



Socio-Economic Status, Occupational Health, and Livelihood Challenges among Beedi Workers in Selected Villages of Keelapavoor Block, Tenkasi District, Tamil Nadu, India

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Abstract:

The beedi sector is one of India's largest unorganized, labor-intensive industries and primarily employs women from lower socioeconomic backgrounds. Long-term exposure to tobacco dust and unfavorable working circumstances negatively impact the health and socioeconomic well-being of beedi workers, even though they provide chances for employment. 400 beedi workers from the villages in Keelapavoor Block, Tenkasi District, Tamil Nadu, participated in the current cross-sectional study to evaluate their socioeconomic situation, occupational health issues, dietary habits, and patterns of livelihood. Direct interviews were used to gather primary data using a pre-tested semi-structured questionnaire. Descriptive statistical techniques were used to analyze the gathered data. The results showed that middle-aged married women with low levels of education and poor household income made up the majority of respondents. The majority of workers relied on beedi rolling as their main source of income, and they reported a number of occupational health issues, such as exhaustion, respiratory conditions, musculoskeletal pain, and skin-related issues. Nearly half of the respondents were landless, showing ongoing economic insecurity even though a sizable portion owned homes. Many respondents also lacked appropriate knowledge about nutrition and healthy eating habits. In order to improve the quality of life for beedi workers, the study emphasizes the critical necessity for the efficient implementation of labor welfare programs, occupational health efforts, nutritional awareness campaigns, and alternative livelihood alternatives.

Key words: Beedi workers; Socio-economic status; Health; Rural livelihood; Labor welfare

INTRODUCTION

One of India's oldest and biggest cottage-based tobacco industries, the beedi sector employs millions of people, mostly women from rural and underprivileged areas. A tendu (*Diospyros melanoxylon*) leaf is wrapped with sun-dried tobacco flakes and tied with cotton thread to create a beedi, a hand-rolled cigaret. The industry continues to offer jobs to a sizable rural population due to its low production costs and vast demand (Boaz and Boaz, 2009).

Beedi manufacturing, in contrast to structured industrial sectors, is primarily done at home, enabling women to combine household duties with earning a living (Russell et al., 2022). However, this type of work exposes employees to ongoing tobacco dust exposure, skin absorption of nicotine, repetitive physical labor, inadequate ventilation, and extended sitting. Numerous negative health effects, such as respiratory conditions, musculoskeletal illnesses, eye irritation, skin allergies, chronic weariness, and a lower quality of life, are caused by these work hazards (Tyagi et al. 2023).

The issues that beedi workers experience are made worse by socioeconomic weakness. Their standard of living is still impacted by low pay, little education, poor access to healthcare, poor nutrition, sporadic work, and ignorance of government support programs. Despite the occupational risks involved, beedi rolling is the primary or secondary source of income for many rural households (Sabale et al., 2012).

Tenkasi District is a significant area for tobacco processing, and Tamil Nadu is one of the main hubs for beedi manufacturing in southern India (Darling Selvi and Sornadevi, 2015). Due to dwindling agricultural opportunities and a lack of other employment, many women in Keelapavoor Block, which is close to the Western Ghats' foothills, work from home as beedi rollers. Comprehensive data from the Keelapavoor Block is still scarce, despite the fact that numerous research have looked at the health and socioeconomic circumstances of beedi workers in various regions of India.

Prior research has mostly concentrated on the socioeconomic circumstances or occupational health of beedi workers. In the chosen villages of Keelapavoor Block, very few studies have concurrently assessed the socioeconomic position, dietary habits, occupational health, housing conditions, land ownership, and reliance on livelihood of beedi workers. As a result, baseline data particular to a given location is still missing.

The current study offers a thorough evaluation of the socioeconomic traits, occupational health issues, dietary habits, housing conditions, ownership of agricultural land, and reliance on livelihood among beedi workers in the study area. The results provide policymakers and welfare organizations with useful baseline data to create focused intervention programs to enhance the living and working situations of this vulnerable group.

METHODOLOGY

Study Area

The present study was conducted in the villages of Keelapavoor Block, Tenkasi District, Tamil Nadu, India. Keelapavoor Block is situated near the foothills of the Western Ghats and is one of the major beedi-producing regions in the district. Due to limited agricultural opportunities and seasonal employment, a large proportion of the rural population, particularly women, depend on beedi rolling as a primary or supplementary source of livelihood.

Study Design

A community-based cross-sectional descriptive study was carried out to evaluate the socio-economic status, occupational health hazards, nutritional practices, and livelihood dependence of beedi workers.

Study Period

The study was conducted between June 2021 and August 2023.

Study Population

The study population consisted of active beedi workers residing in the villages of Keelapavoor Block.

