

THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

Occupational Exposure and Health Risks in Women Beedi Workers in India: A Review

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Abstract:

Occupational health hazards are the emerging problems all over the world. Majority of the labor force belongs to unorganized or informal sectors constitute a vital part of the Indian economy. The beedi industry is traditionally a female dominated informal sector, particularly in tobacco processing and beedi rolling. For millions of women today, as in the past, beedi manufacturing is an occupation in India. The beedi rolling is household occupation engage a large number of female workers on a daily-wage basis and these workers are constantly exposed to many types of hazardous substances, which have a potential to cause occupational diseases to the workers and their families. Very little research has been done on the occupational health, hazards and psychosocial problems of women workers especially in Asian countries like India. The current review mainly focuses on serious concerns about the working conditions, exposer and occupational health problems of women beedi workers in India.

Keywords: beedi industry, beedi workers, occupational health hazards, informal sector

1. Introduction

Women's occupational health (WOH) should have high priority on the international agenda and represents a dynamic equilibrium between the women worker and his occupational environment. Occupational health not only deals with work-related disorders or diseases, but it also encompasses all factors that affect workers' health (Pandve and Bhuyar, 2008). Occupational factors make an important contribution to the global burden of disease. Due to rapid industrialization and fast growth of various activities, the individual in any occupations are exposed to lot of hazards in the work environment. The occupational safety and health (OSH) scenario is complex in India. Occupational safety and health for India is a developmental tool and an empowering movement (Shyam, 2012). The issue of occupational hazards assessment in the workplace is of great concern today. Occupational Health is health of an individual in relation to the work and working environment. However, nearly or more than ninety percent of the workforce in India is within the unorganised sector (Gopalan, 1995; Sheila, 2006; Sharma, 2012) where levels of technology are low, there are decentralised processes of production and conditions of work are deplorable. Occupational exposure to dust is a well-known phenomenon, especially in developing countries (Fatusi and Erbabor, 1996; Aigbedion and Iyayi, 2007; Nwibo, et al., 2012). Occupational health remains neglected in most developing countries due to competing social, economic and political challenges (Ahasan and Partanen, 2001; Nuwayhid, 2004).

In India, 1.83 million people are suffering from occupational diseases contributing to 20% of the global burden (Kouser et al., 2014). The largest segment of the labor force in the country belongs to the unorganized sector, 185.3 million workers in the agriculture sector, 14.6 million in the construction sector, 9.51 lakh in the plantation sector and about 41.35 lakhs in the beedi industry (GoI Planning Commission). In our country, most of the females are working in beedi manufacturing and tobacco processing industries (Rani M. et al., 2003). Women constitute a very high percentage of labour force in the beedi rolling industry (Kusum K., 2005) in India. Srinivasulu (1997) reported that 90% of beedi workers are women. The beedi industry has been classified as unorganized, falling under the small scale and cottage industries sector. Beedi manufacturing is one of the major informal sector activities in India in which a huge numbers of home based women workers are engaged in beedi rolling activities who live below the poverty line. Therefore, there is a need to improve the living and working conditions as well as to promote decent employment and income opportunities for women beedi rollers.

The Indian market for smoking tobacco is dominated by beedis, the Indian version of cigarettes (also known as bidis and biris). A beedi is a forest product, also called as thin South Asian cigarette or poor man's cigarette or Indian country cigar. It contains 0.2–0.3 g of tobacco flake wrapped in a nonporous tendu (*Diospyrox melanoxylon*) leaf or *temburni* leaf and secured with coloured thread at

both ends (Senthil and Subburethina, 2010; Singh, JK. et al., 2014). The beedi is four to eight cm in length. The diameter at the closed end is 0.6 - 0.8 cm and the width at the smoking end is 0.7-0.9 cm (Bhonsle et al., 1992). The tendu leaf constitutes 60% of the weight of the beedi (Jayant and Pakhale, 1987). In addition, tobacco has about 4000 active chemical compounds of which more than 50 are carcinogenic; the list includes nitrosamines, polycyclic aromatic hydrocarbons, radioactive elements, and cadmium (Robert, 1988). On an average, each worker can roll from 400 to 1000 beedi per day depending on individual skill and time. Beedi rolling activities causes injurious occupational health problems due to long time setting in one position and exposure to beedi or tobacco dust. Beedi workers faced many psychological health problems, which possibly due to their nature of occupation.

