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# Analysis of Physical Environment of the House as a Workplace for work-Related Complaints on the Shoe Industry Home Workers in Semarang Regency

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## ABSTRACT

Home workers at the shoe industry in Semarang Regency mostly suffer from callus (84.8%), stiff shoulder (75.8%), and headache (72.2%). This study aims to analyze the physical environment of the house as a workplace with a work-related complaint on the shoe industry workers in Semarang regency. It was an observational research with cross sectional approach. The population were all the workers in the shoe industry, Semarang Regency. The Sample for the research 66 workers taken by proportional random sampling method. Data analysis used distribution frequency, Chi-Square test and logistic regression. The results showed that there were several physical environment variables of the house that have relation with the complaints due to work with the value of  $p \leq 0.05$  such as light intensity, house ventilation, and house temperature. Multivariate analysis showed work-related complaints were influenced by variables of lighting, temperature and ventilation jointly by 93.5% and the rest influenced by other factors. The conclusion of this study was the importance of maintaining the quality of the physical environment of the house as a workplace because it can affect the complaints due to work. Shoe industry home workers should pay attention to the intensity of light, ventilation, and the temperature of the house as a place of work.

**Keywords:** *home workers, physical environment, work place, work related complaints*

## INTRODUCTION

Home-worker is a worker involved in home-based industry through a putting-out production system. According to ILO Convention No. 177 of 1996 on Home Workers, the term *home worker* means work carried out by a person, to be referred to as a homemaker: in his or her home or in other premises of his or her choice, other than the workplace of the employer; for remuneration; which results in a product or service as specified by the employer, irrespective of who provides the equipment, materials or other inputs used<sup>(1)</sup>. Home workers are classified in three groups, namely working on their behalf, working on order, and contract working. Contract workers produce the work they receive from

intermediaries or subcontractors in accordance with the specifications and time schedule stipulated by the principal<sup>(2)</sup>. There are many problems faced by home workers. The seven-country study reported occupational health and safety hazards as a major concern for the home-based workers<sup>(3)</sup>. Many home workers are overworked and must maintain unhealthy postures as an ergonomic risk relating to poor posture from sitting on the floor or at low tables (incense stick and cigarette rollers), long work hours with limited rest time; as well as exposure risks to toxic substances (incense stick rollers, shoe makers, metal workers)<sup>(3)</sup>. In Bangladesh, reported respiratory and other chronic or acute health problems. In Thailand, reported eye strain, sore eyes and blurred vision. Their workplaces have poor lighting and, particularly in the inner city areas, are often congested, hot and stuffy. Exposure to dust and other irritants, such as the pungent fumes of kerosene, results in allergies and respiratory diseases<sup>(4)</sup>. In Nepal, home workers are forced to work in candlelight due to frequent power cuts: the dim light affects the eyes and the smoke from the candles irritates the nose and throat<sup>(4)</sup>.

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Home workers mostly work in their homes that are not according to health requirements. The physical environment factors of the house and also from the production process can have an impact of health problems for workers. In Semarang city, from 146 home workers in charcoal sector identified that housing conditions of home-based workers who were not eligible: ceiling 91.1 percent; floor 57.5 percent; ventilation 42.5 percent and waste disposal facilities 97.3 percent<sup>(5)</sup>. The work complaints from the charcoal sector were 80 percent joint pain and 13.7 percent out of breath, whereas the more often work complaints were 41.1 percent muscle pain; 19.2 percent stiffness; 13 percent cough and 11.6 percent tingling<sup>(5)</sup>. Economic activity in Semarang Regency is dominated by industry sector. One of the industries in Semarang Regency is the leather shoes industry. The leather shoes industry in this study employs homeworkers in charge of sewing shoes. This study aims to analyze the physical environment of the house as a workplace with a work-related complaint on the shoe industry workers in Semarang regency.

**METHOD**

This was observasional research with cross sectional approach. Population home workers from shoe leathers industry were 80 and they spread at Bergas sub distric, Pringapus sub distric and Bawen sub district. The sample size were 66 home workers from Lemeshow formula:

$$n = \frac{Zx^2P(Q)N}{Zx^2P(Q) + e^2N}$$

α= 0.05. Sampling done by proportional random sampling from 3 sub districts from Semarang regency.

The physical environment factors of the house were include: lighting, temperature, ventilation, house wall, house floor and occupancy density. The data were collected by check list for observation the house and questioner for interview the respondent. Data analysis used by distribution frequency, Chi square and logistic regression.

