

CURRENT STATUS OF WORKING ENVIRONMENT AND HEALTHWORKERS AT T&N GARMENT COMPANY KHANH HOA, VIETNAM

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ABSTRACT

Cross-sectional descriptive study was conducted at T&N Garment Co., Ltd., Khanh Hoa province, Vietnam from July 2022 to December 2023 based on measurement tools to evaluate the working environment of 1500 workers. for the purpose of evaluating the working environment and its impact on the health and illness of workers at this facility. Research results show that, regarding the working environment, 21/36 samples measured temperature, 16/36 samples measured humidity, 17/36 samples measured wind speed, 22/36 samples measured light, 9/36 samples measured Noise measurement and 12/36 dust samples did not meet the standards allowed in Vietnam. The highest rate of workers with health level I and II is 78.2 %. Due to environmental pollution, ear, nose and throat diseases and gynecological diseases are the group of diseases with the highest incidence in the disease structure of garment workers here, the rate is 16.4%; followed by eye diseases (16.0%) and bronchial and lung diseases (14.0%) (Advanced age affects the incidence of ear-nose-throat, bronchial-pulmonary, and neurological diseases. Research shows that the working environment and health status of workers still have many shortcomings that need to be overcome.

KEYWORDS: Textile workers, Working conditions, Patterns of diseases, Khanh Hoa.

INTRODUCTION

Textile and garment is one of the important industries in Vietnam with a large number of workers, this brings with it the issue of ensuring the working environment in the textile and garment industry becomes an issue of concern to contribute to increasing productivity. Labor productivity and ensure efficient production and business.

After more than 10 years of joining the WTO, Vietnam's textile and garment export turnover increased 4 times, and the localized value of exported textile products increased 6 times. The textile industry currently employs 3 million workers, accounting for >10% of the country's industrial workforce. The average labor growth rate is over 10%. In Vietnam, the textile industry plays a very important role in economic and social development (Hanh Hong, 2020).

Currently, Vietnam has over 8,000 textile and garment enterprises, including more than 4,000 small (under 200 employees) and micro (under 10 employees) businesses. The textile industry attracts more than 2.5 million workers, of which 1.5 million are direct workers, accounting for about 25% of the labor force of the industrial economic sector and nearly 13% of the total labor force of the whole country (Hanh Hong, 2020).

Khanh Hoa province has more than 50 textile and garment enterprises with nearly 10,000 workers (including female workers), employing about 14% of the total industrial workers in the region. Textile and garment products are largely exported to more than 40 countries around the world. The main markets are the US (more than 50%), EU, Saudi Arabia, Canada and Korea (Socio-Economic Situation of Khanh Hoa Province in 2022).

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Vietnam classifies the textile industry into the group of industries with high risk of labor accidents and occupational diseases. Therefore, it receives special attention regarding the working environment. Workers in the garment industry must often work in a working environment with many harmful factors, such as high temperature, loud noise, dust, lack of light,... depending on the nature of each person's work. but there are different unsafe factors.

Like in many developing countries, working in the garment industry in Vietnam is about 80 - 90% female workers. Average working time is 8 hours/day, sometimes overtime up to 10 - 12 hours/day.

T&N Khanh Hoa Garment Company, Vietnam specializes in manufacturing sportswear with a total direct workforce of more than 1,500 people. This study was conducted to describe the current status of the working environment and health of employees at the Company.

RESEARCH SUBJECTS AND METHODS

Research subjects

- Working environment of T&N Khanh Hoa Garment Company, including factors: microclimate, lighting, noise, cotton dust
- Workers of T&N Khanh Hoa Garment Company: direct workers at clothing factories, have worked at the company for at least 2 years.

Location and time of research

Research conducted from July 2022 to December 2023 at T&N Khanh Hoa Garment Company

Research design: Cross-sectional descriptive study.

Research sample size

-Sample size for measuring working environment: Select 36 measurement samples at 3 garment workshop for each factor including temperature, humidity, wind speed, dust, light, noise (each workshop has 12 measurement points, divided into 3 rows along the workshop, each row has 4 measuring points).

- Sample size to assess worker health status: calculated according to the formula for calculating sample size to estimate the ratio:

$$\frac{z_{1-\alpha/2}^2 \cdot \alpha \cdot P^2}{d^2}$$

$Z_{1-\alpha/2}^2$ confidence coefficient with $\alpha = 0.5\%$, 95% confidence, then $Z_{1-\alpha/2} = 1.96$

d: allowable deviation between the rate obtained from the research sample and the rate of the population, choose $d = 0.05$;

p: Percentage of workers suffering from acute nose and throat diseases among garment workers, choose $p = 0.5$ according to research by Lan Trinh Hong (Lan Trinh Hong, 2013).

