NGUYEN GIANG LONG

THE STATUS OF ALLERGIC RHINITIS CAUSED BY COTTON DUST AMONG WORKERS IN NAM DINH TEXTILES AND OUTCOME OF INTERVENTIONS

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Academic Supervisors:
        1. **Assoc. Prof. Tran Nhan Thang**
        2. **Assoc. Prof. Duong Thi Huong**

Reviewer 1:
Reviewer 2:

The dissertation will be defended at University level Council of Dissertation Assessment at Haiphong University of Medicine and Pharmacy.

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INTRODUCTION

Recently, the textile industry is an increasingly important role in the national economy of Vietnam. The characteristic of the textile and garment industry is using the simple technological. Although the workers had intensity of labor is not too heavy but the way that they work were tight/restraint, requires a fast industrial rhythm... The rate of female workers is very high, accounting for 80-90 % and mostly in the age of 20-35 years, the average working time was over 8 hours / day, sometimes up to 10-12 hours / day. Working environment in garment factories including cotton dust is one of the causes of allergic respiratory diseases such as allergic rhinitis, asthma. Nam Dinh province is known as a strategic development hub of Vietnam Textile and Garment Industry. The research question was: How is the status of allergic rhinitis caused by cotton dust among workers in textiles and garment factories? What were the factors related to this condition? What are the solutions to the problem of allergic rhinitis of textile workers? Therefore, we conducted the research on: **"The status of allergic rhinitis caused by cotton dust among workers in Nam Dinh textiles and outcome of interventions".** The study includes the following objectives:

1. To describe the status of allergic rhinitis caused by cotton dust among workers in Nam Dinh textile and garment factories in 2016

2. To analyse some factors related to allergic rhinitis caused by cotton dust among workers at Nam Dinh textile and garment factories.

3. To evaluate the results of the behavioral change communication and using anti-Leukotriene drug on the group of allergic rhinitis of workers at Nam Dinh textile and garment factories.

THE CONTRIBUTION OF THE THESIS

The thesis provides data that enrich the overall assessment of the prevalence of allergic rhinitis, the relevant factors and effective of community interventions on workers suffering from allergic rhinitis due to cotton dust. This is a good reference for researchers in the field of occupational health and preventive medicine, especially in Nam Dinh province - which is known as the "Textile City".

The result of interventions by means of health education communication combine with the use of anti-leukotriene (montelukast) drug was contributed to the database serving the workers health care and prevention work of the medical staff of the factories, helping them to find the appropriate, effective, feasible and sustainable intervention measures for the health of workers in this sector.

STRUCTURE OF THE THESIS

The main part of the thesis is 113 pages long, consisting of the following sections: Introduction: 2 pages; Chapter 1- Overview: 29 pages; Chapter 2 - Research Object and Method: 18 pages; Chapter 3 - Research Results: 32 pages; Chapter 4 - Discussion: 29 pages; Conclusions and recommendations: 3 pages

The thesis has 124 references, of which 31 are in Vietnamese and 93 are in English. The thesis has 43 tables and 6 pictures. There are 5 appendices of 8 pages.

Chapter 1. OVERVIEW

1.1. Allergic rhinitis

1.1.1. Epidemiology of Allergic rhinitis

The proportion of irhinitis was reported in several studies conducted in many countries, which numbers fluctuated from 3% to 19%. According to David P. Skoner (2001), allergic rhinitis effected on from 20 to 40 million people in US, and the prevalence was increasing. Hyute FC (2014) showed that allergic rhinitis effected on at least 60 million people in US every year, which impacted on quality of life, direct and indirect cost of patients.

1.1.2. Causes of Allergic rhinitis

Basing on vietnamese and foreign authors, the causes of allergic rhinitis included: exposure with strange factors such as respiratory factors (domestic dust, hairy cattles, anther- dust and so on); food factors (eggs, milk, sea food such as shrime, craft, jelly-fish); medicine factors (antibiotics); atopic factor.