Sample Size

A total of 400 beedi workers were included in the study using a purposive sampling method. The sample size was determined based on the availability of beedi workers and their willingness to participate during the survey period.

Sampling Technique

Purposive sampling was adopted to select respondents who were actively engaged in beedi rolling and had sufficient occupational experience to provide reliable information. The following participants were included in the study: Registered or active beedi workers, Individuals aged 18 years and above, Workers engaged in beedi rolling for at least one year and Individuals who voluntarily agreed to participate. Individuals unwilling to provide informed consent and Respondents with incomplete questionnaire data were excluded (Supase et al., 2020).

Data Collection

Primary data were collected through direct household visits using a pre-tested semi-structured questionnaire. The questionnaire was prepared after reviewing relevant literature and consulting public health experts and medical professionals. Information collected included; Demographic characteristics, Educational status, Marital status, Family type and family size, Occupational history, Monthly income, Housing conditions, Agricultural land ownership, Nutritional practices, Food intake pattern, Occupational health problems, and Major diseases among respondents and their family members (Blair et al., 2013).

Statistical Analysis

Data were analysed statistically by using IBM SPSS Statistics (Version V20). Descriptive statistics such as frequency and percentage were used to summarise categorical variables. Chi-square tests were additionally used for the categorical distributions presented in the tables. For Tables 1–7 and 10, the chi-square goodness-of-fit test was calculated against equal expected frequencies; for Tables 8 and 9, the chi-square test of association was used. Statistical significance was considered at $p < 0.05$.

RESULTS

Among the 400 respondents, the highest proportion of beedi workers belonged to the age group of 41–50 years (133; 33.25%), followed by 31–40 years (120; 30.00%) and 51–60 years (69; 17.25%) (Figure 1 and Table 1). The age groups of 21–30, 61–70 and 71–80 years accounted for 10.00%, 7.75% and 1.75%, respectively. The chi-square goodness-of-fit test showed a statistically significant variation in the distribution across age groups ($\chi^2 = 191.90$, $df = 5$, $p < 0.001$). This indicates that the respondents were not equally distributed among the different age categories, with middle-aged workers constituting the major proportion.

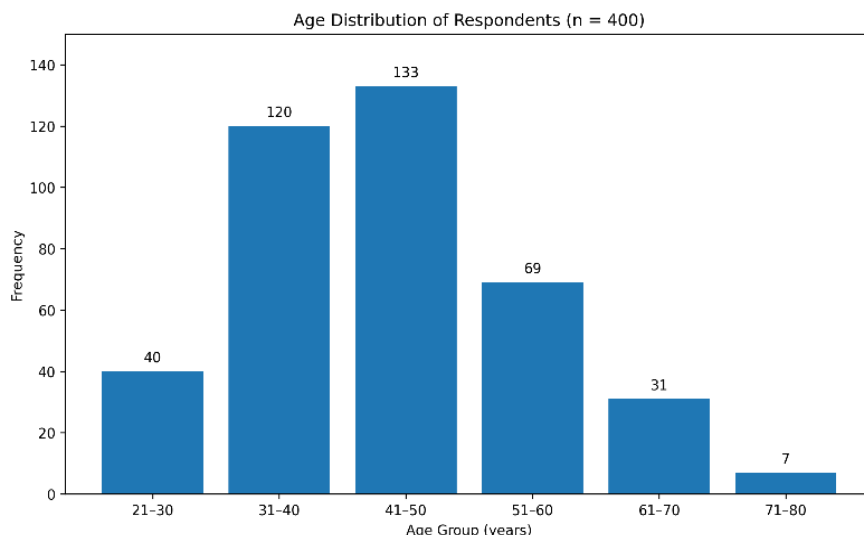


Figure 1: Age distribution of beedi workers.

The females constituted the majority of the study population, accounting for 396 (99.00%), whereas males represented only 4 (1.00%). The chi-square goodness-of-fit test indicated a statistically significant difference in the distribution between male and female respondents ($df = 1$, $p < 0.001$). The findings demonstrate that beedi work in the selected study population was predominantly undertaken by women.

Regarding marital status, the majority of respondents were married (325; 81.25%), followed by widows (51; 12.75%) and divorced or separated respondents (19; 4.75%). Only 5 respondents (1.25%) were unmarried (Table 1). The chi-square goodness-of-fit test showed a statistically significant variation in the distribution of marital status categories ($df = 3$, $p < 0.001$). Married women represented the largest proportion of the surveyed beedi workers.

The educational profile showed that 178 respondents (44.50%) had completed primary education, followed by 99 respondents (24.75%) with middle-level education. Forty-eight respondents (12.00%) were illiterate, while 35 (8.75%) had high-school education and 40 (10.00%) had higher secondary education or above (Table 1). The chi-square goodness-of-fit test revealed a statistically significant variation across educational categories ($df = 4$, $p < 0.001$). Primary education was the most commonly reported educational level among the respondents.

