IJPHCS
Open Access: e-Journal

*International Journal of Public Health and Clinical Sciences*
*e-ISSN : 2289-7577. Vol. 7:No. 3*
*May/June 2020*

# PROFESSIONAL HEALTH RISKS OF TOBACCO FACTORY WORKERS IN THE CITY OF BARISHAL, BANGLADESH: A COMMUNITY BASED SURVEY

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## ABSTRACT

**Aims:** To determine the occupational health hazard of tobacco workers, to assess the dietary diversity and to determine income, disease condition, smoker & nonsmoker, working protection.

**Methods:** Data collected from three areas, tobacco factory (100), around Tobacco factory (100) and Dumki (100). The hazardous condition were assessed by pick flow meter and the dietary patterns of the respondents were measured by food groups including their working condition were inspected and analyzed in SPSS software.

**Results:** Study showed Pick flow-yellow zone (70.70%), red zone (25.30%) and remainder condition were good. Among them <4 food groups taken (44%) and >4/4+ food groups taken (56%). The smokers (40.67%) and non-smokers (59.33%) had a disease condition 32.70%. The mask use were only 9%. The pick flow, BMI and Food groups over the study area was significantly different. As well as BMI, Tobacco use and Mask use over the pick flow were statistically significant. Moreover pick flow over the tobacco use, disease and mask use were highly significant. Tobacco factory hazard had a great effect on the tobacco workers, so it should be halted/minimized at an acceptable level.

**Keywords:** Professional Health Risk, Tobacco Factory, Workers, Bangladesh.

## 1.0 Introduction

Though tobacco industry provide financial support by giving job to the people but the tobacco affects the health of the workers during working badly because the industry workers were coming in contact with the harmful compounds and metabolites(Srinivasan & Ilango, 2013)(Khatun, 2013). Moreover it greatly affects the breathing of air in the factory where the air contain toxic substances in the form of gas, vapors, mist, dusts or fumes etc. In addition it causes different types of health issues of the workers(Elias & Saha, 2011). Numerous study showed that the people who dies for tobacco related illness, their life expectancy was 15 years short then the people who dies due to natural cause. Tobacco related issues will cause death of 10 000 000 people by 20$^{th}$ century and it will be 1000 000 000 by 21$^{st}$ century mostly in developing countries(Yang et al., 2010). Although tobacco contact had no association with mortality or morbidity but it will cause trouble and loss of productivity among tobacco workers (Mcbride et al., 1998). According to U.S Department of Health, Education and Welfare (1967) there was a relation between the factory environment (pollution) with the mental diseases such as mental disorders, nervous system diseases and arthritis. It was evident that the tobacco contact will cause the serious health problems like cancer, cardiovascular disease, stroke, TB, respiratory disease, GIT disorder, cancer in oral cavity, reduced physical fitness, osteoporosis, blindness etc(Sultana, 2015). Tobacco is one of the most important carcinogen causing the above health problems(Bagwe & Bhisey, 1993). The professional sickness was menifested by symptoms like nausea, vomiting, anorexia, dizziness, weakness, etc which was collectively known as “green Symptoms”(Ghosh et al., 1986).

In a nutshell we can say that our study aims to determine the occupational health hazards, dietary pattern, income, disease condition, smoker & nonsmoker, working protection of the tobacco workers.

## 2.0 Materials and Methods

Barisal District was chosen purposively as a study area along with karikori tobacco factory and the research continued from June 2018-December 2018. It was a cross-sectional study of 300 respondents from tobacco factory, around the tobacco factory, outside tobacco factory. Data collected of age groups 15-80 years of permanent residence in and around the factory. New workers, <15 years old workers and pregnant mother were discarded from the sample. The instruments used in data collection Questionnaire, Pick Flow meter to detect the condition of lung, Food groups chart to see the dietary pattern of the people.

