Occupational Morbidity of Women Beedi Workers in Telangana

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Abstract

Background: Beedi rolling is a popular small-scale industry in Telangana which provides employment to about a million people. Beedi rolling is generally done by women sitting at home. Despite the work being labor-intensive, women continue to do it as there is no other source of livelihood. Thus, this study was carried out to understand the morbidity status, working conditions, and hygiene of women beedi workers in the rural areas of Telangana. Materials and Methods: Descriptive, cross-sectional, community-based study was carried out from 2015 to 2016. Sample size calculated was 560 including a non-response rate of 10%. Multistage stratified sampling method was used to select the workers. A pretested semi-structured questionnaire was used to collect data regarding sociodemographic profile, hygiene measures, and health problems after written informed consent. Data entry and statistical analysis were done using Epi Info version 7.2. Results: The study population comprised of 528 women beedi workers. Mean age of study subjects was 40.8 (10.9) years. Most of them were (67%) illiterates. Awareness regarding occupational health hazards and hygienic practices was poor. A significant proportion of workers was found to have chronic diseases including musculoskeletal problems (50%), gynecological problems (31%), respiratory morbidity (27%), hypertension (25%), malnutrition (20%), and diabetes mellitus (2.65%). Conclusions: Beedi workers should be given complete information about the occupational health hazards and replacement training should be given regarding occupational safety and personal hygiene measures.

Keywords: Beedi workers, bidi, morbidity, tobacco

Introduction

Beedi rolling is a popular small scale industry in Telangana which provides employment to about a million people. Almost half of them (n = 4,46,524) were employed in Nizamabad district alone. Despite the work being labor-intensive and less waged, women continue to do it as there is no other source of livelihood. This task is generally done by women and girls at home. Women also roll beedis in factories (designated place for beedi rolling by beedi companies).

The process of making beedi includes collecting tendu leaves and tobacco, rolling into beedis, sorting, baking, labelling, wrapping, and packing of beedis, of which a majority of the women are employed in rolling the beedis. Research has been done in most of the dusty occupations in India but very few on women working in beedi industry. Available literature suggests that they suffer from a wide variety of illnesses such as musculoskeletal disorders, joint pains, respiratory illnesses, skin diseases, headache, nausea, gastric intolerance, hypertension, diabetes, etc., which are either due to chronic occupational exposure to tobacco or due to improper working posture. Thus, this study was carried out to understand the working conditions and hygiene of women beedi workers which might affect their health status.

Methodology

Present study was carried out in rural areas of Nizamabad district, Telangana. Nizamabad district is located in the north-western region in the newly formed state of Telangana. As per 2011 Census of India, the district had a population of 1,534,428 and was named one of the country’s 250 most...
backward districts (out of a total of 640). Study design was cross sectional in nature. Sample size required was calculated as 256 using \( n = \frac{z^2 \times PQ}{\delta^2} \), where prevalence of any morbidity was 20% as per pilot study done with 50 women (95% CI and 5% absolute error). Since the sampling method used was multistage random sampling, a design effect of 2 was used to estimate the final sample size. Adding a non-response rate of 10%, sample size was finalized to 560. Institutional ethical clearance was obtained before starting the study. Informed written consent from participants was obtained before data collection. Data entry was done using Microsoft Excel 2013 version and data was analyzed using Epi-Info version 7.2. Data was summarized in percentages and proportions. Statistical significance was calculated using Chi-square and \( t \)-test.

**Objectives**

- To assess morbidity profile of women beedi workers
- To find out working conditions and personal hygiene measures undertaken by the study population.

**Results**

**Demography**

Most of the women (60%) were in 35–54 years’ age group, illiterate (67%), and belonged to upper lower class (66%). Mean age was 40.8 (10.9) years. Twenty percent of the beedi workers contributed to more than half of the total income of the family. Average household size was 4.2 (1.7). Average total income of the family and per-capita income were Rs. 4953 and Rs. 1240, respectively. Eighteen percent of the study population was habituated to chewing of “paan” which consists of betel leaf, pyrolyzed tobacco, calcium hydroxide, areca nut, etc., [Table 1].