Among the 400 respondents, 301 (75.25%) belonged to nuclear families, while 99 (24.75%) belonged to joint families (Figure 2). The chi-square goodness-of-fit test showed a statistically significant difference in the distribution of family types ($df = 1$, $p < 0.001$). Nuclear families were more prevalent than joint families among the surveyed households.

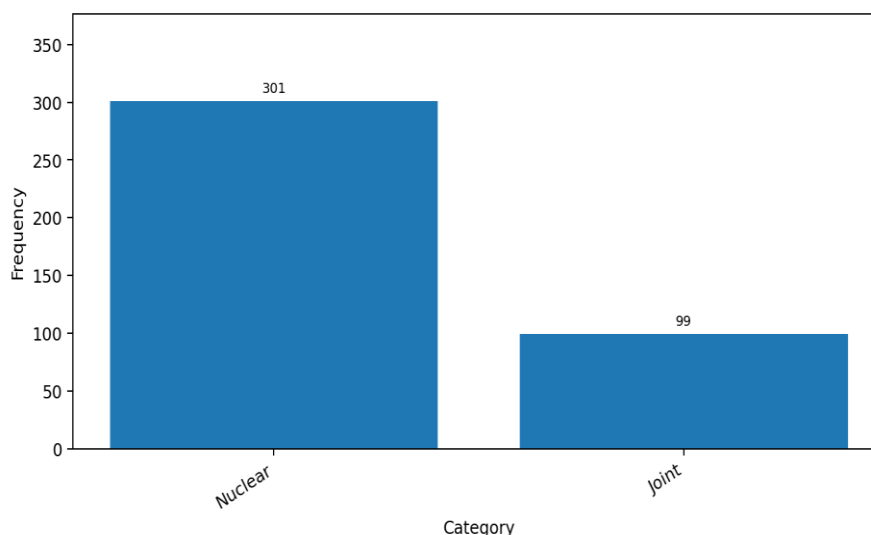


Figure 2: Beedi workers family type

With respect to family size, the majority of respondents belonged to families consisting of 4–5 members (234; 58.50%). Families with up to 3 members accounted for 117 respondents (29.25%), while 41 respondents (10.25%) reported a family size of 6–7 members. Only 8 respondents (2.00%) belonged to families with 8 or more members (Figure 3 and Table 1). The chi-square goodness-of-fit test indicated a statistically significant variation across family-size categories ($df = 3$, $p < 0.001$). Families consisting of 4–5 members were the most frequently reported category.

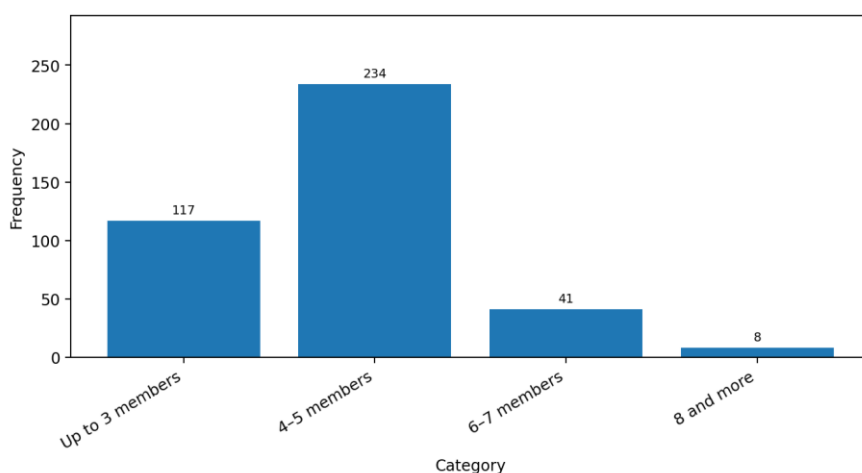


Figure 3: Beedi workers family size

Table 1: Socio Demographic Profile of the beedi workers

S. No	Particulars	Frequency	Percentage
1.	Age		
	21-30	40	10
	31-40	120	30
	41-50	133	33.25
	51-60	69	17.25
	61-70	31	7.75
	71-80	7	1.75
	Total	400	100
2.	Sex		
	Female	396	99
	Male	4	1
	Total	400	100
	%	100	
3.	Marital status		
	Married	325	81.25
	Unmarried	5	1.25
	Widows	51	12.75
	Divorce/Separated	19	4.75
	Total	400	100
4.	Educational status		
	Illiteracy	48	12
	Primary	178	44.5
	Middle	99	24.75
	High	35	8.75
	Hr.Sec.& above	40	10
	Total	400	100
5.	Family type		
	Nuclear type	301	75.25
	Joint type	99	24.75
	Total	400	100
6.	Family size		
	Upto 3 members	117	29.25
	4-5 members	234	58.5
	6-7 members	41	10.25
	8 and more members	8	2
	Total	400	100

The findings showed that 237 respondents (59.25%) reported having two earning members in their families, followed by

115 respondents (28.25%) who reported more than two earning members. Forty-eight respondents (12.00%) reported having only one earning member (Figure 4 and Table 2)). The chi-square goodness-of-fit test revealed a statistically significant variation across the categories ($df = 2$, $p < 0.001$). Families with two earning members constituted the largest group.

