International Journal of Multidisciplinary and Current Research ISSN: 2321-3124
Research Article Available at: http://ijmcr.com

A Study on Reproductive Outcome, Health Problems and Haematological Profile in Rural Women Beedi Rollers of Reproductive Age in Jagitial District of Telangana State

Vanitha.Baluka[#], Prashanth.Ch[#], Kirmani^ and P.P Reddy[#]

[#]Department of Genetics, Bhagwan Mahavir Medical Research Centre, Masab Tank, Hyderabad, Telangana, India
^Department of Biotechnology, Mahatma Gandhi National Institute of Research and Social Action (MGNIRSA), Domalguda, Hyderabad, India

Accepted 15 May 2017, Available online 20 May 2017, **Vol.5 (May/June 2017 issue)**

Abstract

Beedi manufacturing is the second largest industry in India. It provides employment to millions of women mostly from the poor socioeconomic class. In Telangana, beedi rolling is a major occupation for illiterate women in many villages. They are exposed to unfiltered tobacco dust and volatile compounds containing hazardous chemicals while making beedis as they do not use any protective wear. The purpose of this study was to assess the reproductive outcome and health problems and haematological parameters among rural women beedi rollers of Jagitial district. A total of 230 women beedi rollers of reproductive age and 200 women in the same age group (controls) and not occupationally exposed to any chemical or physical agents were enrolled and a questionnaire-based survey was conducted. A high frequency prevalence of abortions, premature births, neonatal births, still births and a significantly decreased fertility rate were observed among the beedi rollers. The study also indicated a high frequency of the health problems and haematological studies shown the decreased mean values in all the parameters except Lymphocytes in rural women beedi rollers when compared with the control group.

Keywords: *Beedi, Beedi Rollers, Unfiltered Tobacco Dust, Health Problems, Reproductive Outcome, Jagitial District*.

Introduction

Beedi sector is an agro-forestry based second largest industry in India and provides employment to millions of women and children who are mostly from the poor socio-economic status. Most of the beedi making is carried out by the contractual, home-based, daily base system where women and children are involved in this work quite easily. There are about 300 manufacturers of beedi brands and thousands of small scale contractors and manufacturers involved in beedi production in India. Beedi manufacturing is a popular small-scale industry in Telangana which provides employment to over 10 lakh beedi workers. There are around 40 beedi manufacturer brands and the annual industry turnover is about 1,500 crores. Till today, the range of beedi manufacturing varies from individual, self-employed beedi workers to the large branded beedi companies (Joshi *et al*., 2013).

Beedi is made by using 0.2 to 0.5 grams of pulverized sun- cured (unfiltered) locally grown tobacco rolled in to a cylindrical shaped tendu or temburi leaf and secured with a thread.

*Corresponding author's ORCID ID: 0000-0000-0000-0000
DOI: https://doi.org/10.14741/ijmcr.v.5.3.11

The tobacco rolled in beedis is different from that used in cigarettes and it is referred as beedi tobacco. Beedi rolling is a one of the major occupation for most of the women, who form the root of the industry. Mostly the people who are employed in this job are illiterates. They are engaged in the process of beedi rolling since a very young age and they roll approximately 500-1000 beedis everyday using 250-400gm of tobacco. These beedi rollers work in small factories or at household- base enterprises or at home in an environment laden with tobacco dust. Individuals working for 6 to 10 hr/day and inhale swallow, expose their skin and mucous surface to significant amounts of particulate tobacco (Rudrama Devi *et al*., 2013).

Beedi rollers are exposed continuously to unburnt tobacco dust mainly through cutaneous and nasopharyngeal routes (Bagwe *et al*.,1991 and Swami *et al*.,1995). Earlier studies carried out on beedi workers showed health problems such as respiratory disorders, skin diseases, gastrointestinal illness, gynecological problems, peptic ulcers (Ranjith *et al*.,1995), hematological abnormalities, stomach pain, postural pains, shoulder pain, eye problems and burning sensation (Bhisey *et al*.,2006) and genotoxic effects such as DNA damage, chromosomal aberrations, micronuclei and sister

chromatid exchanges (Poonam Shukla *et al*.,2011) in workers exposed to tobacco.