1.2. Allergic rhinitis due to cotton dust among weavers

1.2.1. Occupational allergy due to cotton dust

Cotton dust was the most common factor causing allergic rhinitis. This factor was not only in domestic irons but also in companies. It caused occupational diseases relating to cotton dust which were listed as one of 28 insured occupatianal diseases today, and also the cause of allergy rhinitis.

1.2.2. Allergic rhinitis due to cotton dust

Allergic rhinitis due to cotton dust was a status that patients got allergic rhinitis because of breathing in cotton dust for a long time

in labour environment. The majority of manufacturing industries produced occupational dust which penetrated directly into breath way of workers. In addition, cotton dust was one of noticable factors, which was studied in many countries over the world.

1.2.3. Other risk factors of allergic rhinitis among weavers

Over the harms of manufacturing dust, health of weavers was also impacted by noise, labour environment and occupational stress. Labour safety and improving labour environment in Vietnam was mentioned many years ago, but it has not done because of budget.

1.2.4. Diagnosis of Allergic rhinitis

Asking directly patients about their common symptoms such as nasal itches, sneezing, having a runny nose, snuffles; clinical examination, positive test for strange factors; total IgE > 100UI/ml.

1.2.5. Treatment of Allergic rhinitis

Treatment can be specific for similar clinical symptoms. Medicine used for treating allergic rhinitis was antihistamine, anti congestion, corticosteroid, medicine for keeping mast cell stably, anti-cholinergic and anti- leukotriene.

1.3. Methods used to reduce proportion of bronchi asthma among weavers

- ✓ Technic and labour conditions
- ✓ Medium and health training
- ✓ Individual prevention
- ✓ Medical methods

Chapter 2. RESEARCH OBJECT AND METHOD

2.1. Research subjects, locations, time and study periods

2.1.1. Subject

2.1.1.1. Subjects of descriptive research (objective 1):

     - 1082 staffs working directly at the workshops/factories with cotton dust. Exclusion the workers being absent at the facility during the investigation (i.e on sick leave, maternity leave, business trips, training); the workers with less than 12 months employment.

2.1.1.2. Subjects of the intervention study (objective 3):

107 workers with diagnoses of allergic rhinitis who meet the inclusion criteria and do not violate the exclusion criteria.

Exclusion the workers not voluntarily participating the study after being explained about the purpose and objective of the study.

2.1.2. Location

     The research was carried out at two textile and garment facilities in Nam Dinh: Nam Dinh Yarns Factory - Nam Dinh Textile Joint Stock Company and Song Hong Garment Joint Stock Company

2.1.3. Time

     The study (including the preparation and implementation) was conducted in three years from January 2014 to December 2016.

2.2. Research method

2.2.1. Study design

     The study was carried out under two successive designs: cross-sectional descriptive epidemiological studies at Nam Dinh textile and garment facilities and comparative intervention study.

2.2.2. Sample size and sampling method

2.2.2.1. Sample size and sample selection for the study of allergic

rhinitis status

$$n = Z^2(1-\alpha/2) \times \frac{p(1-p)}{d^2}$$

Actually surveyed workers number 1082.

2.2.2.2. Sample size for environmental intervention study

$$n = \frac{[Z_{1-\alpha/2} \cdot \sqrt{2.p.(1-p)} + Z_\beta\sqrt{p1.(1-p1)+p2.(1-p2)}\,]^2}{(p1-p2)^2}$$

After calculation, the sample size for the intervention study was calculated as n = 35 (workers). We selected two intervention groups: Group 1 was used Montelukast drug and nasopharyngeal hygiene communication; Group 2 was only media interference. In fact, we have selected each group of 54 workers diagnosed with allergic rhinitis causeb by cotton dust

2.3. Technical details and data collection tools

2.3.1. Data collection for Objective 1: Describing current status of allergic rhinitis caused by cotton dust among workers

Determining diagnosis allergic rhinitis caused by cotton dust*:* Conducting the interview, clinical examination, cotton dust test and blood sample for IgE quantification.