1.1. Overview of the beedi Manufacturing in India

Beedi is still the most popular smoking tobacco product in Asian countries such as India, Bangladesh, Nepal, Sri Lanka and Pakistan, etc. Beedi manufacturing is a traditional agro-forestry based 2nd largest tobacco based industry in India (Shimkhada and Peabody, 2003). As per Standing Committee on Labour, 49.90 lakh beedi workers in India (Ministry of Labour and Employment, 2011) majority of who are home based women workers. Women constitute 76-95% of total employment in beedi manufacturing (Pande R., 1999; Sudarshan R. and Kaur R., 1999). The All India Beedi, Cigar, and Tobacco Workers Federation estimates women comprise around 90 per cent of total employment in beedi manufacturing. Beedi rolling is the one of the largest and popular small scale industry in India which provides employment to millions of women and children who are mostly from the poor socio-economic status. The beedi industry provides a livelihood to over three million people engaged in tobacco cultivation, processing and beedi rolling (Jaisani, 1989) and one of the largest employers of workers in India, after agriculture, handloom and construction (GoI, 1995). It provides employment for both male and female, mainly those from the lower socioeconomic status. Unorganized sector of work is full of health hazards and injuries and if the workforce is female, the scenario worsens (Bharara K. et al., 2012). India is one of the biggest beedi rolling centers in the world. According to ILO reports, there are about 300 manufacturers of major beedi brands and thousands of small scale contractors and manufacturers involved in the beedi production. Beedi industry has been started in 19th century in India and spread over 16 States of India (Table 1).

1.2. Beedi Manufacturing Process

The beedi manufacturer procures the raw materials (Tendu leaves, tobacco, and thread) for making beedis. Beedi making essentially involves six steps; the first three are wetting, drying and cutting the tendu leaves then followed by placing tobacco inside the tendu leaf, rolling the leaf and securing it with a thread then sorting & roasting and packing (Figure 1). A beedi roller can make about 1,000 beedis a day and is paid Rs 40 to Rs 80 for the day's work.