**Occupational exposure**

Almost 80% of the workers started beedi rolling at the age of 11–15 years and 70% of them were in the vocation of beedi rolling for more than 20 years. Mean years of service was 24.76 (11.47) years. Most of the study population (48%) preferred to roll beedis in and around their homes while 40% rolled beedis both at the factories and at homes [Table 2].

**Personal hygiene measures**

Most of the beedi workers said that they wash their hands immediately after beedi rolling but only 29% of them used soap. None of the workers were aware any personal protective measures [Table 3].

**Morbidity profile**

Most of the subjects were suffering from back and neck pain, joint pains, gynecological problems, respiratory morbidity, visual problems, and frequent headaches [Table 4]. As the age and duration of exposure increased, musculoskeletal problems, breathlessness, visual impairment, and giddiness also increased [Tables 5 and 6]. Graph 1 shows relation between age and various morbidities. Age is a factor which determines the development of various illnesses as can be seen in the Figure 1. The pattern gives an impression that the illnesses occur at varying rates for given age. However, when Cox regression is executed with experience in years as exposure [Figure 2] adjusted with the significant covariate, i.e. age (OR = 0.817, B = -0.203, P = 0.000), it is seen that the occupational stress appears to cause the illnesses to cluster together after similar exposure durations. After about 25 to 30 years of working in the field, the illnesses reveal themselves more or less together, regardless of the age of the person in question. Experience alone, likewise, does not give the same clustering as age adjusted exposure survival pattern [Figure 3].

**Discussion**

Out of the total 528 beedi workers, majority (60%) were in 35–54 years’ age group. The mean age was 40.8 (10.9) years. A study conducted in coastal Karnataka[6] also found most women beedi rollers (57%) to be in the age group of 35–54 years. Mean
age in their study was also 40.8 (11.3) years. Beedi rolling generally involves less physical activity compared to agricultural labor as they need not work in hot sun. Hence, it was found in this study that older women preferred to stay at home and roll beedis. The above said study\textsuperscript{6} had 98.2\% female subjects. This study was designed to do in women only, but as a general observation, it was noted that there were no male beedi rollers found during the entire study period. Male workers were seen in beedi factories employed for jobs such as sorting, baking, packing, and labelling where the contact with tobacco dust is minimal.

In the present study, widowed and separated women comprised of 21.67\% who were living either in their maternal houses or in a separate home. Beedi rolling was the only source of livelihood.

### Table 2: Distribution of study subjects according to occupational exposure

| Characteristics                                      | n (%)     |
|------------------------------------------------------|-----------|
| Age at joining the service                           |           |
| \( \leq 10 \) years                                 | 27 (5.11) |
| 11-15 years                                          | 424 (80.3)|
| 16-20 years                                          | 67 (12.69)|
| \( > 20 \) years                                    | 10 (1.89) |
| Total years of completed service excluding break     |           |
| 0-9                                                  | 45 (8.52) |
| 10-19                                                | 114 (21.59)|
| 20-29                                                | 140 (26.51)|
| 30-39                                                | 162 (30.69)|
| \( > 40 \)                                          | 67 (12.69)|
| No. of working days per week                         |           |
| \( \leq 5 \) days/week                              | 31 (5.87) |
| 6 or 7 days/week                                     | 497 (94.13)|
| Exposure Index (calculated by No. of working days    |           |
| per week \( \times \) No. of working hours per day  | 301 (57 )|
| \( < 36 \) h/week                                   | 157 (29.73)|
| 36-48 h/week                                         | 70 (13.27)|
| \( > 48 \) h/week                                   |           |
| No. of beedis rolled per day                         |           |
| \( \leq 500 \)                                       | 87 (16.48)|
| 500-1000                                             | 286 (54.17)|
| \( > 1000 \)                                        | 155 (29.35)|
| Place of beedi rolling                              |           |
| Inside the house only                               | 102 (19.32)|
| Outside the house (verandah)                        | 8 (1.52)  |
| Both inside and outside the house                   | 142 (26.89)|
| In the factory                                       | 65 (12.31) |
| Both in the house and in the factory                | 211 (39.96)|