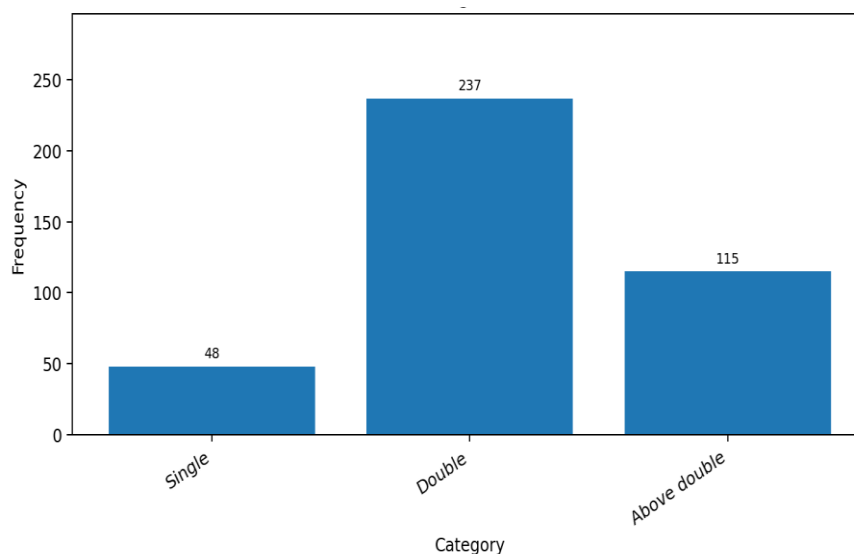


Figure 4: Earning members of beedi worker family

Regarding monthly family income, 122 respondents (30.50%) reported an income of ₹5,001–10,000, followed by 105 respondents (26.25%) with an income of ₹10,001–15,000. Ninety-six respondents (24.00%) reported a monthly family income of ₹0–5,000, while 77 respondents (19.25%) reported an income above ₹15,000 (Figure 5 and Table 2)). The chi-square goodness-of-fit test showed a statistically significant variation across income categories ($df = 3$, $p < 0.001$). The ₹5,001–10,000 income category represented the largest proportion of respondents.

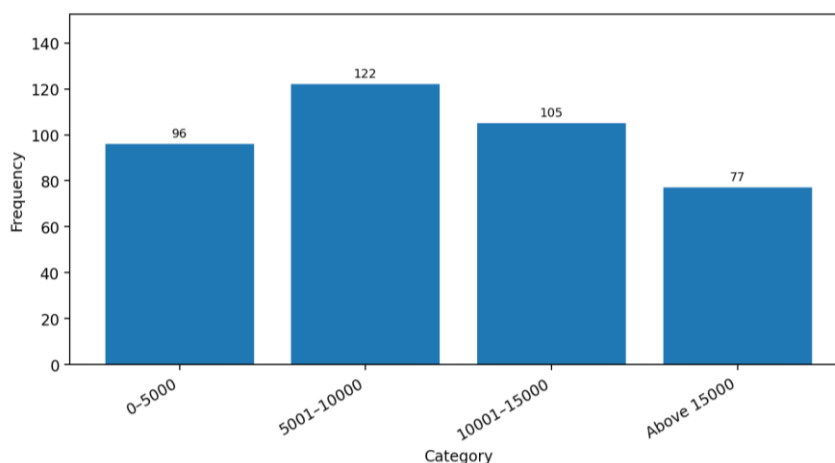


Figure 5: Monthly family income of beedi workers family

With respect to income generated through beedi work, 196 respondents (49.00%) reported earning more than ₹2,000, followed by 114 respondents (28.50%) who earned ₹1,501–2,000. Fifty-seven respondents (14.25%) reported an income of ₹1,001–1,500, whereas 33 respondents (8.25%) earned ₹500–1,000 (Table 2). The chi-square goodness-of-fit test indicated a statistically significant variation in the distribution of income categories ($df = 3$, $p < 0.001$). Nearly half of the respondents reported earning more than ₹2,000 from beedi work.

