariasis, indicating the role of social and environmental vulnerability in disease transmission. The study further demonstrates that lymphatic filariasis has a profound adverse impact on QoL. A statistically significant reduction was observed in the physical, psychological, and social domains among cases compared to controls, while the environmental domain showed no significant difference, likely due to similar living conditions in both groups. Overall, the findings emphasize that lymphatic filariasis is not only a disease of physical morbidity but also substantially impairs psychological well-being.

### Recommendation

Strengthening health education, improving socioeconomic conditions, and ensuring early diagnosis and morbidity management are essential for improving the quality of life for affected individuals. Lymphatic filariasis control should extend beyond treatment to include routine screening, early detection, and effective morbidity management at the community level. Training frontline health workers to identify early symptoms, provide basic care, and promote timely health-seeking behavior is essential. Improving environmental sanitation and vector control measures can further contribute to long-term disease prevention and a better QoL among affected individuals.

### Limitation of the Study

The data collected relied on participants' self-reporting, which may lead to underreporting or inaccuracies, particularly in relation to sensitive conditions. The study's focus on a specific region may also limit the applicability of its findings to different geographic or cultural settings.

### Relevance of the Study

This study provides important evidence on the socio-demographic determinants of lymphatic filariasis in an endemic urban setting of North India. It highlights the significant role of educational status, socioeconomic class, and family structure as key factors associated with disease occurrence, thereby reinforcing the importance of social determinants in filariasis transmission. The study also adds to existing knowledge by demonstrating the substantial impact of lymphatic filariasis on QoL, particularly in the physical, psychological, and social domains using the WHOQOL-BREF tool.

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### Declaration Of Generative Ai And Ai-assisted Technologies In The Writing Process

The authors declare that no generative artificial intelligence or AI-assisted technologies were used in the writing or preparation of this manuscript. The manuscript was written, reviewed, and revised entirely by the authors, who take full responsibility for the accuracy, originality, and integrity of the content of the publication.

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