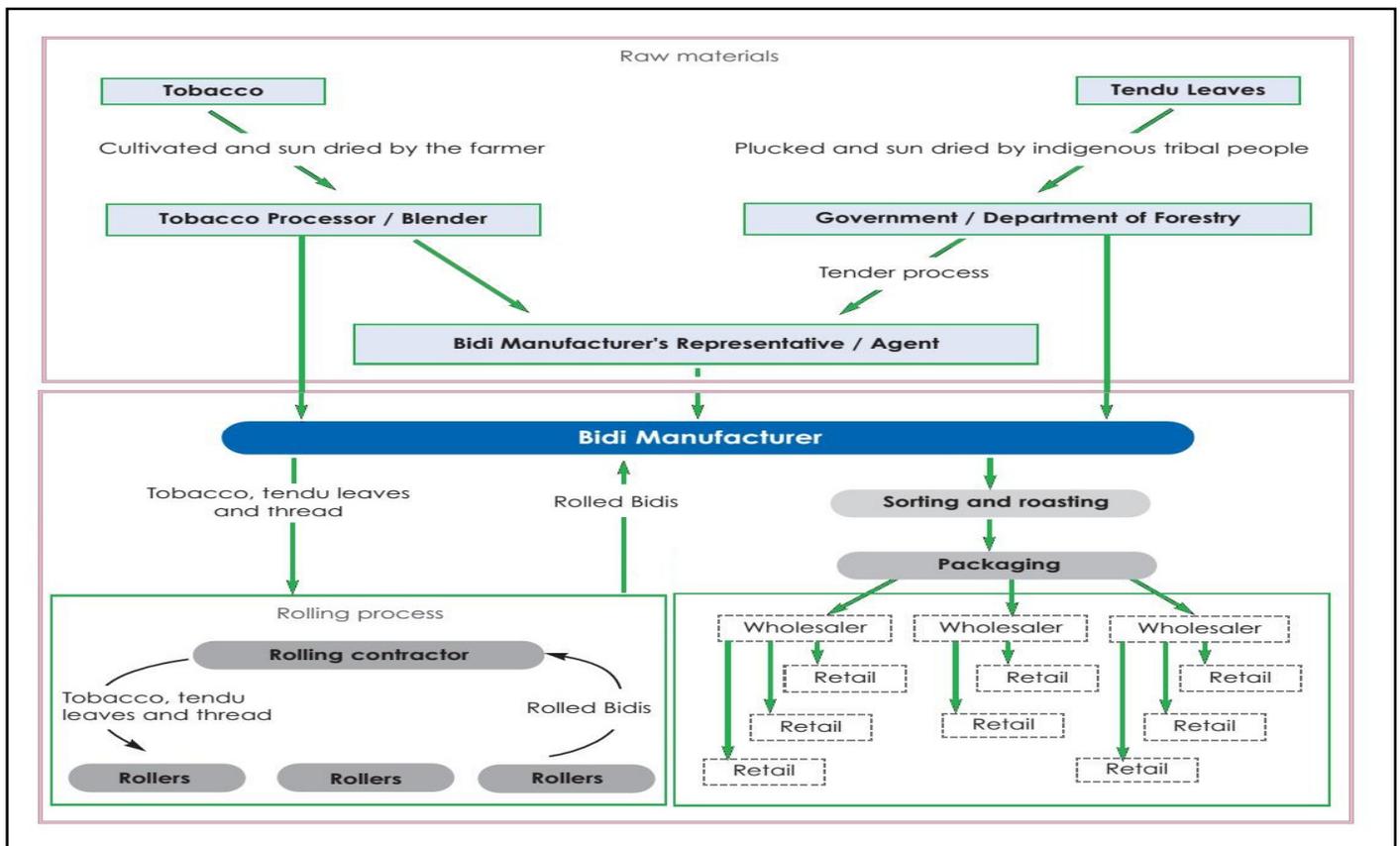


Figure 1: Schematic diagram of typical beedi manufacturing process in India
 Source: Genesis Public Relations, 360 Degree Analysis of Beedi Industry

1.3. Estimated Number of Beedi Workers in India

According to the Seventeenth report of Ministry of Labour and Employment GoI (2011) estimated number of beedi workers so far identified in the country was 49.90 lakhs. According to the IndiaStat, India's comprehensive statistics data estimated total 64.26 lakhs beedi workers and 51.28 lakhs Identity Card Issued to Beedi Workers in India (Table 1). These figures thus clearly show that around 70 percent beedi workers are concentrated in these six states. Beedi workers in India, the third largest component of the work force in India after agricultural workers and textile workers, live and work in conditions of poverty and exploitation.

| S. No. | State | No. of Beedi workers | % | No. of Identity Card Issued | S. No. | State | No. of Beedi workers | % | No. of Identity Card Issued |
|--|----------------|----------------------|-------|-----------------------------|--------|-----------|----------------------|------|-----------------------------|
| 1. | Andhra Pradesh | 458000 | 7.12 | 354429 | 9. | Gujarat | 50000 | 0.77 | 46269 |
| 2. | Madhya Pradesh | 1500000 | 23.34 | 1021259 | 10. | Jharkhand | 114000 | 1.77 | 106929 |
| 3. | Uttar Pradesh | 450000 | 7.00 | 423791 | 11. | Assam | 7725 | 0.12 | 7265 |
| 4. | Tamil Nadu | 700000 | 10.89 | 627251 | 12. | Bihar | 261000 | 4.06 | 255876 |
| 5. | West Bengal | 1974239 | 30.72 | 1440108 | 13. | Tripura | 15946 | 0.24 | 12380 |
| 6. | Chhattisgarh | 25000 | 0.38 | 23598 | 14. | Karnataka | 245691 | 3.82 | 231943 |
| 7. | Maharashtra | 256000 | 3.98 | 247349 | 15. | Kerala | 93942 | 1.46 | 60534 |
| 8. | Rajasthan | 50000 | 0.77 | 40316 | 16. | Orissa | 224486 | 3.49 | 228909 |
| Total No. of Beedi workers 6426029 (100%) and 5128206 Issued Identity Card in India | | | | | | | | | |

Table 1: State-wise No. of Identified Beedi Workers and Issued Identity Card in India (as on 29.4.2013)

Source: IndiaStat.Com.