### Table 3: Distribution as per occupational safety and hygiene measures undertaken by the study subjects

| Variable                                                        | Yes (%) |
|-----------------------------------------------------------------|---------|
| Do you wash your hands after beedi rolling?                     | 509 (96.4) |
| Do you wash with soap?                                          | 150 (29.4) |
| Do you wash your hands and face before taking foods at workplace? | 25 (4.8)  |
| Do you follow means other than handwashing (wiping with towel, etc.)? | 23 (4.4)  |
| Do you wash your hands before breastfeeding your baby?          | 5 (19.3)  |
| Wearing of mask/gloves/full sleeves shirt while working         | 0 (0)    |

Figure 1: Age wise disease-free-survival for various illnesses

Figure 2: The disease-free survival effect of experience on various illnesses adjusted by age

Figure 3: Experience wise disease-free-survival for various illnesses
for them. In a study done in Mangalore, 78% of the participants were married, 5.5% were separated, and 4% were widows.[7] In the present study, only 32.6% of the study population were literate. This is almost 20% lower than DLHS-4[8] data which showed that 51.5% women of rural Nizamabad were literate. In a study done in Andhra Pradesh,[1] 52% of the beedi workers were literate. This might be indicating the fact that more number of illiterate women go for beedi rolling than literate women. In this study, there were 7 women who completed their graduation/post-graduation but still were rolling beedis at home for 8–10 h as they thought that there were no decent job opportunities in their village. Some women who have finished their secondary education (14%) said that their in-laws made

**Table 4: Distribution of workers according to self-reported morbidity at the time of study and on examination* (multiple responses)**

| Self-reported morbidity                  | No. (%) |
|----------------------------------------|---------|
| Back and neck pain                     | 265 (50) |
| Joint pains                            | 208 (39) |
| Gynecological problems                 | 221 (42) |
| Respiratory morbidity                  | 143 (27) |
| Visual problems                        | 123 (23) |
| Frequent headaches                     | 112 (21) |
| Vertigo/Giddiness                      | 39 (7)   |
| Acid peptic disease                    | 31 (6)   |
| Hypertension (self-reported)           | 43 (8)   |
| Diabetes (self-reported)               | 14 (2.6) |
| On examination                         | 226 (42.8) |
| Pallor                                 | 29 (5.5) |
| Koilonychia                            | 34 (6.4) |
| BMI (mean ± SD)                        | 43.6±9.02 |
| Obesity (WHO)                          | 25 (4.73) |
| Hypertension (JNC8)                    | 134 (25.5) |
| Respiratory morbidity as per PEFR measurement (<80%) | 127 (24%) |

**Graph 1:** Graph showing relation between mean age of subjects and their morbidity status

**Table 5: Association of morbidity with age of the study subjects**

| Morbidity Present (%) | Age (mean±SD) | Morbidity Absent (%) | Age (mean±SD) | P     |
|-----------------------|---------------|----------------------|---------------|-------|
| Back and neck pain    | 43.9±10       | 37.6±10.9            | <0.0001       |
| Joint pains           | 45.6±9.5      | 37.6±10.68           | <0.0001       |
| Gynecological*        | 43.3±10.15    | 40.18±11.07          | 0.097         |
| Chronic bronchitis    | 40.1±10.2     | 41±11.2              | 0.4           |
| Breathlessness        | 40.4±10.9     | 40.5±11.05           | 0.056         |
| Rhino-sinusitis       | 40.1±11.3     | 40.1±11.3            | 0.1           |
| COPD                  | 40.4±10.9     | 40.5±11.05           | 0.056         |
| Visual impairment     | 40.1±11.3     | 40.1±11.3            | 0.1           |
| Headaches             | 40.4±10.9     | 40.5±11.05           | 0.056         |
| Giddiness             | 40.1±11.3     | 40.1±11.3            | 0.1           |
| Acid peptic disease   | 40.1±11.3     | 40.1±11.3            | 0.1           |
| Pallor                | 39.3±10.95    | 40.9±10.95           | <0.05         |
| Koilonychia           | 38.6±11.14    | 40.9±10.95           | 0.27          |