Pick Flow Specification

The measurement of peak expiratory flow was pioneered by Martin Wright in 1956 in laldough Hospital of Wales, who produced the first meter specifically designed to measure this index of lung function. Since the original design of instrument was introduced in the late 1950s, and the subsequent development of a more portable, lower cost version other designs and copies have become available across the world.

| Zone | Reading | Description |
|---|---|---|
| Red zone | Below 400L/min | A peak flow reading in the green zone indicates that the asthma is under good control. |
| Green Zone | Above 640L/min | Indicates caution. It may mean respiratory airways are narrowing and additional medication may be required. |
| Yellow Zone | 400-640 L/min | Indicates a medical emergency. Severe airway narrowing may be occurring and immediate action needs to be taken. This would usually involve contacting a doctor or hospital |

Procedure to use Pick Flow Meter

1. The marker to the bottom of the numbered scale.
2. Stand up straight.
3. Take a deep breath. Fill your lungs all the way.
4. Hold your breath while you place the mouthpiece in your mouth, between your teeth. Close your lips around it. DO NOT put your tongue against or inside the hole.
5. Blow out as hard and fast as you can in a single blow. Your first burst of air is the most important. So blowing for a longer time will not affect your result.
6. Write down the number you get. But, if you coughed or did not do the steps right, do not write down the number. Instead, do the steps over again.
7. Move the marker back to the bottom and repeat all these steps 2 more times. The highest of the 3 numbers is your peak flow number. Write it down in your log chart

Some ethical steps were taken which includes pick flow mouth piece were cleaned with chlorinated water prior to use, manager of the factory were informed previously for the workers co-operation and also avoiding criticism.

Analysis was done in SPSS software. We find out the descriptive statistics of the subjects and Independent T test, one way ANOVA test for finding the comparison of their mean along with the different subjects to test the significant level.

International Journal of Public Health and Clinical Sciences
e-ISSN : 2289-7577. Vol. 7:No. 3
May/June 2020

## 3.0 Result

***Table 1.*** *Background Study of the Subject*

| Respondents Information | Numbers | Values |
|---|---|---|
| Age (Mean± Std. Deviation) | 300 | 38.07±13.00 |
| Height (Mean± Std. Deviation) | 300 | 5.49±0.25 |
| Weight (Mean± Std. Deviation) | 300 | 57.93±9.00 |
| **Sex** | | |
| Male (%) | 218 | 72.70 |
| Female (%) | 82 | 27.30 |
| **Income** | | |
| Up to 10000 Taka (%) | 206 | 68.70 |
| 10000-20000 Taka (%) | 91 | 30.30 |
| Above 20000 Taka (%) | 3 | 1.00 |
| **Education** | | |
| Primary (%) | 98 | 32.70 |
| Secondary (%) | 47 | 15.70 |
| Higher Secondary (%) | 26 | 8.60 |
| None (%) | 129 | 43.00 |
| **BMI** | | |
| 17.0-18.4 (%) (Under Weight) | 48 | 16.00 |
| 18.5-24.9 (%) (Normal) | 225 | 75.00 |
| 25.0-29.9 (%) (Overweight) | 26 | 8.70 |
| Above 30 (%) (Obese) | 1 | 0.30 |
| **Pick Flow** | | |
| Below 400L/min (Red) (%) | 76 | 25.30 |
| 400-640 L/min (Yellow) (%) | 212 | 70.70 |
| Above 640L/min (Green) (%) | 12 | 4.00 |
| **Food Groups Taken** | | |
| Up to 2 Groups (%) | 2 | 0.70 |
| 2-3 Groups (%) | 130 | 43.30 |
| 4/4+ Food Groups (%) | 168 | 56.00 |
| **Sufficiency of Income** | | |
| Sufficient (%) | 226 | 75.30 |
| Insufficient (%) | 74 | 24.70 |
| **Bidi/Cigarettes/Tobacco** | | |
| Smoker (%) | 122 | 40.70 |
| Non-smoker (%) | 178 | 59.30 |
| **Disease** | | |
| Present (%) | 98 | 32.70 |
| Absent (%) | 202 | 67.30 |
| **Chest Pain** | | |
| Present (%) | 163 | 54.30 |
| Absent (%) | 137 | 45.70 |
| **Coughing** | | |
| Present (%) | 115 | 38.30 |