1.4. Women's Occupational Health (WOH)

The pattern of women occupation is very different among different countries. In any society the economic status, Safety, security and welfare of women is now accepted as an indicator of a progressive society or its development. However, good research in WOH has been rare (Zahm et al., 1994, 2000; Niedhammer et al., 2000). Women constitute a significant workforce in the informal sectors of industry in the industrially developing countries. Poverty and unemployment have led many women to work in the household industry such as beedi rolling, where they face the risk of many diseases. According to the information provided by the office of Registrar General & Census Commissioner of India, As per Census 2011, the total number of female workers in India is 149.8 million and female workers in rural and urban areas are 121.8 and 28.0 million respectively. Out of total 149.8 million female workers, 35.9 million females are working as cultivators and another 61.5 million are agricultural labourers. Of the remaining female workers, 8.5 million are in household Industry and 43.7 million are classified as other workers. Apart from these activities, they spend almost 5-12 hours per day doing household chores. Beedi rolling is an entirely manual process and major occupation for the women in 16 states of India and it creates alternative income and employment opportunities for them.

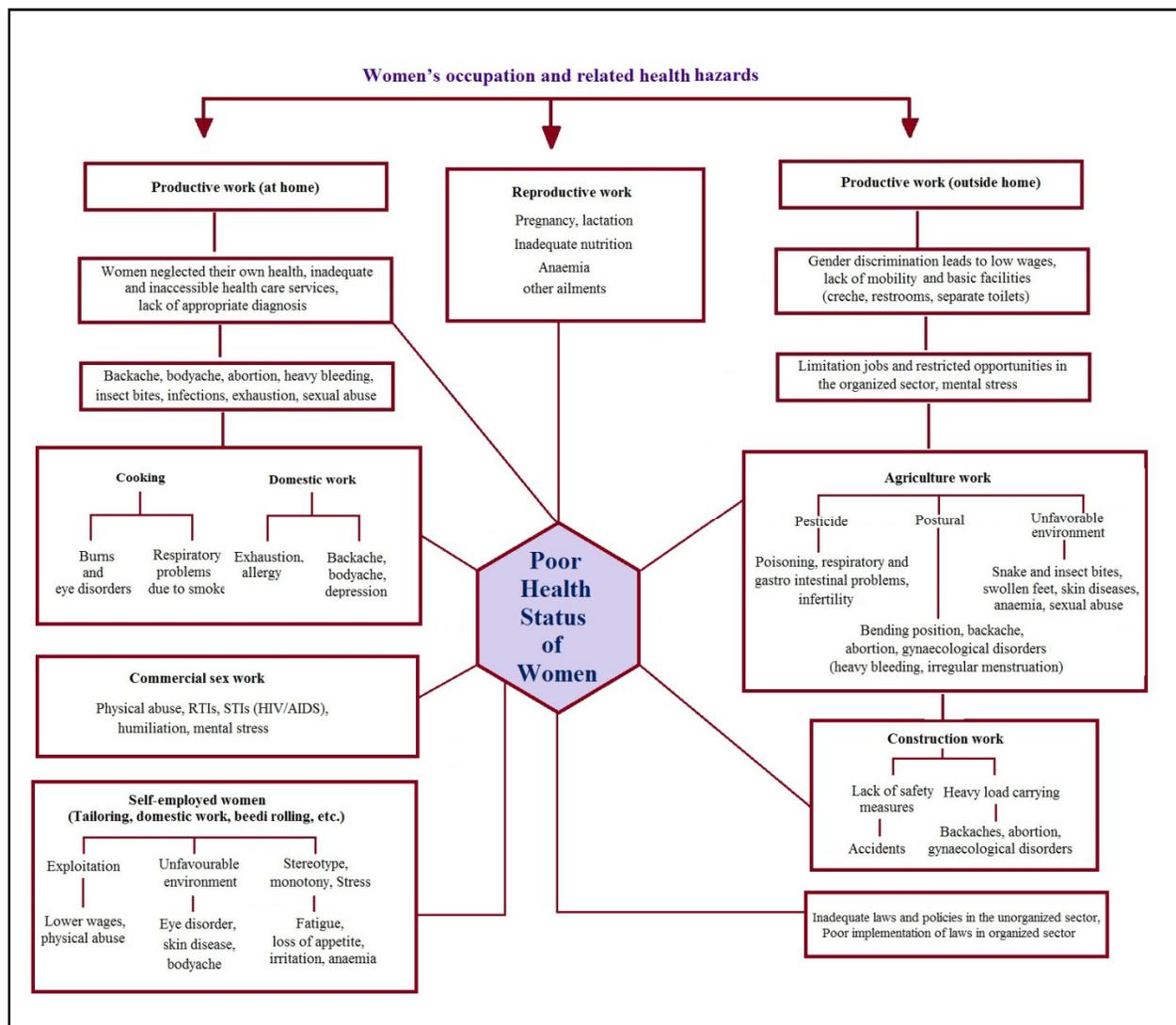


Figure 2: Women's occupation and related health hazards

1.5. Occupational Exposure to Various Hazards in Beedi Workers

Environment of tobacco based industries are usually polluted by tobacco dust, endotoxins and other toxic chemicals. The entire beedi manufacturing process releases large amounts of coarse particles and dust into the work environment resulting in respiratory problems among workers. It has been reported previously that hypersensitivity to allergens contained by tobacco leaves causes occupational asthma (Haber H., 2004). Bhagwe and Bhisey (1995) reported significantly