*) Criteria for diagnosis of rhinitis:

+ Symptoms: Nasal itching, sneezing, having a runny nose, snuffles

+ Signs: otorhinolaryngology check; Thorough examination and evaluation of adjacent organs such as ear, throat, larynx.

*) Criteria for diagnosis of allergic rhinitis caused by cotton dust:

- Diagnosing rhinitis (according to the above criteria), and

- IgE quantification > 100 UI/ml, and Skin test with cotton dust (+).

2.3.2. Data collection for the third goal:

2.3.2.1. Interventions for patients:

Group 1 included 54 patients were treated with Montelukast (Singulair) with a single dose of 10 mg/day for 6 months. In addition, the patient also received a meducation intervention: counseling on the disease, providing protective masks and instructions on wearing masks regularly/properly; guidling wash their nose after work shift.

Group 2 only received a meducation intervention: counseling on the disease, providing protective masks and instructions on wearing masks regularly/properly; guidling wash their nose after work shift.

2.3.2.2. Evaluation of intervention results:

Time was after 6 months of interventions.

- Evaluation of knowledge and practice: Awareness and practice assessment of allergic rhinitis caused by cotton dust, compare results before and after interventions.

- Assessment of clinical presentations: assessment of the prevalence of symptoms, signs, comparison before and after intervention

- Laboratory assessment: the reduction level of IgE total

2.4. Implementing interventions

Interventions for 6 months: Implement a meducation programe for all 155 workers diagnosed with allergic rhinitis caused by cotton dust, of which 54 patients were randomized to receive Montelukast treatment and prevention.

The information are provided for them about current rhinitis diagnosis and treatment, the theoretical basis of treatment, and strategies for preventing rhinitis risk factors. During the course of the study, we did not intervene in the use of other medications as usual of patients.

Interventions were carried out: training for health workers at 2 textile and garment factories (2 health staffs who were heads of the

factory health station), direct counseling, providing protective masks for 155 workers, and deliver Montelukast to 54 workers.

List workers in two groups: group 1 included 54 workers who received meducation intervention and using Montelukast and group 2 with 53 workers receiving meducation intervention. Patients were counseled directly by health staffs every month.

2.5. Management, processing and analysis of data

- Data were collected and analyzed by SPSS 20.0.

2.6. Research ethics

The research was approved by the Council through the outline of Haiphong University of Medicine and Pharmacy and the leader of Nam Dinh Spinning Factory/Song Hong Garment Company. Prior to participating in the study, all subjects will be provided clear information regarding their research objectives and research content. Research only serves for health care, no other purposes.