The housing profile indicated that 338 respondents (84.50%) lived in their own houses, while 44 respondents (11.00%) lived in rented houses. Nine respondents (2.25%) reported having both their own and rented houses, whereas 7 (1.75%) lived in leased houses and 2 (0.50%) reported both leased and owned houses (Figure 6 and Table 2). The chi-square goodness-of-fit test showed a statistically significant variation among the housing categories ($df = 4$, $p < 0.001$). Ownership of a house was the most commonly reported housing condition.

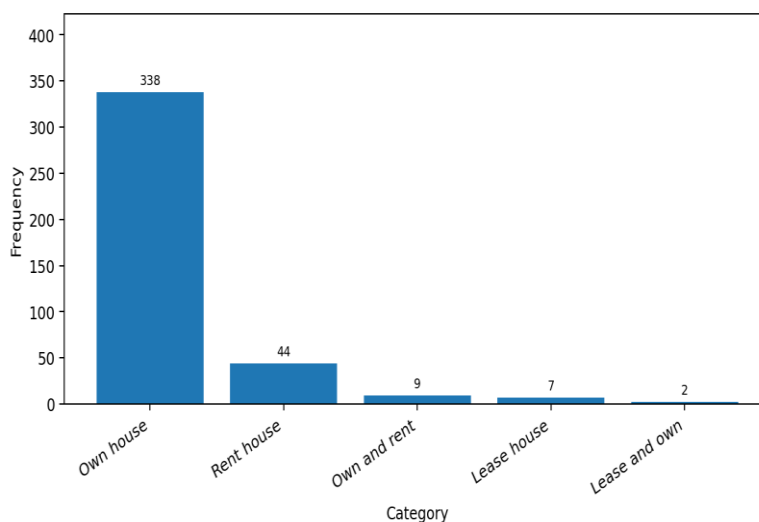


Figure 6: House status of beedi workers

Regarding agricultural land ownership, 244 respondents (61.00%) reported having no agricultural land, while 138 respondents (34.50%) owned agricultural land. Seventeen respondents (4.25%) reported having sold their land, and one respondent (0.25%) reported cultivating leased land (Table 2). The chi-square goodness-of-fit test revealed a statistically significant variation across the land-ownership categories ($df = 3$, $p < 0.001$). The majority of respondents did not possess agricultural land.

Table 2: Socio –economic Profile of the beedi workers

S. No.	Particulars	Frequency	Percentage
1	Earning members		
	Single	48	12.00
	Double	237	59.25
	Above double	115	28.25
	Total	400	100.00
2	Monthly family income (Rs)		
	0-5000	96	24.00
	5001-10000	122	30.50
	10001-15000	105	26.25
	Above 15000	77	19.25
	Total	400	100.00
3	Income from beedi work (Rs)		
	500-1000	33	8.25
	1001-1500	57	14.25
	1501-2000	114	28.50
	Above 2000	196	49.00
	Total	400	100.00
4	House condition		
	Own house	338	84.50
	Rent house	44	11.00
	Own and rent house	9	2.25
	Lease house	7	1.75
	Lease and own house	2	0.50
	Total	400	100.00
5	Agriculture landholder		
	Own land	138	34.50
	Lease land	1	0.25
	No land	244	61.00
	Sold land	17	4.25
	Total	400	100.00

Among the respondents, 333 (83.25%) were full-time beedi workers, whereas 67 (16.75%) were part-time workers (Table

3). The chi-square goodness-of-fit test indicated a statistically significant difference between the two categories ($df = 1$, $p < 0.001$). Full-time workers constituted the predominant group in the study population.

The majority of respondents, 358 (89.50%), reported that they engaged in beedi work as a means of livelihood. Thirty-four respondents (8.50%) reported that they worked to support their families, while 8 respondents (2.00%) indicated other purposes (Table 3). The chi-square goodness-of-fit test showed a statistically significant variation among the reported purposes ($df = 2$, $p < 0.001$). Livelihood generation was the primary reason for undertaking beedi work among the respondents.

Table 3: Labour characteristics of beedi workers

S. No.	Particulars	Frequency	Percentage
1	Types of Worker's		
	Full time	333	83.25
	Part time	67	16.75
	Total	400	100.00
2.	Purpose of beedi work		
	Livelihood	358	89.5
	For supporting family	34	8.5
	Others	8	2.0
	Total	400	100

Regarding the timing of food consumption, 199 respondents (49.75%) reported that they consumed food at the proper time, whereas 201 respondents (50.25%) reported that they did not (Table 4). The chi-square goodness-of-fit test did not show a statistically significant difference between the two responses ($df = 1$, $p \approx 0.920$). The findings indicate that the proportion of respondents consuming food at the proper time was almost equally distributed between the two categories. With respect to the number of meals consumed per day, 286 respondents (71.50%) reported consuming three meals daily. This was followed by 107 respondents (26.75%) who consumed two meals per day. Four respondents (1.00%) reported consuming four meals, while 3 respondents (0.75%) reported consuming only one meal per day (Table 4). The chi-square goodness-of-fit test indicated a statistically significant variation across the categories ($df = 3$, $p < 0.001$). Three meals per day was the most commonly reported dietary pattern.