Although studies have been carried out on beedi industry workers and tobacco smoke exposed people at national and international level, no such studies were carried out on women beedi rollers living in rural areas in Telangana State. Hence, this investigation is attempted to understand the study is find to association with reproductive outcome and health problems and haematological studies in rural women beedi rollers of reproductive age in Telangana State.

Materials and Methods

Study design

Total 230 women (married and unmarried who are in the reproductive age 15-50 yrs) beedi rollers in the age group of 15 to 50 yrs from Ibrahimpatnam, Athmanagr, Ammakapet, Metpally, Godhur and Kathalapur villages of Jagitial district were enrolled for this study..200 Equal numbers of women in the same age group belonging to the same socio economic status and not exposed occupationally to chemical and physical agents was selected for comparison (control group). Studied health problems for all Subjects and control groups (230 from beedi rollers and200 control subjects) then from the above groups we have taken only married women to assess reproductive performance that is 200 from beedi rollers and 186 from control groups. Haematological studies carried out in 100 samples from beedi rollers and control groups.

All the subjects beedi rollers and controls were clinically examined and information on age, nature and duration of the job, hours of work per day, medical history, personal safety measures taken, habits, health problems, living conditions, marital status, family history, socioeconomic status and literacy were recorded using a standard questionnaire.

For haematological studies, 100 subjects from each group were selected. Blood samples were drawn and complete blood picture (CBP) was studied by using Lab life Noble III Analyser.

For reproductive performance, 200 women beedi rollers and 186 control subjects who belonged to the same age group and socio economic status were selected. The information on reproductive history including the number of pregnancies, live births, abortions, still births, neonatal deaths, uterine problems etc. were analyzed.

The study was carried out in the Department of Genetics, Bhagwan Mahavir Hospital and Research Centre, Hyderabad, Telangana. The study was approved by the Institutional Ethics Committee of the Centre and written informed consent was obtained from all the participants of the study. The results were analysed statistically using the appropriate t-test to find the significance between the two groups for the reproductive outcome and frequency of health problems including haematological parameters.

Results

Table 1 Reproductive outcome of rural women beedi rollers of reproductive age

	Beedi rollers		Control Subjects	
Parameters	**No. of Individuals (N=200)**	**Percentage (%)**	**No. of Individuals (N=186)**	**Percentage (%)**
Fertile couples	168	84	171	91.94
Infertile couples	32	16	15	8.06
Pregnancies	416	0	371	0
Live children	358	86	359	97
Abortions	51	12.26	9	2.42
Premature births	14	4	2	0.6
Neonatal deaths	2	0.5	1	0.27
Still births	5	1.20	0	0
Uterine problems	35	17.5	11	6

P value <0.05

Table 2 Age Distribution of study subjects and controls

	Beedi rollers		Control subjects	
Age groups (Yrs)	**No. of Individuals (N=230)**	**Mean ±SD Age(Yrs)**	**No. of Individuals (N=200)**	**Mean ±SD Age (Yrs)**
15-19	13	16.77±1.48	13	16.85±1.63
20-24	45	21.87±1.50	40	21.33±1.51
25-29	41	26.98±1.46	42	25.90±1.3
30-34	42	31.79±1.55	36	31.72±1.3
35-39	30	35.93±1.20	23	36.69±1.58
40-44	27	41.41±6.72	28	41.86±1.24
45-49	17	46.6±5.83	10	47.1±1.66
≥50	15	50.1±0.26	8	50.6±0.92
Total=	230	28.75±12.93	200	25.0±13.66