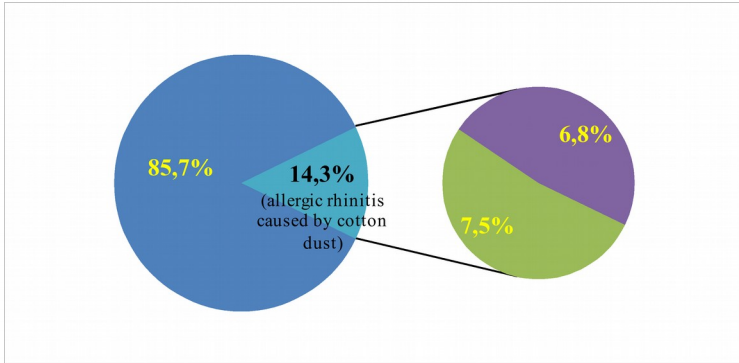## Chapter 3. RESEARCH RESULTS

3.1. The status of allergic rhinitis caused by cotton dust among workers in Nam Dinh textile and garment factories
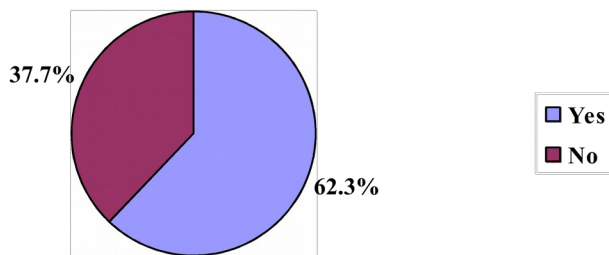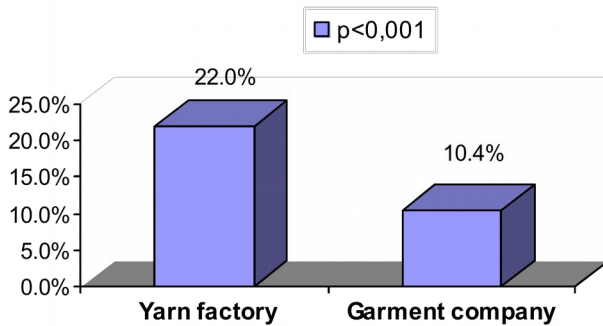

Figure 3.1. The prevalence of ENT cases among workers (n=1082)

The results of Figure 3.1 showed that the prevalence of workers with ENT was 62.3%.

Figure 3.3. The prevalence of allergic rhinitis cases that caused by cotton dust among workers (n = 1082)

The rate of allergic rhinitis that caused by cotton dust in the total number of workers at both sites was 14.3%.

Figure 3.4. The prevalence of allergic rhinitis that caused by cotton dust in each facility

The prevalence of allergic rhinitis caused by cotton dust in Nam Dinh Yarn Factory was 22.0%, higher in Song Hong Garment Joint Stock Company (10.4%) with statistically significant difference ($p < 0.05$).

Table 3.14. The prevalence of allergic rhinitis caused by cotton dust followed gender

Gender	Yarn Factory[1]		Garment Company[2]		Total		p[1&2]
	n	%	n	%	n	%	
Female[3]	45	20,9	50	9,4	95	12,7	**<0,001**
Male[4]	36	23,5	24	13,1	60	17,9	**0,013**
Total	81	22,0	74	10,4	155	14,3	**<0,001**
p[3&4]	0,553		0,127		**0,026**		

The prevalence of allergic rhinitis caused by cotton dust in female workers was 12.7%, lower than that in male workers (17.9%), the difference was statistically significant ($p < 0.05$). The prevalence of allergic rhinitis caused by cotton dust in female workers in yarn factory was 20.9% higher than that of female workers ($p < 0.05$). There were 23.5% of male workers in the yarn factory was diagnosed allergic rhinitis caused bycotton dust, higher than that in the garment company (13.1%) with statistically significant difference ($p < 0.05$).

Table 3.15. The prevalence of allergic rhinitis caused by cotton dust followed age group

Age group	Yarn Factory[1]		Garment Company[2]		Total		p[1,2]
	n	%	n	%	n	%	
< 30	19	24,7	20	9,0	39	13,0	**<0,001**
30-39	33	24,4	32	8,9	65	13,2	**<0,001**
40-49	17	20,0	20	17,2	37	18,4	0,618
≥ 50	12	16,9	2	11,8	14	15,9	1,000*
Total	81	22,0	74	10,4	155	14,3	
p	0,559		0,066		0,277		

*)Fisher's Exact test

The prevalence of allergic rhinitis caused bycotton dust among workers in the age group under 30 years and group (30-39 years) in

the yarn factory was higher in the garment company (p <0.05). At the yarn company, prevalence of allergic rhinitis caused bycotton dust was highest in the under 30 age group (24.7%), the lowest in the 50-year-old group, but the difference was not statistically significant (p> 0.05). At the garment company, the highest prevalence was in the group (40-49), followed by the group >50 years, there was no difference in the prevalence of allergic rhinitis caused bycotton dust in the age group of workers in the Song Hong garment company (p> 0.05).