Table 4: Monitoring (Screening) of Nutritional requirements

S. No.	Particulars	Frequency	Percentage
1	Types of Worker's		
	Full time	333	83.25
	Part time	67	16.75
	Total	400	100.00
2.	Purpose of beedi work		
	Livelihood	358	89.5
	For supporting family	34	8.5
	Others	8	2.0
	Total	400	100

The reported family disease indicators showed that diabetes or sugar-related problems were reported by 69 respondents (17.25%), followed by asthma in 55 respondents (13.75%) and nervous problems in 41 respondents (10.25%). Sinus-related problems were reported by 35 respondents (8.75%), while tuberculosis was reported by 22 respondents (5.50%). Cancer was reported by 13 respondents (3.25%), and smaller proportions reported thyroid problems, kidney problems, heart problems, appendicitis, stroke or paralysis, fits, AIDS, nose flesh and osteoarthritis. These disease indicators may overlap because a respondent could report more than one condition within the family (Figure 7 and Table 5). Therefore, the results should be interpreted as reported disease indicators rather than mutually exclusive disease prevalence categories.

Table 5: Dangerous diseases in beedi workers family

S. No.	Dangerous diseases	Number of affected family	Percentage	Number of normal family	Percentage
1	TB	22	5.50	378	94.50
2	Asthma	55	13.75	345	86.25
3	Cancer	13	3.25	387	96.75
4	Sinus	35	8.75	365	91.25
5	Heart problem	7	1.75	390	98.25
6	Kidney problem	5	1.25	395	98.75
7	Stroke /paralysis	2	0.50	398	99.50
8	Fits	1	0.25	398	99.75

9	Nervous problem	41	10.25	360	89.75
10	Thyroid	3	0.75	397	99.25
11	Nose flesh	1	0.25	399	99.75
12	Osteoarthritis	2	0.50	398	99.50
13	Nervous relaxation	1	0.25	399	99.75
14	Sugar	69	17.25	331	82.75
15	Appendice	3	0.75	337	99.25
16	AIDS	1	0.25	399	99.75

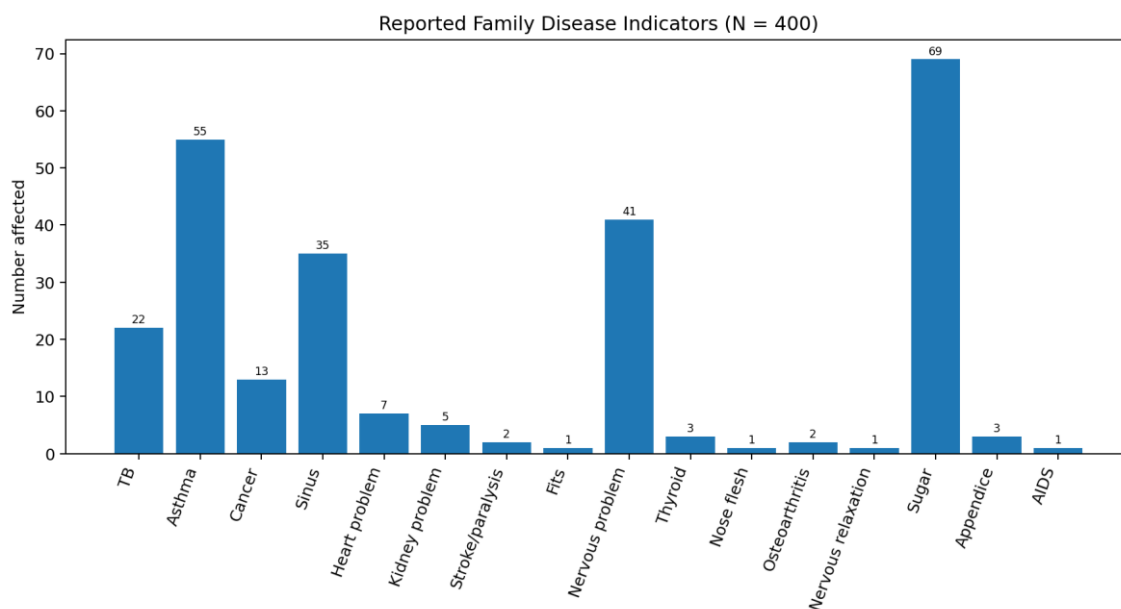


Figure 7: Disease distribution in beedi workers

DISCUSSION

The current investigation offers a thorough evaluation of the socio-economic status, major health hazards, nutritional practices and livelihood dependence of beedi workers in the villages of Keelapavoor Block, Tenkasi District, Tamil Nadu. The results indicate that beedi rolling continues to be a significant source of income for economically marginalized rural women, despite the occupational hazards that are associated with the activity.