higher levels of total suspended particulate matter and inspirable dust in the ambient air of tobacco processing factories and in the breathing zone of the workers when compared with the general environment outside. The mean concentration of inspirable dust particulates (size $\leq 5.5 \mu\text{m}$) was 241.5 mg/m^3 of air inside the factory and 1.6 mg/m^3 of air in the control environment which is 150-fold higher in tobacco processing units than in the general environment and causes chronic bronchitis among tobacco processors (Bhisey, et al., 1999). Permissible concentration of total suspended particulate matter which includes both inspirable and non-hazardous particulates in the ambient air of industrial and mixed use areas is 500 mg/m^3 of air at 25°C as laid down by the Government of India. Ivan Yanav, (1987) studied on tobacco dust under electronic microscope and they described tobacco dust as isometric form and size ranges between 0.005μ to 1.6μ . Particles size of tobacco dusts less than 10 microns are directly inhaled by the worker causes various lung diseases. Tobacco leaves mainly contain specific chemicals such as nitrosamines, formaldehyde, acetaldehyde, crotonaldehyde, hydrazine, arsenic, nickel, cadmium, benzopyrene, and potassium which are cancer causing substances (Vera, et al., 2009). Raw tobacco dust can contain bacteria, endotoxins, and fungal spores, pollen, mites, insects, particulates, inorganic materials such as quartz, and residues of pesticides or insecticides (Blair et al., 1983). Beedi rollers handle 225–450 g of beedi tobacco per day and inhale tobacco dust and volatile components present in the work environment (Govekar and Bhisey, 1992). Beedi rollers are exposed to unburnt tobacco dust through cutaneous and pharyngeal route and it is extremely harmful to the body since it is carcinogenic in nature and can cause cancer during long exposure. Mainly two factors that cause health hazards are first, the raw materials especially tobacco and secondly, the nature of work, working conditions and the workplace.