Table 3.16. The prevalence of allergic rhinitis caused by cotton dust followed seniority

Seniority	Yarn Factory[1]		Garment Company[2]		Total		$p_{1,2}$
	n	%	n	%	n	%	
<10 years	41	25,2	33	8,7	74	13,6	<0,001
10 - ≤ 20	18	25,4	30	11,4	48	14,3	0,003
>20 years	22	16,4	11	15,7	33	16,2	0,897
Total	81	22,0	74	10,4	155	14,3	
p	0,147		0,166		0,675		

The prevalence of allergic rhinitis caused by cotton dust among workers did not different according to seniority in the yarn factory and garment company (p> 0.05). The prevalence of under-10 years and seniority (10-20 years) in the yarn factory was 25.2% and 25.4%, respectively, higher than in garment company (8.7% and 11.4% %) with statistically significant difference (p <0.05).

Table 3.17. The prevalence of allergic rhinitis caused bycotton dust followed job characteristics

Jobs	Yarn Factory[1]		Garment ompany[2]		p[1,2]
	n	%	n	%	
Regular exposure to cotton dust[3]	75	24,2	66	9,9	**<0,001**
Irregular exposure to cotton dust[4]	6	10,3	8	16,3	0,361
Total	**81**	**22,0**	**74**	**10,4**	
p[3,4]	0,019		0,157		

There was a difference in the prevalence of allergic rhinitis caused by cotton dust in th two groups of direct and indirect workers exposed to dust in 2 factories/companies (p <0.05). Specifically: Allergic rhinitis prevalence caused bycotton dust in the direct worker group in the yarn factory was higher in the Garment Company (24.2% vs. 9.9%) with p <0.05. The prevalence of allergic rhinitis caused bycotton dust among workers in direct/ indirect labor (irregular contact with dust) was significantly (p <0.05) different at the yarn factory but not in garment company (p> 0.05).

3.2. Some factors related to allergic rhinitis caused by cotton dust among workers at Nam Dinh textile and garment factory.

Table 3.29. A multivariate analyzes of related factors and allergic rhinitis caused by cotton dust

Factors		OR adjusted	95%CI	p value
Factory	Garment	-		
	Weave	1,51	0,60 – 3,83	0,381
Gender	Female	-		
	Male	1,71	1,13 - 2,60	**0,011**
Temperature	Standard permitted	-		
	Not up to standard	1,17	0,55-2,52	0,684
Humidity	Standard permitted	-		
	Not up to standard	0,83	0,39-1,75	0,631
Cotton dust	Standard permitted	-		
	Not up to standard	1,40	0,74-2,64	0,296
Personal allergy history	No	-		
	Yes	2,42	1,61-3,63	<0,001
Family allergy history	No	-		
	Yes	17,62	9,14-33,96	<0,001

Considering the inclusion of multivariable models of p<0,2 in multivariable analysis using the enter-forward method, the results suggest that there are three factors that influence the allergic rhinitis prevalence due to cotton dust at Nam Dinh Textile Garment Joint Stock Corporation are gender factor, history of allergies (individuals and families). Specifically, male workers were 1.7 times more likely to suffer from allergic rhinitis due to cotton dust than those who were female (95% CI = 1.13 to 2.60, p <0.05). Workers who had a history

of allergy were more likely get disease of 2.4 times (95% CI = 1.61-3.63, p <0.001). Those with family allergy history were 17.6 times more likely (95% CI = 9.14-33.96; p <0.001) than other workers.

3.3. The results of the behavioral change communication and using anti-Leukotriene drug on the group of allergic rhinitis of workers at Nam Dinh textile and garment factory

Table 3.30. The knowledge of workers on pre-and post-intervention cotton dust

Time / Proper knowledge	Before intervention		$p_{1,2}$	After intervention		$p_{3,4}$
	Comm. and med[1] (n=54) (n,%)	Comm.[2] (n=53) (n,%)		Comm. and med[3] (n=54) (n,%)	Comm.[4] (n=53) (n,%)	
Regarding the association between family history of allergies and allergic rhinitis	12 (22,2)	25 (47,2)	0,007	54 (100,0)	54 (100,0)	-
Symptoms of allergic rhinitis	8 (14,8)	14 (26,4)	0,138	48 (88,9)	51 (96,2)	0,149
Measures against allergic rhinitis relapse	9 (16,7)	16 (30,2)	0,098	47 (87,0)	48 (90,6)	0,563