Table 3 Health problems in rural women beedi rollers of reproductive age

	Beedi Rollers			Control Subjects		
Health Problems	**No. of Individuals (N=230)**	**Percentage (%)**	**Age Mean ±SD**	**No. of Individuals (N=200)**	**Percentage (%)**	**Age Mean ±SD**
Hair loss	235	86.33	34.09±9.54	138	69.00	41.09±6.254
Headache	206	77.00	33.41±9.82	123	70.5	32.04±7.31
Weakness	170	61.33	35±9.45	104	57.5	42.34±6.09
Hyper tension	149	64.78	38.72±12.05	49	24.5	41.10± 7.54
Joint pains	143	51.67	38.14±9.34	27	13.5	44.48±2.62
Eye problems	136	50.33	34.20±8.44	82	41.00	39.96±6.28
Body pains	135	49.33	35.11±10.11	59	29.5	37.39±7.37
Anaemia	116	41.00	35.22±9.45	19	9.5	41.84±4.56
Stomach pain	89	39.69	33.63±11.09	30	15.00	26.77±5.93
Gastrointestinal disorders	62	26.96	36.90±11.44	20	10.00	46.75±2.49
Renal problems	32	13.91	38.91±11.44	8	4.00	46.75±2.49
Nervous disorders	22	9.57	39±10.62	3	1.5	49±1.73
Respiratory disorders	14	6.09	34.21±8.32	2	1.00	48±2.83
Muscular pain	12	5.22	36±11.80	0	0.00	0
Diabetes	7	3.04	47.57±3.60	2	1.00	51.5±0.71
Dermatological problems	7	3.04	40.14±10.32	2	1.00	48.5±2.12

P Value<0.05

Table 4 Haematological parameters in rural women beedi rollers of reproductive age

Haematological Parameters	**Beedi rollers MEAN± SD**	**Control Subjects Mean± SD**
Haemoglobin (%)	11.79±1.36	12.14±0.92
RBC	4.20±0.51	4.356±0.41
PCV	39.30±7.48	41.447±4.10
MCV	85.44±5.40	86.346±4.31
MCH	26.27±2.39	27.95±1.75
MCHC	31.95±1.36	32.58±1.11
WBC	6173±1936.04	6084±1650.08
Neutrophils (%)	58.08±6.34	59.76±6.99
Lymphocytes (%)	36.08±7.58	34.16±5.53
Eosinophils (%)	3.8±0.66	3.71±0.64
Monocytes	2.42±0.50	2.31±0.46
Basophiles	0.0±0.0	0.0±0.0
Platelets	2.23±0.57	2.40±0.63

P value <0.05

The results on reproductive outcome in both the groups presented in Table-1 indicated adverse reproductive outcome in the beedi rollers when compared to the controls. An increase in the frequency of abortions (12.16% vs 2.42 %), premature births (4 % vs 0.6%), neonatal deaths (0.5% Vs 0.27%), still births (1.20% vs 0%) and uterine problems (17.5% vs 6%) and a decrease in the fertility rate (84 % vs 91.94%) and frequency of live births (86% vs 97%) were observed in women beedi rollers when compared to controls. Statistical analysis of the data for the differences for various reproductive parameters between two groups was performed using T appropriate test and the differences between the two groups for all the parameters were found to be significant (P <0.05).

The results on health problems in beedi women rollers and control subjects are presented in Tables 2-3. The participants were categorised into different age groups and presented in Table-2, shows that the mean age of the subjects in different age groups in study and control groups. The mean age of the study group is 28.75± 12.93 as against 25.0±13.66 in control subjects.

The frequency prevalence of almost all the health problems showed an increase in the study group as compared to control group (Table-3). While the frequency of respiratory disorders was 1% in controls it has increased to 6.09 %in the beedi rollers, Frequency of gastrointestinal disorders was 10% in controls while the frequency was 26.96% in beedi rollers. The frequency of hypertension was 24.5 % in controls and the frequency

was increased to 64.78%in study subjects. Similar increase in other health problems was also observed in the study subjects compared to controls.

The data also indicated occurrence of all health problems at early age in beedi rollers when compared to controls (Table-3).

Statistical analysis of the data for the differences for various health problems between the two groups was performed using T test and differences between the two groups were found to be significant (P<0.05). The results on the haematological parameters presented in Table -4, clearly showed a significantly decreased mean values for almost all haematological parameters except for lymphocytes.