Substituting into the formula to calculate sample size, we get $n = 364$, increase to 450 to divide equally among 3 workshops. So the minimum health survey sample size is 450 people.

Sampling method

Randomly select stratified by workshop workers who have worked for 2 years or more and volunteer to participate in the study. According to the company's data, 03 workshops have about 1,200 workers working for 2 years or more. We randomly selected from the list of workers working for 2 years or more from the 3 workshops above to study, specifically each workshop has 150 workers.

Information collection method

Environmental measurement: Samples are taken right at the scene, measurement locations are selected according to job location. Each location takes samples at different times, measures directly and takes the average value of the measurements (Table 1).

- Temperature and humidity measurement: Tesla thermometer and hygrometer, Testo 410-1 anemometer, Germany
- Light measurement: Testo 545, Lutron LX107, Germany
- Noise measurement: Extech SDL600, Taiwan
- Dust measurement: Microdust Pro dust meter, Casella, UK

Collect health information: Directly interview research subjects with personal information about some diseases and the working environment using a pre-designed set of questions (questionnaire). Collect health information through health examination results and occupational disease detection examinations in July and August 2022 conducted by scientific staff of the Institute of Occupational Safety and Health Sciences.

Classify workers' health according to "Standards for classifying health for recruitment and periodic examination for workers in occupations and jobs" according to Decision No. 1613/QĐ-BYT dated August 15, 1997 of the Minister Ministry of Health. According to this Decision, worker health is divided

Table 1. Methods of measuring working environment

N	Measurement parameters	Measurement methods	Measuring range	Measurement uncertainty
AIR ENVIRONMENT				
1	Microclimate (temperature, humidity, wind speed)	TCVN 5508:2009	Temperature: 0°C÷50°C Humidity: 10%÷95% Wind speed: 0 ÷ 5 m/s	$U_R < 5,0\%$
2	Noise	TCVN 9799:2013	20 - 120 dB	$U_R < 5,0\%$
3	Respiratory dust	MDHS 14/3	0,01mg/m ³	$U_R < 5,0\%$
4	Cotton dust	OSHA standard – 29CFR, 1910.1043 App A	0,01 mg/m ³	$U_R < 10,0\%$
5	Light	TCVN 7114:2008	0,1 lx - 199 900 lx	$U_R < 5,0\%$

(Source: research team)

into 5 types: i) type I - very healthy: workers are in good health, do not suffer from chronic diseases; ii) type II- healthy: can suffer from chronic diseases but does not affect working health; iii) type III- Moderate, suffering from some chronic diseases, which can affect working health; iv) type IV- weak: Has a disease that causes complications that affect the ability to work and requires long days off for treatment; v) type V - very weak, weak, serious disease that cannot be cured. Classification of diseases: according to the classification of the World Health Organization (ICD-10) to determine the structure of diseases of workers.

Data processing and analysis

Data are entered and data analysis is conducted using SPSS.22.0 software. The data are presented as average values and proportions. Statistical tests used include ÷2 to compare proportions, and statistical value threshold when $p > 0.05$.

Research ethics

Research is conducted after reporting and reaching agreement on research content with business leaders and permission from relevant agencies. Research subjects voluntarily participated after receiving a clear explanation of the purpose and meaning of the research. Information collected is honest, objective, confidential and used only for research purposes.

RESEARCH RESULTS

Current status of working conditions of the enterprise

The working environment temperature does not

meet Vietnamese Standards: QCVN 26:2016/BYT (QCVN) in 2 workshops with up to 63.88% of measured samples, working environment humidity samples do not meet QCVN with a rate of 44%. 47% and the number of wind speed measurements in working environments that do not meet QCVN standards accounts for 47.22% (Table 2).

Regarding the quality of the working environment, 61% of light measurement samples did not meet QCVN, 25% of noise measurement samples did not meet QCVN, 33% of cotton dust samples did not meet QCVN (Table 3).

Thus, it can be seen that the working environment in the workshops is polluted with high temperature, noise pollution, light dust pollution and insufficient lighting.

Structure of health and illness of workers of T&N Khanh Hoa company

Among the 450 workers participating in the study, the proportion of female workers accounted for 95.6%, the ages were mainly from 30 to 39 (accounting for 53.9%) and the working age was mainly from 2 to 7 years old (accounting for 67.3%).