The study revealed that the majority of respondents were middle-aged women (41–50 years), suggesting that economically productive women are the primary workforce in the beedi industry. Beedi manufacturing is primarily dominated by women aged 30 to 50 years, as they combine household responsibilities with income-generating activities (Sabale et al., 2012; Pande, 2019). Previous research has reported similar observations. The home-based nature of beedi production is reflected in the predominance of female workers, which enables women to work without physically departing their homes.

The educational attainment of respondents was generally modest, with over half having only completed primary education. Many women are compelled to continue beedi rolling despite the adverse health effects of the practice, as low educational status restricts employment opportunities outside the informal sector. Awareness of government welfare programs and occupational safety measures is also diminished by low literacy (Kumar et al., 2021).

This study revealed that 88% of respondents were entirely dependent on beedi rolling for their livelihood, underscoring the economic dependence of rural households on this occupation. Despite the fact that the majority of families had two earning members, the household income was insufficient to cover the rising costs of living. Previous research has reported comparable results, identifying low wages and irregular employment as the primary causes of persistent poverty among beedi laborers (Khanam and Anjum, 2021).

The housing conditions indicated that the majority of respondents owned their homes; however, nearly half of them did not possess agricultural land. This is indicative of the growing reliance on wage-based occupations and the scarcity of alternative income sources. Women may have been further motivated to pursue beedi rolling as a primary or secondary occupation in rural areas due to the diminishing agricultural opportunities.

A significant number of respondents consumed diets that were nutritionally deficient, as indicated by the nutritional assessment. Inadequate dietary practices may be exacerbated by poor household income, a lack of nutritional awareness, and irregular working schedules. The risk of malnutrition and related health complications is often elevated as a result of the limited time available for the preparation of balanced meals, which is frequently the result of long working hours (Kruger et al., 2008).

The respondents exhibited a high prevalence of occupational health issues. Musculoskeletal discomfort, fatigue, reduced appetite, and difficulty walking were frequently reported. These symptoms may be linked to poor workplace ergonomics, repetitive finger movements, prolonged sitting posture, and continuous tobacco handling. Home-based tobacco laborers in

numerous regions of India have been documented to experience comparable occupational disorders (Boaz and Boaz, 2009). The study identified respiratory disorders as one of the primary health concerns. The most frequently reported disease was asthma, followed by skin disorders, sinusitis, tuberculosis, diabetes, kidney disorders, osteoarthritis, and cancer. Respiratory irritation, allergic reactions, and chronic pulmonary diseases may result from prolonged exposure to tobacco dust. The long-term health risks of laborers may be elevated as a result of the absorption of tobacco particles through the skin (Daneshmandi et al., 2017).

The results also indicate that family members, particularly infants and elderly individuals residing in the same household, may be indirectly exposed to tobacco dust due to the fact that beedi rolling is primarily conducted within homes. This indirect exposure may elevate the livelihood of respiratory illnesses and other health-related complications in non-beedi workers.

Overall, the current investigation illustrates that the obstacles encountered by beedi workers are not limited to occupational health; they also encompass poverty, inadequate nutrition, low educational attainment, restricted employment opportunities, and inadequate awareness of welfare programs. Collectively, these interrelated factors impede socio-economic development and diminish their quality of life.

Consequently, it is imperative to enhance the living conditions of beedi workers in rural villages by strengthening occupational health services, promoting women's education, enhancing nutritional awareness, and creating sustainable alternative livelihood opportunities.

CONCLUSION

The current investigation underscores the occupational and socio-economic obstacles encountered by beedi workers in villages of Keelapavoor Block, Tenkasi District, Tamil Nadu. The survey results indicated that the majority of respondents were middle-aged women who were heavily reliant on beedi rolling as their primary source of income, had limited domestic income, and had low educational attainment. The persistent economic vulnerability of a significant number of respondents was reflected in their lack of agricultural land and alternative employment opportunities, despite the fact that many of them possessed their homes.

Furthermore, the investigation revealed that fatigue, respiratory disorders, musculoskeletal issues, skin diseases, and other chronic health conditions were linked to protracted occupational exposure to tobacco dust and repetitive manual labor. Numerous respondents also demonstrated nutritional deficiencies and inadequate awareness of balanced diets, which may elevate their susceptibility to occupational illnesses.