Discussion

Beedi rolling is one of the most popular amongst unorganized industry in some parts our country. Women constitute 76-95% of total employment in beedi manufacturing (Sudarshan *et al*, 1999). Majority of young and elderly illiterate women belonging to low socioeconomic status, not aware of the safety measures to be taken at work place are involved in this occupation. The potential effects of tobacco smoke exposure on reproductive outcomes are major scientific and public health concern. As the beedi rolling is one of the main occupations of rural women of Telangana state, the present investigation attempted to understand the reproductive outcome and health problems in rural women beedi rollers of Jagitial district.

The results showed an increase in the frequency of abortions, stillbirths, neonatal deaths and decrease in fertility rate and live births suggesting adverse reproductive outcome in women beedi rollers as a result of unwarranted exposure to tobacco dust at work place. The unfiltered tobacco dust contains about 4000 active chemical compounds of which more than 50 are carcinogenic and mutagenic.

Earlier studies have explained the adverse effects of tobacco on the pregnancy as a function of maternal exposure (Julia *et al*., 2009).Conclusive evidence shows that maternal tobacco consumption increases the risk of infertility, sub fertility, ectopic pregnancy, preterm birth, low birth weight, and still births (Rogers JM., 2008), indurations of the hands and complications of pregnancy in women beedi rollers (Aghi *et al*., 2001). Tobacco consumption showed evidence with respect to the risk of spontaneous abortions (Department of Health and Human Services, 2004). Exposure of pregnant women to ETS (Environment tobacco smoke) has been shown to be associated with low birth weight in the infants of exposed non-smoking mothers (Lambers, (1996), Andres,(2000), Farha arfffin *et al*,(2010)).

However no studies were carried out on mutagenic and teratogenic effects in women beedi rollers from south India. Our study clearly showed impaired reproductive performance of women workers. Since these women were exposed to tobacco dust before conception and also during pregnancy, it is difficult to pinpoint the exact nature of effects i.e mutagenic or teratogenic. These effects may be cumulative consequences of both mutagenic and teratogenic effects, due to possible exposure of women to tobacco dust, which contain variety of carcinogenic or mutagenic constituents. Earlier studies also established the mutagenic/carcinogenic effects of these compounds (Hoffmann *et al* 1990, 1997) in a variety of test systems.

Previous studies also indicated genotoxic effects in beedi rollers. Umadevi *et al*. (2003) reported cytogenetic effects in cigarette factory workers occupationally exposed to tobacco dust. Hoegsted *et al* (1991) and Bukvic (1998) reported an increased cytogenetic damage in peripheral blood lymphocytes of workers occupationally exposed to tobacco dust using different genetic end points, such as sister chromatid exchanges (SCE) and micronucleus (MN). Studies also reported genotoxic effects in workers occupationally exposed to pesticides in pesticide manufacturing industry (Bhalli *et al*., 2006).Gem Gemitha and Sellappa Sudha,(2013)concluded that rubber industry exposure induce genotoxic effect in buccal epithelial cells in the workers and can be taken as an indication that these individuals have increased cancer risk. Elzbieta Olewinska *et al* (2010), showed that occupational exposure to lead is associated with DNA damage, and confirmed that comet assay is a rapid, sensitive method suitable for biomonitoring studies.

The present study has shown increased frequency of health problems in rural women beedi rollers when compared to the controls. Earlier studies carried out in different countries where beedis are manufactured also showed health problems in beedi workers.

Joshi *et al* (2013) observed that almost 90% of the workers developed pain in various body parts and occupational health problems as reported by the male and female beedi workers. The most frequent pain is shoulder pain in both males and females followed by back pain and neck pain. Ranjitsingh and Padmalatha (1995) observed respiratory disorders, skin diseases, gastrointestinal illness, gynaecological problems in beedi rollers .Numbness of the fingers, breathlessness and stomach pains including cramps and gas, have also been reported in beedi rollers (Dikshit and Kanhere .,2000). Mittal *et al*. (2008), found that postural pains, eye problems and burning sensation in the throat are common ailments in women beedi rollers. Bhisey *et al*. (2006) recorded that inspirable dust of tobacco in the tobacco factory was associated with chronic bronchitis in workers.