Comm.): communication intervention group;
med.): communication and medication intervention group

Proper knowledge about the relationship between family history of allergies and allergic rhinitis; The correct knowledge about the symptoms of the disease and the relapse prevention measures of the workers after the intervention have significantly increased in both groups and no difference between the two groups (p> 0.05).

Table 3.31. Practice of objects about allergic rhinitis caused by cotton dust before and after intervention

Time	Before intervention		$p_{1,2}$	After intervention		$p_{3,4}$
Proper knowledge	Comm. and med[1] (n=54) (n,%)	Comm.[2] (n=53) (n,%)		Comm. and med[3] (n=54) (n,%)	Comm.[4] (n=53) (n,%)	
Get a disease	29 (53,7)	32 (60,4)	0,486	48 (88,9)	48 (90,6)	0,775
Cotton dust avoidance	45 (83,3)	43 (81,1)	0,766	47 (87,0)	48 (90,6)	0,563
Washing nose after work shift	10 (18,5)	15 (28,3)	0,232	39 (72,2)	43 (81,1)	0,276

Comm.): communication intervention group;
med.): communication and medication intervention group

Proper practice when they or their close relative have allergic rhinitis; the practice of cotton dust preventive measures was increased after intervention and there was no difference between two intervention groups treated with medication and communication with the intervention group (p> 0,05). The prevalence of practising nasal irrigation after work shift also increased significantly after intervention and no difference between two groups (p> 0.05).

3.3.2. Improved symptoms of allergic rhinitis

**Table 3.32-3.35. Effectiveness of functional symptoms in the
study group**

Objects	Group drug				Communication group				Effectiveness of intervention (%)
	Before intervention (n=54)		After intervention (n=54)		Before intervention (n=53)		After Intervention (n=53)		
Symptoms	n	%	n	%	n	%	n	%	
No symptoms of itching	12	22,2	36	66,7	13	24,5	23	43,4	123,3
No symptoms of sneezing	3	5,6	25	46,3	2	3,8	14	26,4	132,0
No symptoms of runny nose	9	16,7	35	64,8	11	20,8	21	39,6	197,6
No symptoms of stuffy nose	21	38,9	45	83,3	24	45,3	33	62,3	76,6

After intervention, the prevalence of asymptomatic nasal irritation increased from 22.2% to 66.7% in the Montelukast workers group; No symptons of sneezing increased from 5.6% to 46.3%; No symptoms of runny nose increased from 16.7% to 64.8% and no signs of stuffy nose increased from 38.9% to 83.3%. For the group receiving intervention only by health education communication, the prevalence of nasal irritation increased from 24.5% to 43.4%; no symptoms of sneeze increased from 3.8% to 26.4%; No symptoms of runny nose increased from 20.8% to 39.6%; No symptoms of nasal congestion increased from 45.3% to 62.3%. Intervention effectiveness ranged from 76.6% to 197.6%.

3.3.3. Improved symptoms of allergic rhinitis

Table 3.37-3.40. Effectiveness of interventions on physical symptoms of the study group

Objects / Symptoms	Group drug				Communication group				Effectiveness of intervention (%)
	Before intervention (n=54)		After intervention (n=54)		Before intervention (n=53)		After intervention (n=53)		
	n	%	n	%	n	%	n	%	
Pink nasal mucosa	29	53,7	48	88,9	29	54,7	35	66,0	44,9
No mucus nasal cavity	9	16,7	37	68,5	9	17,0	26	58,9	63,7
Normal middle conchae	29	53,7	49	90,7	33	62,3	38	71,7	53,8
Normal inferior conchae	31	57,4	45	83,3	32	60,4	34	64,2	38,8