The study confirms that the challenges faced by beedi workers are multifaceted, encompassing economic insecurity, inadequate nutrition, limited educational opportunities, insufficient implementation of welfare schemes, and occupational health risks. To enhance the quality of life of beedi workers, an integrated approach is necessary, which involves government agencies, public health professionals, labor welfare organizations, and local communities.

The results of this study offer a valuable foundation of information for researchers, policymakers, and labor welfare authorities to develop evidence-based interventions that are intended to enhance the safety of beedi workers in rural areas of Tamil Nadu, as well as their access to health care, livelihood security, and socioeconomic development.

POLICY RECOMMENDATIONS

Based on the findings of the present study, the following recommendations are proposed:

- 1.Regular occupational health screening programmes should be organized for beedi workers to facilitate early diagnosis and treatment of respiratory, musculoskeletal, and skin-related diseases.
- 2.Government welfare schemes for beedi workers should be implemented more effectively with improved awareness and simplified access.
- 3.Skill development programmes should be introduced to promote alternative income- generating activities such as tailoring, food processing, handicrafts, poultry farming, vermicomposting, mushroom cultivation, and small-scale entrepreneurship.
- 4.Nutritional awareness campaigns should be conducted to educate workers about balanced diets and preventive health practices.
- 5.Educational support and scholarship programmes should be strengthened to prevent child labour and school dropouts among children of beedi workers.
- 6.Further multidisciplinary research involving environmental monitoring, occupational exposure assessment, and clinical investigations is recommended to understand the long- term health impacts of beedi rolling.

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REFERENCES

1. Blair, J., Czaja, R. F., & Blair, E. A. (2013). *Designing surveys: A guide to decisions and procedures*. Sage publications.
2. Boaz, A., & Boaz, O. (2009). Community-based sustainable management of tendu leaves (*Diospyros melanoxylon* Roxb.): a case study of Harda district of Madhya Pradesh, India. *Sustainable Production of Wood and Non-wood Forest Products: Proceedings of the IUFRO Division 5 Research Groups 5.11 and 5.12*, Rotorua, New Zealand, March 11-12, 2003, 604, 51.
3. Daneshmandi, H., Choobineh, A., Ghaem, H., & Karimi, M. (2017). Adverse Effects of Prolonged Sitting Behavior on the General Health of Office Workers. *Journal of lifestyle medicine*, 7(2), 69-75. <https://doi.org/10.15280/jlm.2017.7.2.69>
4. Darling Selvi, V., & Sornadevi, C. (2015). Empowerment of women through Beedi employment in Tirunelveli District. *facilities*, 294, 12.
5. Khanam, Z., & Anjum, R. (2021). Female Beedi Workers and their Socio-Economic and Health Conditions; A Case Study of Sandila (Hardoi, UP).
6. Kruger, H., Hendricks, M., & Puoane, T. (2008). Nutritional management of multiple nutrient deficiencies. N. Steyn, N. Temple, *Community textbook for nutrition in South Africa: A rights-based approach*, 663-694.
7. Kumar, P., Kamath, A., Nayak, R., Kulkarni, M. M., Kamath, V. G., Mullapudi, S., & Bhagawath, R. (2021). Beedi Rollers' Perception toward Alternative Means of Livelihood amid Economic Benefits. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*, 46(2), 268-272. https://doi.org/10.4103/ijem.IJCM_629_20
8. Pande, R. (2019). Globalisation and Women's work in the Beedi Industry. *Studia Historiae Oeconomicae*, 37(1), 191-221.
9. Russell, A., Chandra, P., Robson, M., Narayanan, P., Joseph, S., Mukherjee, P., Aghi, M., Otafiez, M., Dutta, M., Bhojani, U., Pathak, P., & John, S. (2022). Implementing FCTC Article 17 Through Participatory Research With Bidi Workers in Tamil Nadu, India. *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco*, 24(11), 1714-1719. <https://doi.org/10.1093/ntr/ntac075>
10. Sabale, R. V., Kowli, S. S., & Chowdhary, P. H. (2012). Working condition and health hazards in beedi rollers residing in the urban slums of Mumbai. *Indian journal of occupational and environmental medicine*, 16(2), 72—74. <https://doi.org/10.4103/0019-5278.107075>
11. Supase, A. S., Oswal, K., Mukherjee, K., Singh, A., & Chaturvedi, P. (2020). Alternative livelihood for bidi workers: a study based on primary research on home-based bidi rollers of Solapur city of Maharashtra. *Int J Community Med Public Health*, 7(11), 4402-4409.
12. Tyagi J, Beri D, Ingale S, Sinha P, Bhaumik S. Occupational health hazards of bidi workers and their families in India: a scoping review. *BMJ Global Health*. 2023 Nov;8(11):e012413.