1.6. Occupational Health Hazards of Beedi Rollers in the Country

Millions of women and men work in poor and hazardous conditions around the world. Beedi rolling represents one of the most important women occupational health issues in India today. Occupational health is an essential part of working conditions, since most of the health problems occur among workers exposed to unhealthy substances and dangerous situations. Occupational hazards to which workers may be exposed and which may cause various diseases. These hazards are physical hazards, chemical hazards, and biological hazards, mechanical and psychosocial hazards. The major occupational diseases or morbidity of concern in India are silicosis, musculoskeletal injuries, coal workers' pneumoconiosis, chronic obstructive lung diseases, chronic obstructive pulmonary disease (COPD), asbestosis, byssinosis, pesticide poisoning and noise-induced hearing loss. Beedi rolling is a serious occupational health hazard as these workers are constantly exposed to tobacco dust, fumes and other dangerous chemicals viz: nitrosamines and nicotine in their work environment which are readily absorbed by the body through skin, respiratory epithelium and mucous membrane of mouth, nose and intestine and causes number of health problems (Umadevi, et al., 2003; Singh, J. K. et al., 2014). The Beedi rolling is a hazardous profession and leads to two major categories of occupational diseases. The harmful effect of inhaling tobacco dust and fume causes one of them and the other is result of long hours of continuous sitting in an improper working posture during beedi rolling. Health hazards associated with occupational exposure to tobacco was initially reported by Mc Cornick et al in 1948. Many study reviewed that the women Beedi rollers face several occupational health problems have been reported (Table 3). Beedi rollers are at risk for cytogenetic toxicity caused by occupational exposure to tobacco (Bagwe, et al., 1992; Mahimkar and Bhisey, 1995). Occupational exposure to tobacco dust in workers processing beedi was shown to be associated with an increased cotinine level and urinary mutagenicity (Bagwe and Bhisey, 1995) as well increased chromosomal aberrations (Mahimkar et al., 1995; Rajiv S., 2013). Chronic exposure to tobacco dust causes nasal inhalation and cutaneous absorption of tobacco alkaloids especially nicotine, therefore the considerable evidences showed that workers employed in beedi industries are at risk of cancer, lung diseases and other many health related common problems (Swami S. et al., 2006). Wali and Raut, 2013 was observed in female tobacco workers, the lung volumes decrease with increase in age and period of work exposure. When beedi are stored in the house, food spoils quicker and family members experience nausea and headaches (Panchamukhi et al., 2000). The beedi workers suffer from many occupational health problems from constant exposure to tobacco dust (ILO, 2001). Previous study suggested that a wide variety of occupational health risks are known to exist in women beedi workers (Table 2).

| S. No. | Disease Groups | Symptoms / Illness |
|--------|---|---|
| 1. | Musculo-skeletal Or Ostiological problems | Pain in Shoulder, Neck pain, Knee pain, Cramp, Swelling in limbs, Rheumatism, Posture problems, Muscular entropy, joint pains and swelling |
| 2. | Gastrointestinal | Abdomen pain, Acidity, Gastric, trouble, Vomiting, Diarrhea, Constipation |
| 3. | Respiratory disorders | Tuberculosis (TB), Chronic Bronchitis, Asthma, Breathlessness, Cough, Sneezing, Throat burning, Cold, Allergy, lung cancer, decreasing lung volumes |
| 4. | Neurological | Headache, Giddiness, Nausea |
| 5. | Eye problems | Eye watering, Eye burning, Poor vision, Eye pain, Double vision |
| 6. | Skin diseases | Skin tanning, Rough skin, dermatitis, eczema, Thickening of skin, Skin cancer |
| 7. | Gynecological | Urinary burning, miscarriages |
| 8. | Cytogenetic | Mutations, DNA damage, Chromosomal aberrations, genotoxicity |
| 9. | Blood related | Reduction in RBC, WBC, platelet counts and Haemoglobin levels, anaemia |
| 10. | Others | Callosities, Nail discoloration, Loss of Appetite, Tiredness, fevers, Piles, white discharge, palpitation, wheezing, worry, Occupational stresses, |

Table 2: Common occupational health problems among women beedi workers

Occupational health studies show that those workers are involved in beedi manufacturing and tobacco processing has evidence of nicotine (Ghosh et al. 1979), creatinine (Singh, J. K. et al., 2014) and urinary thioether (Shukla, P. et al., 2011) in their urine samples. Toxic effects of nicotine on nerves have been well explained (Taylor 1996). Nicotine gets absorbed through the skin while rolling tobacco and has been demonstrated in the blood of beedi-rollers who do not smoke (Ghosh PC. et al., 2005). Fahmida Khatun et al., 2013, found that 75% female workers in tobacco processing mills suffering from low blood pressure working. Absorption of nicotine induces oxidative stress among beedi workers (Swami S. et al., 2006). Due to handling of tobacco, nicotine is absorbed in the body, mainly through skin, as evidenced from the excretion of nicotine and cotinine in the urine. The urinary excretion rate of nicotine and its major metabolite, cotinine, was significantly increased in most of the cases. Detection of cotinine in urine samples from beedi rollers with no tobacco habits indicated that occupational exposure leads to cutaneous absorption of tobacco constituents and the resultant increase in exposure to alkylating agents was evident from elevated urinary thioether levels (Sardesai Suman P. et al., 2007). Studies suggest that beedi workers have higher levels of chromosomal damage and higher exposure to mutagens (urine mutagenicity and urine thioether levels) than do match controls (Govekar and Bhisey, 1992; Bhisey R.A. et al., 1992; Bagwe and Bhisey, 1995; Bhisey R.A. et al., 1999). Khanna, et al. (2014) investigated that the beedi rollers seem to be facing the occupational hazard of genotoxicity due to handling beedi tobacco and inhalation of tobacco dust. In recent years, numerous studies have been conducted on the women beedi rollers in India with respect to their various work related health problems (Table 3). Studies from India have shown increased occurrence of occupational disorders in women beedi rollers as well as other workers related tobacco based occupation.