RBC, MCV, MCH, MCHC WBC, Neutrophils, Monocytes, Eosinophils and platelet count of beedi rollers showed significantly decreased levels compared with control subjects. The abnormal results observed in the haematological parameters of women beedi rollers can be related to unfiltered tobacco dust exposure. Although a number of occupational health problems have been

reported for the women beedi rollers, information on the effects of tobacco dust in various blood Parameters of beedi rollers is very limited. Similar observation on abnormal haematogical profile was previously reported among beedi workers who were exposed to tobacco dust (Rudrama Devi *et al*., 2013).The abnormal results observed in the haematological parameters of women beedi rollers can be related to unfiltered tobacco dust exposure.

The present study has shown increased frequency of health problems in rural women beedi rollers when compared to the controls. Earlier studies carried out in different countries where beedis are manufactured also showed health problems in beedi workers.

The toxic effects of the various constituents of tobacco dust were well established in a variety of test systems (Tricker and Preussmann., 1991), Steinhoff, (1998), Michael P. Waalkes,(2003), Lu H1*et al*, (2005), Salaspuro,(2008).The abnormal reproductive parameters and health problems might be due to unwarranted occupational exposure to tobacco dust in the work place.

Earlier studies provided evidence for the health problems and genotoxic effects in workers occupationally exposed to tobacco. Our study is the first report to show the reproductive outcome and health problems in rural women beedi rollers living in Jagitial district of Telangana state.

Conclusion

The overall results showed adverse reproductive outcome and an increase in health problems in rural women beedi rollers in Jagitial district. These effects in women might be due to occupational exposure to tobacco dust in the work environment. There is a need to monitor reproductive outcome and health problems in women beedi rollers who work with tobacco from time to time and in order to generate data on various health and reproductive issues. Awareness programmes on safety measures may be taken up for these illiterate women beedi rollers to prevent/control these effects.

References

[1]. Aghi MB, Gopal M .Exploiting women and children-India's beedi industry. Lifeline 2001;6:8-10.

[2]. Andres RL, Day MC. Perinatal complications associated with maternal tobacco use. Semin Neonatol 2000; 5(3):231–241.

[3]. Bagwe AN, Bhisey RA .Mutagenicity of processed beedi tobacco: possible relevance to beedi workers. Mutat Res 1991; 261(2): 93-99.

[4]. Bagwe AN, Bhisey RA, Govekar RB.Toxic effects of exposure to tobacco among beedi rollers. Toxicol Lett 1992; 22(6): 1205-1206

[5]. Bhisey RA, Bagwe AN Occupational exposure to unburnt beedi tobacco elevates mutagenic burden among tobacco processors. Carcinogenesis 1995; 16(5): 1 095-1 099.

[6]. Bhisey RA, Bagwe AN, Mahimkar MB, Buch SC. Biological monitoring of beedi industry workers occupationally exposed to tobacco. Indian J Public Health 2006; 50(4):231-235.

[7]. Bukvic N, Bavaro P , Elia G, Cassano F , Fanelli M Guanti G. Mutat. Res1998; 415: 25– 30.

[8]. Department of Health and Human Services (US) The health consequences of smoking: a report of the Surgeon General. Rockville (MD): DHHS, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health (US); 2004.

[9]. Dikshit RP, Kanhere S .Tobacco habits and risk of lung, oropharyngeal and oral cavity cancer: a population based case control study in Bhopal, India. Int J Epidemio 2000;29(8):609-614.

[10]. Elżbieta Olewińska *et al*.Level of DNA Damage in Lead-Exposed Workers. Ann Agric Environ Med 2010; 17, 231–236.

[11]. Farha arfffin *et al*, Environmental tobacco smoke and stress as risk factors for miscarriage and preterm births.Arch Gynecol Obstet 2012; 286:1187–1191.