*Gynecological problems included the participants who had hysterectomy done for any reason, menorrhagia, premature ovarian insufficiency, early menopause, reproductive tract infections

**Table 6: Association of morbidity profile with duration of service in beedi rolling†**

| Duration of service (in years) | Number of subjects | Back and neck No. (%) | Joint pains No. (%) | Visual problems No. (%) | Pallor No. (%) | Breath-lessness No. (%) | Rhino-sinusitis No. (%) | Headache No. (%) | P     |
|-------------------------------|--------------------|-----------------------|--------------------|-------------------------|----------------|------------------------|------------------------|-----------------|-------|
| <10                           | 45                 | 6 (13)                | 0 (0)              | 2 (4)                   | 27 (60)        | 4 (9)                  | 9 (8)                  | 5 (11)          |       |
| 10-20                         | 114                | 41 (36)               | 28 (25)            | 14 (12)                 | 52 (46)        | 13 (13)                | 29 (25)                | 27 (24)         | <0.0001|
| 20-30                         | 140                | 70 (50)               | 50 (36)            | 35 (25)                 | 56 (40)        | 34 (24)                | 34 (24)                | 38 (27)         | <0.0001|
| 30-40                         | 162                | 100 (62)              | 88 (54)            | 45 (28)                 | 66 (41)        | 32 (20)                | 31 (19)                | 35 (22)         | <0.0001|
| >40                           | 67                 | 48 (72)               | 42 (63)            | 27 (40)                 | 25 (37)        | 16 (24)                | 15 (22)                | 7 (10)          | <0.05  |
| Total                         | 528                | 265                   | 208                | 123                     | 226            | 99                     | 118                    | 112             |       |

†Duration of service in beedi rolling is directly proportional to age of the subjects; hence, the morbidity status was related in similar pattern to both age of the subjects and duration of service.
them to take up the job. Going outside the home to work was considered to be of lower status or shameful in some families.

In contrast to the general opinion that joint families are prevalent in rural areas, this study found that 64% of the subjects belonged to nuclear families, 29% to three generation families and rest to joint families. The findings were in concurrence with 2011 census\[9\] data which showed 70.11% of the population in rural India belonged to nuclear families. Mean household size in this study was 4.2 which exactly matched with DLHS-4\[8\]. Average number of beedi workers per family was 1.2 and all the female members in a family were expected to be skilled in beedi rolling including children and adolescents.

With regards to socioeconomic status, majority (66.48%) belonged to upper lower class followed by lower lower class (23.11%) and lower middle class (9.6%). According to Joshi et al.,\[1\] 61% of their study population belonged to upper lower class followed by 39% who belonged to lower middle class. More than half of the beedi workers contributed to 1/4 to 1/2 of the total income of the family in contrast to the study done in coastal Karnataka\[6\] where almost all the workers contributed to less than 1/4 of the total income. It is understood from this study that beedi rolling becomes the only source of income in many low socioeconomic group families especially in droughts when there is no availability of water for the agricultural crops to be grown.

This study has shown that 18% of the study population was habituated to tobacco in various forms which is much higher than NFHS4 (2015-16) data in which only 4.4% of the women in rural areas were using tobacco in any form. 15% of the women were habituated to toddy in concurrence with NFHS4 (15%).\[10\] The reason for high prevalence of tobacco use among beedi workers could be the tobacco itself, which is easily available for them. The reason which most participants gave for taking tobacco was, it gives them a feeling of pleasure as they have to sit and work hard for a long duration of time. They also told that toddy makes them forget the musculoskeletal pains arising out of the un-ergonomic working posture.

Most of the study population (40%) rolled beedis both in the factory (karkhana in local language, which is generally a small hall which is ill or over ventilated, without a proper roof where more than 30 women worked from 9 AM to 7 PM, without any sanitation/drinking water facility available) and in the house. 19% of them preferred to roll beedis only inside the house. 12% of them rolled beedis only at factory. Rest (27%) of the study population rolled beedis both inside and outside the house, generally in corridors along with group of other beedi workers.

Most studies have reported beedi making as home-based industry where women work at home. Study done at Mangalore\[7\] reported that 70% of the women preferred to work inside the house. In present study women who were educated and young preferred to work at home rather than going to factory. Recent mothers also preferred to work at home as it was easy to look after their children.