| Location | No. of Respondents (N) & Age Groups | Types of Health Hazards Faced by the beedi workers * (% of Total) | Reference |
|----------------------|-------------------------------------|---|--|
| Rajasthan | N = 200 | Respiratory disorders (Cough, Breathlessness, Facial swelling, Anemia, Hemoptysis, Anorexia, Disphagia, Asthmatic allergy) | Prakash and Vyas, 2012 |
| Bihar | N = 197, 20 to 60 | More than 70% suffered from eye, gastrointestinal and nervous problems while more than 50% suffered from respiratory problems, mostly throat burning and cough. More than 75% faced osteological problems. | Yasmin, S. et al., 2010 |
| Madhya Pradesh | N = 70, ≤14 to >30 | 62.86% headache, 51.43% back pain, 20% eye problem, 11.13% asthma, limbs and shoulder pain (67.14%), gastric (17.57%), TB (7.14%). | Sen V., 2007 |
| Uttar Pradesh | N = 214, 20 to ≤75 | Eye problems (33.8%), Respiratory problems (22.68%), Osteological problems (48.05%), Skin problems (29.63%) and Headache (14.81%) | Singh, J. K. et al., 2014 |
| West Bengal | N = 92, ≤20 to >41 | Musculo-Skeletal (100%), Respiratory (50%), Eye (43%), Dizziness (33%), Stomach problems (28%) and Gynecological (7%) | Chandra K. D., 2013 |
| Andhra Pradesh | N = 470, 15 to ≥35 | Back pain and neck pain (76.60%), Pain in shoulder/knee (80.85%), Abdomen pain (18.72%), Cough (bronchitis) (27.24%), Breathlessness (20.22%), Acidity (40%), Tuberculosis (6.8%), Nausea/vomiting (19.14%), Headache (40.42%), Generalized weakness (34.4%), and skin diseases (dermatitis) (21.27%) | Joshi, K. P. et al., 2013 |
| Andhra Pradesh | N = 100, 18 to >50 | Cancer related diseases (51%), lung problem (32%), cough (11%) and chest pain (6%). | Nagalakshmi T., 2013 |
| Maharashtra | N = 54 | Headache (50%), Acidity (25%), Nausea and Vomiting (20%), Breathlessness (30%), Cough (32%) and Chest Tightness (25%) problems faced by Female Tobacco Workers. | Wali and Raut, 2013 |
| Maharashtra (Mumbai) | N = 52, 20 to 70 | Weakness and fatigue (88.5%), Lower backache (78.8%), pain in knee (42.3%), Headache (32.7%), Eye problems (36.5%) and other. | Sabale, et al., 2012 |
| Karnataka | N = 113, 14 to 69 | Musculoskeletal disorder (64%), Anemia (47%), Gastrointestinal disorders (44%), Respiratory disorders (36%), Obstetric and gynecological (42%), Ophthalmic conditions (36%) and other (35%). | Manjula, A. et al., 2012 |
| Karnataka | N = 426, 15 to 70 | Oral health status: Gingival disease (16.26%) and Periodontal disease (83.25%). | Vanishree N., et al., 2014 |
| Karnataka | N = 439, 18 to ≥55 | Musculoskeletal problem (34.6%), Eye problems (31.2%), Respiratory problems (12%) and Other problems (19.8%) | Madhusudan M. et al., 2014 |
| Tamilnadu | N = 310, 15 to 80 | Defective vision (62.9%), headache(53.5%), eyes irritation (38.1%), redness of eyes (6.5%), eye watering (6.5%), photophobia (3.5%), skin tanning (22.9%), rough skin (11.9%), miscarriages (4.8%) and other | Mittal S., et al., 2008 |
| Tamilnadu | N = 50 | Body Pain (46%), Respirator Problem (24%), Diabetes (14%), Heart Problem (14%), Cancer (2%) and other | Srinivasan and Ilango, 2013 |
| Tamilnadu | N = 182, 20 to 50 | Reduction of lung functions (16% of workers had obstructive, 7% had restrictive and 10% had mixed type of ventilatory defect) | Kouser et al., 2014 |
| Tamilnadu | N = 388 | 28% skin diseases, 32% anemic problems and more than 70% suffered from eye, gastrointestinal and nervous problems, 50% respiratory problems and more than 75% faced osteological problems. | Senthil, K.N. and Subburethina, B.P., 2010 |