[12]. Gem Gemitha ,Sellappa Sudha. Assessment of Genotoxicity Among Rubber Industry Workers Occupationally Exposed to Toxic Agents Using Micronucleus Assay. Iran J Cancer. PrevSpring 2013; 6(2): 73–77.

[13]. Hoegsted B, Holmen A , Karlson A , Raihle G , Nillus K, Vestlund K. Mutat Res 1991; 263: 51- 55.

[14]. Hoffmann D, Hecht SS. Advances in tobacco carcinogenesis. In: Cooper CS, Grover PL, editors. Handbook of experimental pharmacology. Vol 94/I. Heidelberg (Germany): Springer-Verlag1990; p. 63-102.

[15]. Hoffmann D, Hoffmann I. The changing cigarette, 1950-1995. J Toxicol Environ Health 1997;50:307-64.

[16]. Joshi *et al*. An epidemiological study of occupational health hazards among bidi workers of Amarchinta, Andhra Pradesh. Journal of Academic and Industrial Research 2013; Vol. 1(9) pp. 561-564.

[17]. Julia *et al* .Exposure to Maternal and Paternal Tobacco Consumption and Risk of Spontaneous Abortion. Public Health Rep, 2009; 124(2): 317–322.

[18]. Lambers DS, Clark KE .The maternal and fetal physiologic effects of nicotine. Semin perinatol 1996; 20(2):115–126 2.

[19]. Lu H1*et al*.Carcinogenic effect of nickel compounds.2005.

[20]. Mahimkar MB, Bhisey RA Occupational exposure to tobacco increases chromosomal aberrations in tobacco processors. Mutat Res 1995; 334(2): 139-144

[21]. Michael P. Waalkes. Cadmium carcinogenesis2003.

[22]. Mittal S, Apoorva M, Rengappa R .Ocular manifestations in beedi industry workers. Indian J Opthalmol 2008; 56:319-322.

[23]. Poonam Shukla, Asha Khanna, and Salil K. Jain. Working condition: A key factor in increasing occupational hazard among beedi rollers: A population health research with respect to DNA damage. Indian J Occup Environ Med2011; Sep-Dec; 15(3): 139–141.

[24]. Ranjitsingh AJA, Padmalatha C.Occupational illness of beedi rollers in south India. Env Econ 1995; 13(4):875-879.

[25]. Rastogi SK, Singh VK, Kesavachandran C, Jyoti, Siddiqui MKJ, *et al*. Monitoring of plasma butyrylcholinesterase activity and haematological parameters in pesticide sprayers. Indian Journal of Occupational and Environmental Medicine 2008; 12: 29–32.

[26]. Rogers JM, Tobacco and pregnancy: overview of exposures and effects. Birth Defects Res C Embryo Today 2008; 84:1–15. [PubMed]

[27]. Rudrama Devi *et al*. Micronuclei and sister chromatid exchanges in women beedi workers occupationally exposed to tobacco dust. Innovative Journal of Medical and Health Science 2013; 3: 55 - 58.

[28]. Salaspuro. Acetaldehyde as a common denominator and cumulative carcinogen in digestive tract cancers. 2008.

[29]. Steinhoff D1, Mohr U.the question of carcinogenic effects of hydrazine. 1988.

[30]. Sudarshan , R. and Kaur, R. The tobacco industry and women's employment: Old concerns and new imperatives. Ind. J. Labour Econ 1999; 42(4): 675-685.

[31]. Swami, S., Suryakar, A.N. and Katkam, R.V. Absorption of nicotine induces oxidative stress among bidi workers. Toxicol Lett 1995; 18(2): 259-265

[32]. Tricker and Preussmann. Carcinogenic N-nitrosamines in the diet: occurrence, formation, mechanisms and carcinogenic potential. 1991.

[33]. Umadevi, B., Swarna, M., Padmavathi, P., Jyothi, A. and Reddy, P.P. Cytogenetic effects in workers occupationally exposed to tobacco dust. Mutation Research 2003; 535(2), 147–154.