After the intervention, in the Montelukast group, the prevalence of pink nasal mucosa increased from 53.7% to 88.9%; No mucus nasal cavity increased from 16.7% to 68.5%; The prevalence of normal middle conchae increased from 53.7% to 90.7%; The prevalence of normal inferior conchae increased from 57.4% to 83.3%. For the group receiving only media interventions, the prevalence of pink nasal mucosa increased from 54.7% to 66.0%; the prevalence of no mucus nasal cavity increased from 17% to 58.9%; the prevalence of normal middle conchae increased from 62.3% to 71.1%; normal inferior conchae have increased from 60.4% to 64.2%. Intervention effectiveness from 38.8% to 63.7%.

Table 3.43. Improved efficacy in subclinical

Objects / Level of decrease in IgE	Interventions for communication and medicine (n=54)		Communication intervention (n=53)		p
	n	%	n	%	
Excellent (decrease >20%)	45	83,3	21	39,6	<0,001
Good (decrease 10%-20%)	6	11,1	6	11,3	
Medium (decrease <10%)	2	3,7	5	9,4	
Bad (increase)	1	1,9	21	39,6	
Total	54	100,0	53	100,0	

After intervention, the Montelukast group had a reduction in IgE levels in the blood> 20% (excellent level) of 83.3%, significantly higher (p<0.05) than in the control group Communication interventions (an excellent reduction in serum IgE levels of 39.6%). In the group receiving only media interventions, 39.6% had elevated levels of IgE in their blood compared to the previous six months.

Chapter 4. DISCUSSION

4.1. Prevalence of allergic rhinitis (AR) caused by cotton dust among the workers at Nam Đinh Textile Company

Our study was conducted on 1082 workers in 2 textile and garment factories in Nam Dinh. Some results were cited: the rate of ear – nose - throat diseases was 62.3% (Figure 3.1); the prevalence of allergic rhinitis caused by cotton dust among the total of workers at both sites was 14.3%. Research by Vu Van San (2002) on 780

workers at Hang Kenh Carpet Company, Hai Phong Province found that 32.5% of workers affected by occupational AR due to cotton dust. The AR prevalence of our study was lower than that in Hang Kenh Carpet Company in 2002, due probably to the fact that the carpeting process generated more cotton dust in one hand, and the tailored technology has been improved after 15 years of development in other hand, so the allergic rhinitis due to cotton dust has decreased. Considering the AR prevalence in term of the factory, we found that (Figure 3.4): the rate was 22.0% in Nam Dinh spinach factory, was higher in the Song Hong factory (10.4%) with significant difference (p <0.05). In fact, the technology of fibers textile with the main material is organic cotton will generate more cotton dust in the sewing industry process, the results of environmental factors measuring in these two facilities also showed that: the labor environment (temperature, humidity, wind speed, cotton dust concentration) at Song Hong garment company is better than that of Nam Dinh Fibers factory.

Concern to the AR prevalence by gender (Table 3.14): the rate in female workers is 12.7%, lower than in male workers (17.9%), the difference was statistically significant (p <0.05). Finding out about the AR prevalence by age group, the results of Table 3.15 showed that the AR rate in two companies was highest in the age group of 40 to 49. According to the factory, we found that the AR in the age group under 30 years and group of 30 to 39 in the fiber factory was higher than in the garment company (p <0.05). In our study, as shown in Table 3.16: The AR prevalence was not different by seniority in two companies (p> 0.05). The AR prevalence in the group of workers aged under 10 years and age from 10 to 20 years in the fiber factory

is 25.2% and 25.4%, was higher than in the garment company (8.7% and 11.4% %) with statistically significant difference (p <0.05).