| | | |
|---|---|---|
| Absent (%) | 185 | 61.70 |
| **Visit to Doctor** | | |
| Visited (%) | 96 | 32.00 |
| Not-visited (%) | 204 | 68.00 |
| **Mask:** | | |
| Use (%) | 27 | 9.00 |
| Not used (%) | 273 | 91.00 |

The Table 1 showed the mean age, height and weight of the respondent were 38.07, 5.49, and 57.93 respectively. The percentage of male and female was 72.70% and 37.3% among which the income up to 10000 Taka 68.7% which was assumed that it was equal to 10000 Taka or less than that. The respondent minimum primary education was 32.70% and a larger portion was without any education which was 43%. The normal BMI of the respondents was present 75% and the percentage of overweight and obese were 8.7% and 0.3% respectively. The pick Flow percentage along with red marks (Below 400L/min) and yellow marks (400-640 L/min) were 25.3% and 70.7% respectively. The food groups taken by them with less than 4 food groups was 44% and 4/4+ food groups taken 56%. The smoker and nonsmoker percentage among the respondents was 40.7% and 59.3% respectively. The disease condition, chest pain, coughing of the respondent was 32.7%, 54.3% and 38.3% respectively. The working condition showed that the workers didn't use any working clothes and most of them that is 91% of them didn't use mask during working.

***Table 2.*** *Comparison of their Mean Along with the Different Subjects to Test the Significant Level*

| Variables | Numbers | Mean ± Std. Deviation | P-value |
|---|---|---|---|
| **Pick Flow over Study Area** | | | |
| Tobacco Factory | 100 | 373.80±46.84 | |
| Surrounding Area | 100 | 507.60±47.76 | .000[a] |
| Dumki Area | 100 | 564.50±75.31 | |
| **BMI over Study Area** | | | |
| Tobacco Factory | 100 | 20.57±2.59 | |
| Surrounding Area | 100 | 21.79±3.01 | .007[a] |
| Dumki Area | 100 | 21.30±2.53 | |
| **Food groups over Study area** | | | |
| Tobacco Factory | 100 | 3.54±0.54 | |
| Surrounding Area | 100 | 3.47±0.50 | .042[a] |
| Dumki Area | 100 | 3.65±0.48 | |
| **BMI over Pick Flow** | | | |
| Below 400L/min(Red) | 76 | 20.39±2.54 | |
| 400-640L/min(Yellow) | 212 | 21.41±2.78 | .001[a] |
| Above 640L/min(Green) | 12 | 23.12 ±2.27 | |
| **Pick Flow over tobacco use** | | | |
| Smoker/user | 122 | 430.57±79.37 | .000[b] |
| Nonsmoker/non-user | 178 | 517.19±95.55 | |
| **Pick Flow over Disease** | | | |
| Present | 98 | 427.24±79.98 | .000[b] |
| Absent | 202 | 508.51±96.32 | |

International Journal of Public Health and Clinical Sciences
e-ISSN : 2289-7577. Vol. 7:No. 3
May/June 2020

| | | | |
|---|---|---|---|
| **Pick Flow over mask use** | | | |
| Used | 27 | 372.96±43.66 | .000[b] |
| Not used | 273 | 492.75±96.24 | |
| **Pick Flow over Chest pain** | | | |
| Present | 163 | 430.55±81.31 | .000[b] |
| Absent | 137 | 543.14±81.65 | |
| **Tobacco use over Pick Flow** | | | |
| Below 400L/min(Red) | 76 | 1.38±0.49 | |
| 400-640L/min(Yellow) | 212 | 1.65±0.48 | 0.00[a] |
| Above 640L/min(Green) | 12 | 2.00±0.00 | |
| **Mask use over Pick flow** | | | |
| Below 400L/min(Red) | 76 | 1.71±0.46 | |
| 400-640L/min(Yellow) | 212 | 1.98±0.15 | .000[a] |
| Above 640L/min(Green) | 12 | 2.00±0.00 | |