**RESULT AND DISCUSSION**

All of Home workers from leather shoes industry in Semarang Regency were women. The frequency of complaints from home workers as in table 1.

**Table 1: Frequency Distribution of Work Complaints**

Work Complaints	Yes (%)	No (%)
Shortness of Breath	54.5	45.5
Headache	72.2	27.5
Eye pain	57.6	42.4
Upper back pain	60.6	39.4
Lower back pain	59.1	40.9
Stiff shoulders	75.8	24.2
Tremor	40.9	59.1
Menstrual Disorders	13.6	86.4
Callus	84.8	15.2
Nausea/Vomiting	22.7	77.3
Itching	42.4	57.6

Headache, Stiff Shoulders, Callus, Upper back pain and Lower back pain were the usually complaints from home workers. The frequency of complaints became the basic for divided in to Complex Complaints and Simple Complaints base on mean values. There were 57.6% Complex Complaints and 42.4% Simple Complaint. Home workers of shoe industries often had to pursue production time and numbers that unmatch with the terms of provisions. Workers usually had to complete up to 20 pairs of footwear within two days. Based on the results of interview, workers could finish 1 pair of footwearwithing one hour so at least the workers need to work 10 hours a day. All the workers who sewed the footwear are female. Therefore, they often had to multitask between work and household activities which certainly added to their physical and emotional burden<sup>(6)</sup>

The frequency distribution of physical environment factors of the house such as: Lighting, ventilation, house wall, house floor, temperature and occupancy density were in table 2.

**Table 2: Frequency Distribution of Physical Environment Factors**

Physical Environment Factors	Frequency (%)
<b>Lighting</b>	
Not Qualified	65.2
Qualified	34.8
<b>Ventilation</b>	
Not Qualified	68.2
Qualified	31.8

Conted...

<b>House Wall</b>	
Not Qualified	13.6
Qualified	88.4
<b>House Floor</b>	
Not Qualified	4.5
Qualified	95.5
<b>Temperature</b>	
Not Qualified	62.1
Qualified	37.9
<b>Occupancy Density</b>	
Not Qualified	15.2
Qualified	84.8

Environmental conditions of the house as a work place for home workers with the poor lighting cause

of work-related complaints, too much or too little light strains eyes and may cause eye irritation and headaches<sup>(7)</sup>. Ventilation that are not in accordance with the requirements will result in disruption to the activities of home workers who do a lot of sewing work activities in a closed house. It certainly can affect the physical condition of respondents who cause work complaints such as respiratory symptoms, asthma (shortness of breath), allergy and sick building syndrome such<sup>(8)</sup>. Environmental conditions of the house as a work place for home workers with temperatures above the Threshold Limit (NAB) can cause work complaints such as fatigue, headache, nausea/vomiting, and shortness of breath. Manual workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress, especially for workers in low-middle income countries in tropical regions<sup>(9)</sup>

**Table 3: The Association between the physical environment factors of the house with Work Complaints**

Variables	p value	PR	CI 95%
Lighting	0.001	3.530	1.598-7.799
Ventilation	0.003	2.489	1.234-5.019
House Wall	1.000	0.960	0.514-1.739
House Floor	1.000	1.167	0.510-2.671
Temperature	0.046	1.707	1.012-2.882
Occupancy Density	1.000	1.050	0.603-2.828

There were association between: Lighting with work complaints, ventilation with work complaints and temperature with work complaints. Home workers had risk for work complaints 3.5 times greater if the lighting were not qualified compare with the lighting qualified in their home. Besides that, home workers had risk for work complaints 2.5 times greater if ventilation were not qualified compare with qualified ventilation. And home workers had risk for work complaints 1.7 times greater if temperature not qualified compare with qualified temperature.

**Table 4: The Logistic Regression of physical environment factor**

Variables	B	p	Adjusted OR	CI 95%
Lighting	2.491	0.001	12.076	2.905-50.205
Ventilation	1.776	0.014	5.906	1.424-24.504
Temperature	1.890	0.009	6.621	1.603-27.338
Constant	-8.754			

The multivariate analysis with logistic regression showed work-related complaints were influenced by variables of lighting, temperature and ventilation jointly by 93.5% and the rest influenced by other factors.

**CONCLUSION**

The conclusion of this study was the importance of maintaining the quality of the physical environment of the house as a workplace because it can affect the complaints due to work. Shoe industry home workers should pay attention to the intensity of light, ventilation, and the temperature of the house as a place of work.

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