ASSESSMENT OF LUNG FUNCTION AMONG WORKERS IN RELATION TO DUST CONCENTRATION IN TATMADAW TEXTILE MILL, YANGON

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Introduction

- Among the working person, the occupational health is essential part for them.
- Textile industry is one of the most technologically complex industries, and in this work place, workers may be exposed to various safety hazards such as cotton dust, excessive noise, accidents and diseases.
- Among the different textile pollution, cotton dust pollution is the most important in terms of health effects .

General Objective

- To assess the lung function of workers in relation to dust concentration in Tatmadaw textile mill.

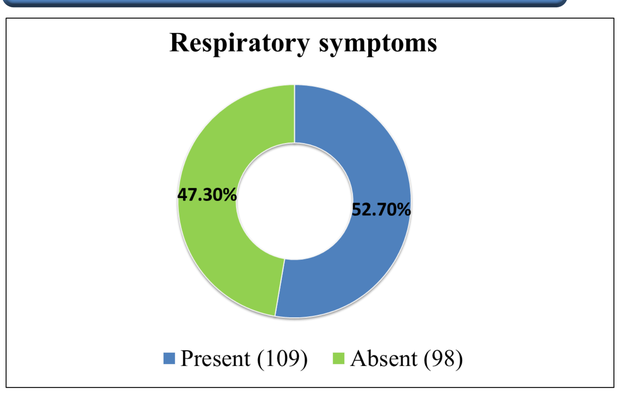
Specific Objectives

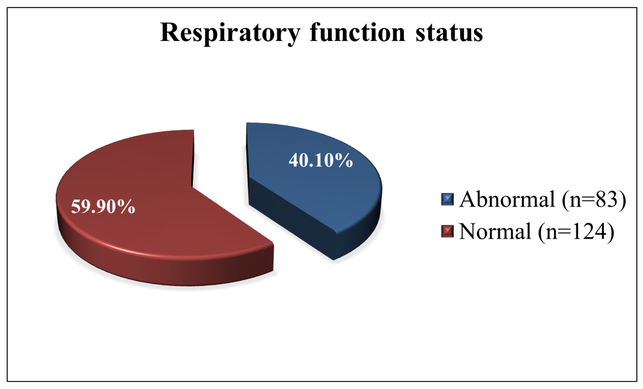
- To determine the proportion of workers with abnormal lung function
- To explore the dust concentration of the different departments
- To find out the association between socio-demographic characteristics, dust concentration and lung function of the workers.

Materials and Methods

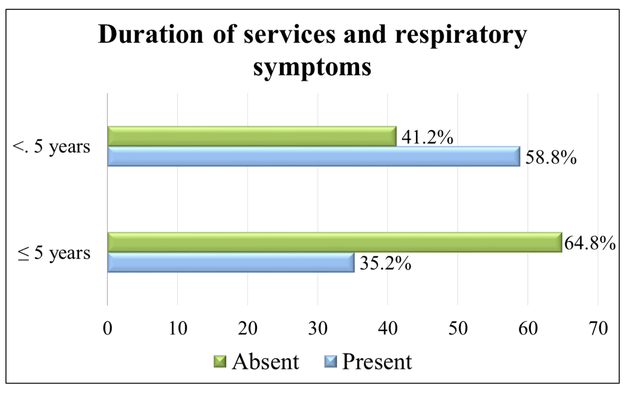
- A cross-sectional descriptive study design was conducted at Tatmadaw Textile Mill, Yangon from April to December 2018.
- Textile mill workers were selected by using the systematic sampling method from six sections.
- In total, 207 workers participated in face-to-face interviews using adapted questionnaire which was originally approved by British Medical Research Council's Committee on Environmental and Occupational Health.
- USA made Airchek Sampler (model 224-44XR) and AirChek 3000 Deluxe (model 210-3311) air sampling pump were used to detect the total and respirable dust to the individuals.
- Spirometer was used to detect the pulmonary impairment of the textile workers.

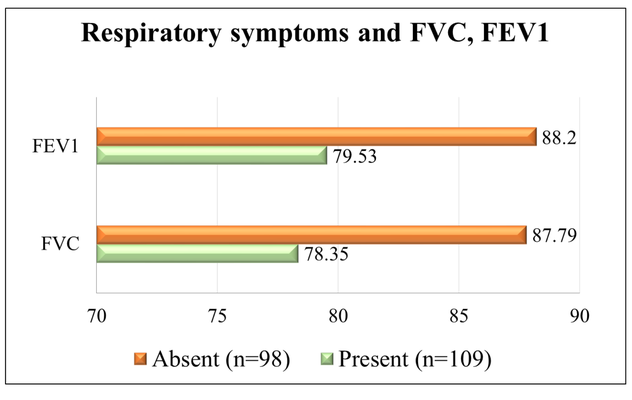
Results and Discussion





- Presence of irritation symptoms such as cough, cough with phlegm and rhinitis were found as 33 (30.3%), and the presence of dyspnea symptoms such as breathlessness, wheezing and chest illness were 33 (30.3%), and 43 respondents (39.4%) have both symptoms of irritation and dyspnea.
- Normal lung function is characterized by FEV1>80%, FVC>80% and FEV1/FVC > 0.7.