Survey results show that workers in good health are in types I & II (accounting for 78.2%), the proportion of garment workers in poor health (types IV and V) is 3.3%. In the group of workers over 7 years old, the incidence of type I diseases decreased, and types IV and V diseases appeared (2.14%). Workshop 3 is the place with the largest number of workers with over 7 years of work (accounting for 35.3%), and also has the highest rate of type IV and V diseases compared to the other 2 workshops (Table 4).

Regarding the structure of diseases of workers according to ICD10, nose and throat diseases account for the highest rate of 16.43%, followed by gynecological diseases 16.43%, eye diseases 16.0%. Teeth-maxilla of acial (14.0); bronchial and lung diseases (10.9%); followed by the musculoskeletal disease group (9.8%); cardiovascular blood pressure (9.3%); skin diseases (7.6%), digestive diseases (7.1%) and finally neurological diseases (2.4%). Research also shows that older workers working in hot, humid, dusty, and noisy environments have a high incidence of diseases of the nose and throat, gynecology, lungs, bronchi, musculoskeletal, and cardiovascular diseases most (Table 5).

Discuss the environmental impacts on worker health and illness

Impact of temperature and humidity pollution

The results in Table 2 show that all 3 workshops have more than half of the measured samples with thermal pollution (average 63.88%). According to Lien Nguyen Thi Bich (Hanh Hong, 2020), heat and humidity pollution is the cause of ear-nose-throat,

lung-bronchial diseases and contributes to the increase in gynecological diseases for female workers. Working in a hot environment will cause the body to tire quickly, the respiratory and cardiovascular systems must increase activity to increase the ability to eliminate heat, because high air temperatures cause other environmental pollutants to affect more to the worker's body. The results in Table 6 show that 16.43% of workers have ear, nose and throat diseases, 10.9% have bronchial lung diseases and 16.43% of female workers have gynecological diseases.

Also according to Lien Nguyen Thi Bich (Hanh Hong, 2020), environments with high temperature and humidity also help mold grow, making workers susceptible to skin diseases. Table 5 shows that 7.6% of workers have skin diseases.

Impact of dust pollution

Dust in the working environment is the cause of many occupational disorders. Dust generated from current sewing technology is highly organic. Due to the characteristics of garment technology, dust often

Table 2. Results of measuring temperature, humidity and wind speed at the factory (Number of measuring points n=36)

Measurement location	Microclimate indicators					
	Temperature (°C)		Humidity (%)		Wind speed (m/s)	
	Number of failed	Ratio (%)	Number of failed	Ratio (%)	Number of failed	Ratio (%)
Workshop1 (n=12)	08	66,67	04	33,33	06	50,00
Workshop2 (n=12)	07	58,33	05	41,67	05	41,67
Workshop3 (n=12)	08	66,67	07	58,33	06	50,00
Total (n=36)	23	63.88	16	44,44	17	47,22
Vietnamese Standards:	20 – 34 ^{0C}		40 -80%		0,1 – 1,5m/s	
QCVN26:2016/BYT						

(Source: Research team; Number of failed: The number of measurement samples that do not meet Vietnamese standards)

Table 3. Results of measuring dust, noise, and light

Measurement location	Light indicator		Noise criteria		Cotton dust criteria	
	Number of failed	Ratio (%)	Number of failed	Ratio (%)	Number of failed	Ratio (%)
Workshop1 (n=12)	07	58,33	03	25,0	03	25,0
Workshop2 (n=12)	07	58,33	02	16,67	04	33,33
Workshop3 (n=12)	08	66,67	04	33,33	05	41,67
Total (n=36)	22	61,11	09	25,0	12	33,33
Vietnamese Standards	QCVN 22:2016/BYT: 500 lux		QCVN 24:2016/BYT: ≤ 85 dBA		QCVN 24:2016/BYT: ≤ 1 mg/m ³	

(Source: Research team)

arises in relatively large amounts. At Khanh Hoa T&N Company, according to Table 3, the total number of dust measurement samples that did not meet standards was quite high (33.33%). According to Hai Do Tran (2019), dust pollution is the cause of diseases of the nose, throat, lungs, bronchi and skin. At T&N company, according to survey research, the disease incidence is: nasopharynx: 16.43; lung 14.0% and skin 7.6%. According to Lan Trinh Hong (2013), cotton dust pollution in garment factories not only causes lung and bronchial diseases but also increases the risk of gynecological diseases for female workers. That is why at T&N company, nose, throat, lung, bronchial, skin, and gynecological diseases of female workers are relatively high (Table 5).

Harmful effects of lack of light

Lighting is also an element that needs to be improved at this company. Specifically, the results from Table 3 show that up to 61.1% of measurement samples do not meet QCVN standards. According to Hien Hoang Minh (2010), insufficient lighting can lead to eye disorders, increase fatigue, and is unsafe for workers in garment factories. The impact of lack

of lighting also needs to be paid attention and researched further into the combined effects with other factors of the working environment.