Owing to the improper working posture, most common self-reported morbidities were back, neck and joint problems, similar to almost all the studies done previously.\[6,7,11,12\] The important finding in this study which was not reported in other studies was the gynecological morbidity (including menorrhagia, foul-smelling white discharge, hysterectomy due to various causes, premature menopause, etc.) which was reported by about 42% of the participants. It was reported in one study done in Mumbai\[11\] but in only about 26% of the subjects. Similar to study done in Karnataka, this study has also shown statistically significant association between duration of exposure, musculoskeletal problems, and visual problems. In addition to the above, increasing age and duration of exposure to tobacco were significantly associated with breathlessness and giddiness.

This study ventured to explore modifiable behavioral aspects with respect to occupational safety and hygiene at the workplace. Almost all the beedi workers (96%) said that they wash their hands immediately after beedi rolling; however, only 29% of them used soap for handwashing. Only 4.8% of the study population admitted that they wash their hands before taking snacks/foods at the workplace that too without soap. A study done in Mumbai\[11\] has shown that 83% women washed hands after beedi rolling.

80% of the mothers said that they do not wash their hands before breastfeeding their baby and the rest 20% would wash their hands but not with soap. Some women were even found rolling beedis simultaneously while breastfeeding their babies. Study done in Andhra Pradesh\[3\] also found that there was poor hygiene among 83% of the beedi workers and 90% of the women breastfed their children without washing their hands.

None of the women wore face mask/gloves/apron/goggles while rolling the beedis. Most of them were not even aware about the use of personal protective equipment (PPE) like face mask, respirator, apron, goggles, etc. It was noted during data collection, though not a part of the questionnaire, that many respondents indicated that they would not wear the PPE even if available since they felt it was unnecessary and uncomfortable to work with. It was in concurrence with study done in Mumbai\[11\] in which none of the workers wore any personal protective equipment.

This highlights the need to explore the attitudes and practices of the workers according to their own perceptions so that interventions can be made that are worker-friendly and implementable without resistance.

It was found in this study that training per se was not imparted to the beedi workers in terms of occupation and occupational hygiene. The poor personal hygiene and poor knowledge on morbidities associated with beedi rolling highlight the need for training classes to be taken before recruiting them into the service of beedi rolling. The implication of beedi rolling occupation for tobacco addiction is yet to be confirmed by doing more studies. It is worthwhile to explain the workers...
about risks of tobacco addiction or accidental tobacco ingestion by kids at home during the training period.

**Summary**

The prevalence of musculoskeletal, gynecological, respiratory morbidities, hypertension, obesity, diabetes mellitus, etc., among women beedi workers warrants designing and implementation of many preventive measures in this sector. The risk associated is enhanced because of the young age at which the employees start their career. Some of the morbidities were associated significantly with the aging of the subjects and duration of service. The hazards may be attributed to the harmful effects of tobacco dust and *tendu* leaves, improper working posture for long durations, and unhygienic conditions at the workplace. Lack of better employment opportunities and relevant skills are prime reasons for engaging in the risk-ridden occupation of beedi rolling for many of the women in the study. The substantial income and sedentary nature of the job made it attractive to many. Because tobacco is a ubiquitous substance, most of the workers did not find it desirable to pay attention to protective measures. In fact, a significant number of them were habituated to tobacco too. The spectrum of illnesses tilted heavily toward noncommunicable diseases. There were no attempts at preventing either the illnesses brought upon by the sedentary nature of the job or the specific issues which could be averted using protective devices.

**Recommendations**

Engineering controls to reduce the dust of tobacco may be made possible in factories. Considering the perilous impact of the substance in question, it may be worthwhile to raise the minimum age of working so that the potential effects of occupational morbidity can be lessened and also impressing upon them to rely upon some alternative small scale employment opportunities which do not pose much risk to the workers as well as the population in general.

**Limitations**

As it is not a case-control study, a temporal relationship cannot be established between beedi rolling occupation and morbidity status.

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**Conflicts of interest**

There are no conflicts of interest.

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