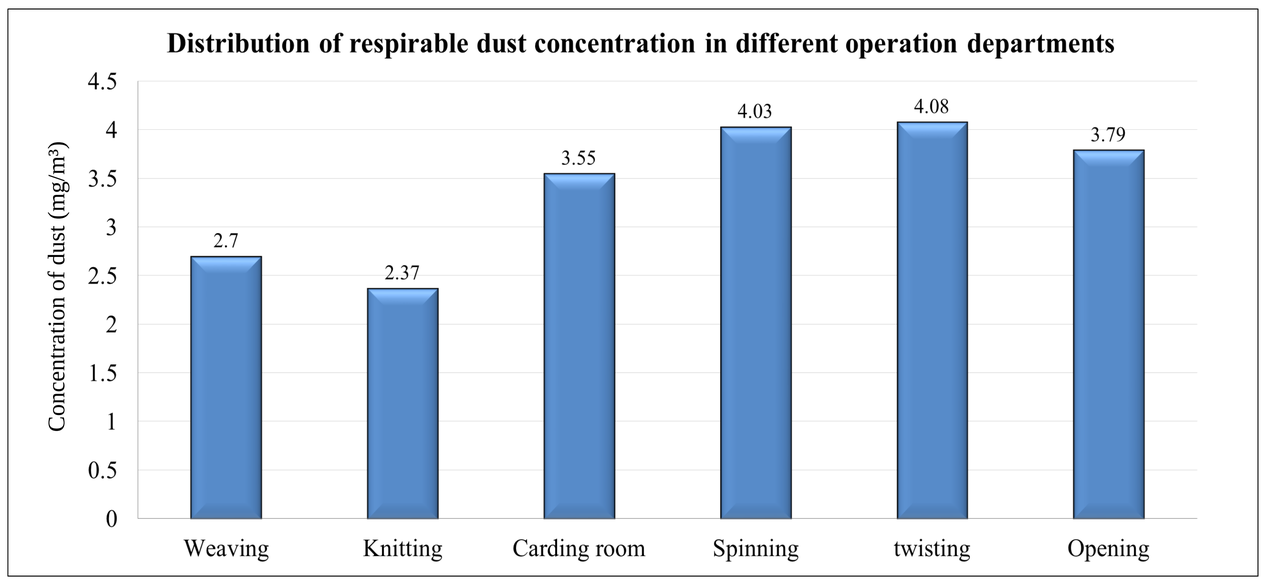


- More experienced employees had longer duration of exposure to cotton dust and they have at greatest risk of developing respiratory symptoms.

Table 1. Association between Duration of services and FVC, FEV1, FEV1/FVC

Duration of services	FVC		p-value	FEV1		p-value	FEV1/FVC		p-value
	Normal	Abnormal		Normal	Abnormal		Normal	Abnormal	
≤ 5 years	46 (85.2%)	8 (14.8%)	< 0.001*	44 (81.5%)	10 (18.5%)	0.004*	54 (100%)	0 (0.0%)	0.146
> 5 years	85 (55.6%)	68 (44.4%)		92 (60.1%)	61 (39.9%)		145 (94.8%)	8 (5.2%)	

- The respondents with longer duration of service had more chance to detect the abnormality of respiratory functions.



- ACGIH recommended that the respirable dust concentration is equal or lower than 3 mg/m^3 .

Table 2. Comparison of Respiratory function by Respirable dust concentration

Respiratory functions	Respirable dust concentration		t	p-value
	High (Mean ± SD)	Normal (Mean ± SD)		
FVC	80.30 ± 20.080	85.40 ± 14.703	-2.088	0.038*
FEV1	81.00 ± 21.053	86.35 ± 15.015	-2.111	0.036*
FEV1/FVC	0.8627 ± 0.092	8702 ± 0.074	-0.651	0.516

- Can be assumed that the exposure of heavy cotton dust concentration is one of the risk factor for decreasing the respiratory parameters of workers.
- Persistent inhalation of the cotton dust causes the pulmonary impairment which can be observed in textile workers and this also causes nonspecific respiratory irritation that leads to hypersecretion of mucus, smooth muscle hypertrophy and mucus gland hyperplasia.

*p<0.05 statistically significant

Conclusion

- In order to reduce respiratory functions impairments, awareness raising programmes to exposed workers focusing on potential health effects of exposure to cotton dust should be established.
- Should be encouraged to use the personal protective equipment with enforcement.
- Responsible authorities should focus on occupational safety policies, installing vacuum cleaners to reduce dust concentration in industry.
- Periodic medical check-up should be applied among textile mill workers to reduce the unnecessary respiratory functions impairment due to the cotton dust exposure.

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References

1. Sudha B, Meenaxi T. Occupational health hazards in textiles industry. Asian Journal of Home Science. 2014;9(1):267-71.
2. Mehwish N, Mustafa U. Impact of Dust Pollution on Worker's Health in Textile Industry: A Case Study of Faisalabad, Pakistan. Pakistan Institute of Development Economics, Islamabad; 2016.
3. Tadesse S, Kelaye T, Assefa Y. Utilization of personal protective equipment and associated factors among textile factory workers at Hawassa Town, southern Ethiopia. Journal of Occupational Medicine and Toxicology. 2016;11(1):6.
4. Timothy JB, Irene P. An approach to interpreting spirometry. American family physician. 2004;69(5):1107-16.