

Article

Socio-demographic profile and lung function status among tobacco workers

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Abstract: This cross-sectional study was conducted to assess the lung function status and socio-demographic profile of the tobacco workers. The study place was “Akij Tobacco Industry” which is situated in Sharsa Upazila under Jessore District of Bangladesh. The period of the study extending from January to December 2014. Tobacco worker who had worked in Akij Tobacco Industry, both male and female and working period more than one year. The total sample size was 203 and simple random sampling was done to select the workers on the basis of their identification number. Data were collected through face to face interviews using a semi-structured questionnaire and lung function status measured by the spirometer. About one-third (34.0%) of the workers was in the age group 40-60 years and mean age were 35.8 ± 0.2 years. Of them the majority (54.1%) were male, 89.2% were married, and 48.3% were illiterate. More than half (53.2%) of the worker from the joint family and maximum (53.7%) respondents were in the income group 5000-10000 taka, 39.4% of the worker lived in katcha house and 95.5% were using the sanitary latrine. Approximately half (49.7%) of workers were working for more than 10 years and 66.5% of the workers were working daily for 6-8 hours. More than half (52.7%) of the workers were consuming tobacco product in which 62.3% used to smoke and 31.1% exposed to smokeless tobacco. The mean \pm SD forced vital capacity in the 1st second (FEV1) was 2.25 ± 0.12 whereas forced vital capacity (FVC) was 2.59 ± 0.27 and the FEV1/FVC ratio was 87.16 ± 4.91 . There was no significant ($p > 0.05$) difference between male and female in their lung function status. There was a significant difference ($p < 0.05$) was found between in mean score of FEV1/FVC ratio and the total working period. From the public health point of view, preventive measures need to be taken to control the dusty environment and wearing of personal protective masks.

Keywords: socio-demographic profile; lung function status; tobacco workers

1. Introduction

The World Health Organization (WHO) estimates occupational health risks as the tenth leading cause of morbidity and mortality. Respiratory disorders among tobacco workers have been described by several authors, because of the nature of the manufacturing operations in the tobacco industry, certain potential health hazards

exist for tobacco workers (Kouser *et al.*, 2012). Respiratory impairment among workers was reported to be caused by exposure to varieties of dust in small and large scale industries generated during their production processes (Czeslawa *et al.*, 1998).

The nature of respiratory diseases caused by occupational dust is influenced by the type of dust and duration of exposure (Mengesha and Bekele, 1998). Raw tobacco dust can contain bacteria, endotoxins, and fungal spores, pollen, mites, insects, particulates, of inorganic materials such as quartz, and residues of pesticides or insecticides (Imbus, 1994).

In occupational respiratory diseases, the spirometer is one of the most important diagnostic tools. It is the most widely used instrument to evaluate the pulmonary function status of a subject and can measure and judge the restriction or obstruction of lung function (Ruppel, 1997). A similar study conducted by Banu *et al.*, 2014 among tobacco workers found that who had exposed to tobacco dust for a longer duration (>11 years) had significant reductions of FVC, FEV1, and FEV1/FVC.

There are many tobacco factories in many parts of Bangladesh and in Jessore district a remarkable population is engaged in tobacco industrial activities (Ahmed, 1995). But unfortunately, they are not aware that they are at the risk of impaired lung functions. Considering this the present work was carried out to study the socio-demographic profile and status of lung functions in tobacco industry workers. The outcome of this study would help to create awareness among the tobacco workers and authorities and they may take appropriate measures to protect lung health against tobacco hazards.

2. Materials and Methods

2.1. Study design and settings

This cross-sectional study was carried out with an objective to assess the lung function status along with socio-demographic profile among the tobacco workers. The study place was “Akij Tobacco Industry” which is situated in Sharsa Upazila under Jessore District of Bangladesh. The period of the study extending from January to December 2014.

2.2. Study population and sample size

Tobacco worker who had worked in Akij Tobacco Industry, both male and female, worked in this industry more than one year. The total sample size was 203 and simple random sampling was done to select the workers on the basis of their identification number.

2.3. Data collection process

Data were collected through face to face interviews using a semi-structured questionnaire. Lung function status was measured by recording the Force vital capacity (FVC), Force expiratory volume in one second (FEV1) and FEV1/FVC ratio.

2.4. Statistical analysis

Data were recorded, validated and stored using the Statistical Package for the Social Sciences (SPSS) Windows software, version 20.0. Continuous variables were presented as mean with standard deviation while categorical variables were reported as the percentage with range. Differences between the group (2 groups) were assessed using independent samples t-tests and One-way ANOVA (>2 groups). The significance level was determined as $\alpha < 0.05$.