Table 3: Major occupational health hazards in Indian women beedi rollers based on the published literature

* Multiple answers

A significant increase in DNA damage was observed in the beedi rollers working in confined environment as compared to those who worked in open and mixed kind of working conditions (Shukla, P. et al., 2011). The working conditions influence the degree of occupational hazard among beedi rollers. Ratna and Kaur (1999); Aghi and Gopal (2001) also reported induration of the hands and complications of pregnancy in women beedi rollers. Sardesai et al. (2007) found that women beedi rollers deliver low birth weight babies. Beedi rolling beyond the 7th month of gestation and for more than six hours per day was associated with a small but insignificant decline in birth weight and crown heel length (Mandelia et al., 2014).

Yasmin, S. et al., (2010) found that the total RBC, WBC, platelet counts and haemoglobin levels were significantly lower and miscarriage rate was significantly higher in the beedi rollers as compared to the control group. Rajasekhar et al. (2007) also found a reduction in WBC count and Haemoglobin percentage in smokeless tobacco consumers.

The level of cadmium, chromium and lead in the fingernails of women beedi workers were particularly higher than the control subject not exposed in the occupational working conditions. The concentrations of these metals have been gradually increased based on their year of experience. Fredi Moses and John prabakaran (2011) reported that the levels of Pb (44.2 µg g-1), Cd (3.86 µg g-1) and Cr (2.72 µg g-1) in the fingernails of beedi workers were higher compared to other metals. The occupational exposure to cadmium leading to renal failure and also causes emphysema, prostate and lung cancer (Landrigan, 1982) and exposure to chromium also leading to lung cancer (Michaels et al., 2006), liver and kidney necrosis (WHO, 1988) has been reported.

The numerous studies revealed that the women beedi rollers face several health problems, possibly due to direct inhalation of tobacco dust and flakes.

In order to prevent occupational health hazards and to develop working conditions, the employer must arrange occupational health care services for employees using proper health care professionals and consultants (Lillsunde P. et al., 2008). The Government has enacted three major central laws for the welfare of beedi workers. They are the Beedi and Cigar Workers (Conditions of Employment) Act, the Beedi Workers Welfare Cess Act, and the BWWF Act.

According to the Occupational Safety and Health Act, the employer has to consider all issues regarding the quality of work, working skills, working conditions, gender, employee's age, personal capacities and all other conditions that are regarded reasonably necessary in order to protect the employee from exposure to accidents or risks to his or her health (Lillsunde P., et al., 2007). The National Health Policy of India 1983 and 2002 has outlined the urgent need to prevent and treat diseases and injuries arising due to occupational hazards in both the organized and unorganized sectors.

2. Conclusion

The household beedi rolling industry is a high risk occupation to develop various types of health problems. The poor environmental conditions coupled with unhygienic conditions and long time setting in one position have been found the reasons for developing many types of complaints. In current scenario, women beedi rollers are exposed to long duration of tobacco dust and other indoor working environmental conditions for more production of beedis. Due to which occupational hazards causes many diseases. The present review pointed out the great need for a comprehensive occupational and environmental health management strategies for this type of small scale industries. Thus, all the dimensions of the study variables reveals that the health hazards existing in the beedi rolling environment experienced by the women beedi rollers is at an alarming rate. There is a need to impart education to the women beedi rollers regarding the health hazards caused by tobacco and the urgent need to minimize tobacco exposure among the processors and to use protecting equipments such as gloves, masks, first aid facility etc.

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