Impact of noise

The harmful effects of noise in textile technology, causing physiological disorders, causing fatigue and increasing the incidence of many diseases, have been studied by Russian, British and French authors since the 19th century. According to many authors, the rate. The incidence of other pathological disorders caused by noise is much greater than affecting hearing Barry *et al.* (2011). Through the research results in Table 3, it shows that the number of noise samples that do not meet QCVN standards in all 3 workshops is 25.0%. Our research results are similar to Hai Do Tran's research (2019), the working environment of garment workers in 8 garment factories across the country also has a proportion of noise measurement samples that do not meet standards. Allowable hygiene is about 19 - 25%. The author also notes the preventive care of occupational diseases caused by noise such as reduced hearing of workers Hai Do Tran (2019).

Table 4. Age distribution of workers in factories

	Proportion of workers in factories by age, %							
	1- 3 years		> 3- 5 years		> 5 - 7 years		> 7 years	
Rate according to workshop	n	%	n	%	n	%	n	%
Workshop 1	34	22.7	33	22.0	41	27.3	42	28.0
Workshop 2	32	21.3	35	23.3	38	25.3	45	30.0
Workshop 3	29	19.3	31	20.6	34	22.7	53	35.3

(Source: research team)

Table 5. Structure of diseases of workers by age

Diseases	Distribution of diseases according to occupational age								p-value
	2 - 3 years		3-5 years		5 -7 years		> 7 years		
	(n=90)		(n=80)		(n=133)		(n=147)		
	n	Ratio %	n	Ratio %	n	Ratio%	n	Ratio %	
Nose and throat disease	11	12.2	13	16.2	18	13.5	32	21.8	< 0.05
Gynaecologicaldisease	5	5.5	8	10.0	11	8.3	25	17.0	< 0.05
Eye disease	6	6.7	5	6.2	8	6.0	23	15.6	< 0.05
Bronchial and lung diseases	7	7.8	8	10.0	10	7.5	19	12.9	< 0.05
Dental and facial diseases	7	7.8	5	6.25	9	6.8	13	8.8	< 0.05
Cardiovascular disease	4	4.4	7	8.75	9	6.8	12	9.5	< 0.05
Diseases of muscles - bones - joints	2	2.2	2	2,5	4	3.0	8	4.0	< 0.05
Digestive diseases	9	10.0	16	20.0	19	14.3	28	19.0	< 0.05
Skin diseases	13	14.4	15	18.7	19	14.3	27	18.4	< 0.05
Neuropathy	10	11.1	12	15.0	17	12.8	24	16.3	< 0.05

(Source: research team)

Table 6. Structure of diseases of workers by workshop

Diseases	Workshop 1		Workshop 2		Workshop 1		Medium %	p-value
	Quantity	Ratio%	Quantity	Ratio%	Quantity	Ratio%		
Nose and throat disease	23	15.3	25	16.7	26	17.3	16.43	< 0.05
Gynaecological disease	16	10.7	15	10.0	18	12.0	16.43	< 0.05
Eye disease	13	8.7	15	10.0	14	9.3	16.0	< 0.05
Bronchial and lung diseases	14	9.3	13	8.7	17	11.3	14.0	< 0.05
Dental and facial diseases	11	7.3	13	8.7	10	6.7	10.9	< 0.05
Cardiovascular disease	12	6.7	12	8.0	10	6.7	9.8	< 0.05
Diseases of muscles - bones - joints	3	2.0	3	2.0	5	3.3	9.3	< 0.05
Digestive diseases	22	14.7	24	16.0	26	17.3	7.6	< 0.05
Skin diseases	26	17.3	25	16.7	23	15.3	7.1	< 0.05
Neuropathy	19	12.7	21	14.0	23	15.3	2.4	< 0.05

(Source: research team)

CONCLUSION AND RECOMMENDATIONS

The current status of the working environment at T&N Khanh Hoa Company still has many problems. Microclimate indicators, light, noise, and cotton dust all have samples that do not meet allowed standards (QCVN). The proportion of workers with health types I and II accounts for the majority, but there are still workers with health types III, IV and V. Ear, nose and throat diseases, gynecological diseases, and bronchopulmonary diseases are the group of diseases that account for the highest proportion tallest. The rate of workers getting sick is high. Age is a factor that affects the health status of workers. The company needs to take measures to improve the working environment such as: Ventilation, thermal protection; minimize cotton dust; noise in the factory; Improve lighting quality and have preventive intervention strategies to improve workers' health.

Conflict of Interest - None

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