3. Results

Table 1 shows socio-demographic characteristics of the tobacco factory workers. About one-third (34.0%, 33.0%, and 33.0%) of the workers was in the age group 40-60 years, 29-39 years and 18-28 years, respectively. Mean age of the tobacco workers was 35.8 ± 0.2 years. Male (54.1%) worker predominance over female (45.9%) worker. Maximum respondents (89.2%) were married; whereas only 10.8% were single either unmarried or widow/widower. Regarding educational status, maximum (48.3%) were illiterate while 40.9% were primarily completed. More than half (53.2%) of the worker from joint family and the rest of them were from a single family. In monthly family income, maximum (53.7%) respondents were in the income group 5000-10000 taka and about one-third (31.0%) of the respondent family income more than 10000 taka. More than one-third (39.4%) of the worker lived in katcha house and the rest of them were living in semi-pacca and pacca house. A vast majority (95.5%) of the respondents was using the sanitary latrine and only (4.5%) were using the non-sanitary latrine. On the other hand, maximum (46.8%) respondents was using wood for the purpose of cooking fuel and 39.4% were using cow dung for cooking purpose (Table 1).

Table 2 shows the behavior and lifestyle pattern of the worker. Approximately half (49.7%) of workers were working for more than 10 years. About one-third (34.5%) were work for less than 5 years. A majority (66.5%) of the workers was working daily for 6-8 hours. More than half (52.7%) of the workers were consuming tobacco product in which 62.3% used to smoke and 31.1% exposed to smokeless tobacco. The majority (86.3%) of the workers was consumed bidi and 12.3% were consumed cigarette among them, 46.1% of the workers had consumed 6-10 sticks per day. Less than half (42.5%) of respondent were consumed gul and 40.0% were consumed sada pata (Table 2).

Table 3 illustrates the mean lung function volume of the workers expressed in liters. The mean \pm SD forced vital capacity in the 1st second (FEV1) was 2.25 ± 0.12 whereas forced vital capacity (FVC) was 2.59 ± 0.27 and the FEV1/FVC ratio was 87.16 ± 4.91 (Table 3).

Table 4 depicts the relationship between gender and lung function status of the tobacco workers. There was no significant ($p > 0.05$) difference between male and female in their lung function status (Table 4).

Table 5 represents the association between working period and the FEV1/FVC ratio of the workers. There was a significant difference ($p < 0.05$) was found between in mean score of FEV1/FVC ratio and the total working period (Table 5).

Table 1. Socio-demographic characteristics of the workers (n=203).

Characteristics	n	%
Age group		
18-28 year	67	33.0
29-39 year	67	33.0
40-60 year	69	34.0
Gender		
Male	110	54.1
Female	93	45.9
Marital Status		
Married	181	89.2
Single	22	10.8
Educational status		
Illiterate	98	48.2
Primary (I-V)	83	40.9
Secondary (VI-X)	20	9.9
HSC	2	1.0
Family type		
Nuclear	95	46.8
Joint	108	53.2
Monthly family income		
<5000	31	15.3
5000-10000	109	53.7
>10000	63	31.0
Housing condition		
Katcha	80	39.4
Semi-pacca	95	46.8
Pacca	28	13.8
Sanitation facility		
Sanitary	193	95.5
Non-sanitary	10	4.5
Drinking water source		
Tube well	115	56.7
Deep tune well	88	43.3
Type of cooking fuel		
Wood	95	46.8
Cow dung	80	39.4
Dry leaf	25	12.3
Gas	3	1.5

Table 2. Behavior and lifestyle pattern of the workers (n=203).

Characteristics	n	%
Total working period		
<5 years	71	35.0
5-10 years	31	15.3
> 10 years	101	49.7
Daily working period		
Up to 6 hours	3	1.5
6-8 hours	135	66.5
>8 hours	65	32.0
Tobacco habit		
Yes	107	52.7
No	96	47.3
Types of tobacco consumption		
Smoking	66	62.3
Smokeless	33	31.1
Both	7	6.6
Types of smoking		
Bidi	63	86.3
Cigarette	9	12.3
Hukka	1	1.4
Number of sticks per day		
<5 sticks	21	28.8
6-10 sticks	35	47.9
>10 sticks	17	23.3
Types of smokeless tobacco		
Jorda	7	17.5
Sada pata	16	40.0
Gul	17	42.5

Table 3. Lung function status of the workers (n=203).

Measures of spirometer	Mean \pm SD	Range
FEV1*	2.25 \pm 0.12	0.86
FVC**	2.59 \pm 0.27	1.34
FEV1/FVC ratio	87.16 \pm 4.91	17.76

* Forced Vital capacity in 1st Second (FEV1) ** Forced Vital Capacity (FVC)

Table 4. Relationship between gender and lung function status.

