

Industrial Tobacco Dust Chronic Impact on Workers Health

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INDUSTRIAL TOBACCO DUSTS' EXPOSURE CHRONIC IMPACTS ON WORKERS' HEALTH

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[Background]

Tobacco industry develops rapidly, employs millions workers worldwide, increasing incident of workers' health problems caused by tobacco dusts' exposure (TDE). Most of the research related to tobacosis has always make smokers exposed to nicotine as research subjects. Based on data from Cancer Research UK in 2010, the prevalence of tobacosis age more than 16 years in the UK were 23% in men and 20% in women. In Indonesia there is no research that collects data on the incidence of tobacosis especially in the working environment so that the effect of exposure to dust containing nicotine tobacco on the health of workers is not yet known and studied.

[Materials & Methods]



Dry Tobacco Leaves Production Process

Research subjects



Tobacco Industry Workers

Research instruments

The research instruments were questionnaire to evaluate workers' health history and medical vital signs' examination equipment to evaluate workers' general health. As an addition, Ankle-Brachial Index (ABI) and hematological changing were being measured using Omron digital tensimeter and hematocrit examination kits by microhematocrit method.

Statistical analysis

Data were analyzed using appropriate statistic tools and hematology data were analyzed using correlation Somer's D with SPSS version 21.

[Results and Discussion]

Health History

Health history result showed that the problems occurred on the body entrance of tobacco dust, e.g. respiratory, eyes and skin disorder, and these problems were more common in T0 group (table 1) probably due to adaptation process has already start from T1 group. This result is relevant to research by Yasmin, Afroz and Hayat (2010) in the beedi workers where about 55.8% of them having respiration problem.

[Acknowledgements]

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The aim of this study was to determine the chronic impacts of TDE on workers' health by investigating health history, general health examination and including some blood parameter examination by comparing the duration of working.

This research is an observational survey research using a cross sectional method. The study subjects were non-smoker tobacco industry workers in one of the biggest tobacco industry in Jember, Indonesia that employing thousand workers and has been certified international standard.

Subjects were healthy women aged at least 26 years old, with non-smoker status, actively working indoor as sorting labor for 8 hours per day within 6 working days during the week.

Table 1. General information and health history of subject

	Subject (n=108)			Total
	T0	T1	T2	
Age :				
26-30 years	5	2	0	7
31-40 years	15	18	3	36
41-50 years	9	13	23	45
> 50 years	7	3	10	20
Education status :				
Illiterate	8	2	10	20
Elementary	20	27	23	70
Junior high	5	4	3	12
Senior high	3	3	0	6
Health history				
Anemia	12	23	22	57
Respiratory problems :				
Short breath	6	6	5	16
Cough	7	13	5	25
Sneezing	3	6	4	13
Sore Throat	10	14	5	29
Nervous problems :				
Dizzy				
Paresthesia	15	15	18	48
Tremor	15	19	15	49
Eye problems :				
Get something in the eye	11	10	15	36
Eye burn	3	6	14	23
Hyperemia	5	6	14	25
Sandy eye	5	9	14	28
Epistrophe	5	8	13	26
Skin problems :				
Itch	5	9	7	21
Redness	3	10	7	20

General Health

General health result showed about half workers had tachypnea and high blood pressure in T1 and T2 group (table 2). High blood pressure occurs in 74% of the workers similar with the explanation Purves et al. in his book entitled Neuroscience 3rd edition, i.e. an increase in blood pressure caused by activation of nAChR and vasopressin by nicotine induction.

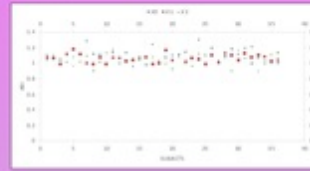


Figure 1. Ankle-brachial index distribution among groups

Ankle-Brachial Index (ABI)

ABI measurement showed no risk of arterial disease in all group, but it was significantly lower in T1 or T2 group compare to T0 group (figure 1). Only about 10% of the subjects were having abnormal ABI and this showed that tobacco dust exposure did not affecting much in peripheral arteries.

Table 2. General health of subject

HTN classification :	Subject (n=108)			Total
	T0	T1	T2	
Normal	7	7	4	18
Pre-HTN	15	11	13	39
HTN stage I	6	14	8	28
HTN stage II	8	4	11	23
Heart rate :				
Bradycardia	0	0	1	1
Normal	33	32	29	94
Tachycardia	3	4	6	13
Respiration Rate :				
Bradypnea	0	0	0	0
Normal	19	18	16	53
Tachypnea	17	18	20	55

Hematocrit Examination

Based on table 3 data we can conclude that a low hematocrit levels dominate hematocrit tobacco industry workers. This is consistent with results from Kholdayamidi et al. (2001) study. The study proves that the decline in CD-44 may occur due to exposure to nicotine. CD-44 is an inducer of signal changes comitted hemopoietic stem cells into stem cells or CFU-E, the parent of the mature erythrocytes. The decline in CD-44 led to a decrease in production of mature erythrocytes which manifests as a decrease in hematocrit levels.

Future Experiment

This study relates between long exposure to tobacco dust with hematocrit levels of tobacco industry non-smokers workers. Duration of exposure grouped into three groups: 0-5 years, 6-19 years and ≥ 20 years. In the group of workers who had been exposed for 0-5 years, it was dominated by the normal hematocrit levels that mostly occurred in workers exposed for 0-3 years. This is relevant with research conducted by Asif et al where the 0-3 years of exposure showed no change in hemato crit. While searching method for early detection and early prevention. We hope that this study can be used to improve the quality of health, safety and security of the tobacco industrial workers.

[Conclusions]

- Low hematocrit level indicated the suppression of bone marrow that was possibly caused by nicotine effect from TDE.
- Before showing a decline in T2 group, hematocrit level was first incline from 4 years to 10 years' exposure, possibly caused by the compensation ability on extra-medullary hematopoiesis.
- Industrial TDE chronic impacts on workers' health similar to chronic impacts of nicotine exposure and the study of hematological changing pattern is suggested to be developed as screening examination of tobacosis because it is applicable annually on workers' general health examination.

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