Note: [a]P value for One way ANOVA Test
[b]P value for Independent T Test

The Table 2 showed the pick flow, BMI, food groups over the study area were seen significantly differences in the study area as expected. Again BMI, tobacco use, mask use over the pick flow was seen and it showed a significant differences among the of pick flow categories. Simultaneously the pick flow over tobacco was showed a significant differences among the smokers and non-smokers. Moreover pick flow over disease, chest pain, mask use were seen and we got statistically significantly differences among disease present and absent, for chest pain (present and absent and mask use) and mask use significant differences were also found.

## 4.0 Discussion

In this study showed maximum respondents had a normal BMI that was similar to the study of (Srinivasan & Ilango, 2013). This happened due to the respondent, who were hardworking and strong and stout (Srinivasan & Ilango, 2013). About three fourth of the respondent fall in the yellow zone, red and yellow zone 25.30% and 4% respectively. But the study of (Paul et al., 2013) showed half of them were in red zone and rest of them were green zone but the yellow zone were nil because all the workers were not exposed to dust for similar span of time and irregular exposure for a long time will surely cause a great problems. The dietary pattern showed 4/4+ food groups were taken by 56% of the people and 44% were below 4 groups as because they had a little time to take food during working in factory. Previously studied Ghosh et al (Ghosh et al., 1980) and also our study showed that the ½ of the respondents were smokers as they were working in tobacco factory they were influenced for it and a very important thing its free for the factory people.

In the study the pick flow were seen and a significant differences among the study area. In the study of (Das et al., 2015) pick flow over study area of tobacco factory worker had a statistically significant. It was due to the exposure of tobacco dust (Sultana, 2015).Histamine and Bradykinin had profound effect on the microvascular, causing vasodilation and increase vascular permeability. Increased histamine and bradykinin cause smooth muscle to contract and

could cause mucosal edema and hypersecretion of bronchial muscle resulting increase airway resistance and decrease lung compliance (Das et al., 2015). Again study of Medhi et al (Medhi et al., 2006) showed that BMI over the workers of the tea garden were also statistically significant as expected because the socio-economic condition of the factory worker are different from the native workers and they didn't get a sufficient time to eat so they couldn't it homemade food and they intake food which were not nutritionally healthy and that's why their condition of BMI were much more different from the native people live at home involved in other profession. Moreover the study of Hatleiy et al., 2000 (Hatleiy et al., 2000) a statistically significant result was obtained in the study area of Koutalia (Mali) that was food groups over the study area which was in accordance to our result. There was differences in the salary of the respondent by which they could afford their family and as well as the cost of the commodities Strum et al (Sturm et al., 2005). Again the study showed that the BMI and tobacco use over the pick flow category had a significant differences which was similar to the study of Paul et al(Paul et al., 2013) which was statistically significant as because the person with a high BMI possess more fat in the body and the circumference of the chest of that person was more so there will be differences in the pick flow reading with the change of the BMI (Moran, 2015). Simultaneously the people were exposed to the tobacco dust was suffering from diseases but the person who was fully involved in smoking will had a significant different reading in the pick flow. In the study of Glory and Gambo (Glory & Gambo, 2016) showed that the peak flow rate was statistically highly significantly less ($p<0.0001$) in the cigarette smokers than in the non-smokers. So, it also proves that there was also variation of the smokers and non-smokers pick flow reading.

## 5.0 Conclusion

The "Tobacco Control Law" in the country should be enforced strictly so that the owner of the factory maintain healthy environment for the workers to prevent or reduce the occupational health hazards at an acceptable level.

## 6.0 Competing Interest

The authors declared that there is no competing of interest.

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