Lung function status	Gender	Mean \pm SD	t*, df	P
FEV1	Male	2.25 \pm 0.13	-0.034, 201	0.797
	Female	2.25 \pm 0.11		
FVC	Male	2.71 \pm 0.43	-0.067,201	0.235
	Female	2.71 \pm 0.41		
FEV1/FVC ratio	Male	84.28 \pm 9.33	-0.469,201	0.297
	Female	84.29 \pm 8.90		

* Student t test

Table 5. Relationship between total working period and FEV1/FVC ratio.

Lung function status	Total working period	Mean \pm SD	F*, df	P
FEV1/FVC ratio	<5 years	85.08 \pm 4.54	10.710, 2200	0.001
	5-10 years	88.23 \pm 5.14		
	> 10 years	88.29 \pm 4.66		

* One way ANOVA test

4. Discussion

The present study is a step towards research into the socio-demographic profile and lung function status in a rural area of Bangladesh. A similar study was conducted in India found that exposed to tobacco dust and flakes at the workplace, has shown a significant decline in the pulmonary functions of these workers with increasing years of exposure (Rath and Chaudhary, 2000). About one-third (34.0%, 33.0%, and 33.0%) of the workers were in the age group 40-60 years, 29-39 years and 18-28 years, respectively. Mean age of the tobacco workers was 35.8 ± 0.2 years. Male (54.1%) workers were predominance over female (45.9%). A similar study showed that 96% of subjects were from the Muslim religion with 32% fallen within the age group ranging from 25 – 54 years. Only females were involved in the study (Thomas *et al.*, 2015).

The present study stated that maximum respondents (89.2%) were married; whereas only 10.8% were single either unmarried or widow/widower. Regarding educational status, maximum (48.3%) were illiterate while 40.9% were primarily completed. More than half (53.2%) of the worker from joint family and the rest of them were from a single family. In monthly family income, maximum (53.7%) respondents were in the income group 5000-10000 taka and about one-third (31.0%) of the respondent family income more than 10000 taka. Above findings were correlated with the nationwide survey conducted by the National Institute of Population Research and Training (BDHS, 2011).

In our study viewed that more than one-third (39.4%) of the worker lived in katcha house and the rest of them were living in semi-pacca and pacca house. A vast majority (95.5%) of the respondent was using the sanitary latrine and only (4.5%) were using the non-sanitary latrine. On the other hand, maximum (46.8%) respondents were using wood for the purpose of cooking fuel and 39.4% were using cow dung for cooking purpose. Above results corresponded with BDHS, 2011.

In our study revealed that approximately half (49.7%) of workers were working for more than 10 years. About one-third (34.5%) were working for less than 5 years. The majority (66.5%) of the workers was working daily for 6-8 hours. More than half (52.7%) of the workers were consuming tobacco product in which 62.3% used to smoke and 31.1% exposed to smokeless tobacco. A majority (86.3%) of the workers was consumed bidi and 12.3% were consumed cigarette among them, 46.1% of the workers had consumed 6-10 sticks per day. Less than half (42.5%) of respondent were consumed gul and 40.0% were consumed sada pata.

In a previous cross-sectional study of Bangladesh found that the prevalence of tobacco smoking is 23.19%, of which 48.28% are male and 1.47% are female. Daily tobacco smoking is more prevalent in the rural area (22.51%) than the urban area (19.85%) (Chloros *et al.*, 2004).

The current study found that the mean \pm SD forced vital capacity in the 1st second (FEV1) was 2.25 ± 0.12 whereas forced vital capacity (FVC) was 2.59 ± 0.27 and the FEV1/FVC ratio was 87.16 ± 4.91 . There was no significant ($p > 0.05$) difference between male and female in their lung function status. In another study showed that the pulmonary functions were significantly higher in males than females. These differences are may be due to physiological factors, especially greater height and weight (Kouser *et al.*, 2014 and Blair *et al.*, 1983).

In our current study stated that there was a significant difference ($p < 0.05$) was found between in mean score of FEV1/FVC ratio and the total working period. A similar study conducted by Banu *et al.*, 2014 among tobacco workers found that who had exposed to tobacco dust for a longer duration (> 11 years) had significant reductions of FVC, FEV1, and FEV1/FVC.

5. Conclusions

On the basis of this cross-sectional study, it was concluded that there was no significant difference between male and female in their lung function status, whereas total working duration was significantly associated with the FEV1/FVC ratio. In view of the deleterious effects of harmful materials on the respiratory system, we suggest that preventive measures need to be taken. These measures include control of the dusty environment and wearing of personal protective masks. Medical surveillance should be part of this prevention program and should include lung function testing before starting employment and regularly during employment in these industries.

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Conflict of interest

None of declare.

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