There was a difference of AR prevalence in the two groups of direct and indirect workers exposed to dust in 2 companies (p <0.05). In fact, the AR prevalence among workers exposed to cotton dust was higher in the Garment Factory (24.2% vs. 9.9%), with p <0.05 (Table 3.17). The AR prevalence among workers in regular and irregular contact with cotton dust was significantly different at the fiber factory (p <0.05), but not in garment company (p > 0.05). The results of our study are consistent with the findings of Dantas Ide P et al., who studied among 124 workers from Nova Novaanja Co-operative of Nova Odessa (Sao Paulo) from September to December 2008 to assess the symptoms of occupational rhinitis in workers exposed to cotton dust. Results showed that 63.7% of workers complained of nasal congestion, 57.2% had itchy nose, 46.7% had rhinorrhea, and 66.1% had sneezing. Of the patients considered to be very symptomatic, 9% had nasal obstruction; 9% had itchy nose; 4% had rhinorrhea; and 6.4% had sneezing. The authors commented that there were a strong relationship between job-related exposure in the cotton industry and the symptoms of rhinitis. The authors also concluded that data analysis clearly demonstrated the presence of rhinitis symptoms in these patients, demonstrating that prevention and treatment of this condition in the workplace is totally important.

2. Factors associated to AR caused by cotton dust

Considering the multivariable models by factor associated analyzing using the enter-forward approach with p <.02, the results suggest that there were three factors that influence the AR prevalence in Nam Dinh textile and garment. Those were the gender, allergic

antecedence (individuals and families). In fact, the risk of AR affected among the male workers was 1.7 times higher than that of female workers (95% CI = 1.13-2.60, p <0.05). Also, the risk of AR affected among the workers with individuals allergic history were 2.4 times higher (95% CI = 1.61-3.63, p <0.001) and families history of allergy was 17.6 times higher (95% CI = 9.14-33.96; p <0.001) than those with other workers. The result of AR factor associated analysis from the research conducted by Wang ZH in China also showed that the AR has a sustainable correlation with asthma and atopic eczema. Or the research of López Pérez G have pointed that the allergic diseases prevalence in Mexico City was 42.6%, and AR was the most common. The most important risk factor for allergic diseases was family history.

3. Intervention results

In the intervention component, we've conducted a health education on allergic rhinitis for all 155 workers diagnosed with AR by cotton dust. Among them, 54 workers were treated with Montelukast in combination with health education. After 6 months of intervention, the results of table 3.30 showed that their knowledge concern to the association between family allergic history and AR, to the symptoms of the disease and the relapse prevention measures have significantly increased in both groups and were not different between the groups treated by Montelukast and health education with the intervention group only by health education (p>0.05). These results are the basis for a comparison of the efficacy of Montelukast in the two groups by drug and health education and health education only. In term of practical evaluation of AR after intervention between the two groups, the results of table 3.31 mentioned that the rate of

correct practice was higher in the group with AR history or AR family history. The percentage of workers practicing cotton dust preventive measures increased after intervention and there was no difference between the two groups treated with Montelukast and health education with the health education only (p> 0.05). The rate of nasal irrigation practice after work time also increased significantly after intervention and seemed similar between the two groups (p> 0.05). Saline nasal washings have been known for more than a century, and so far there have been many scientifically validated studies demonstrating the effectiveness of nasal irrigation with saline. Results from table 3.32 to 3.35 and table 3.37 to 3.40 showed that Montelukast drug interventions are best for mild and moderate physical and affective symptoms. This is a really meaningful result for the public health sector. The results of our study also mentioned a significant reduction in total serum IgE level after 6 months (Table 3.43). Montelukast has been justified to inhibit IgE by the way of reducing the production of IL 4 - one of the factors that activate lymphocytes B to produce IgE.

4. Limitations of the study

Representation of the sample is not enough high because we only selected in one province of northern. The analysis of the relationship between the different occupations, factors that cause allergic rhinitis to allergic rhinitis by cotton dust in workers were not deep and comprehensive due to the cross-sectional description design. There is not any research studying on comparable evaluation of allergen standardized in accordance with international standards.

CONCLUSION

1. Prevalence of allergic rhinitis (AR) caused by cotton dust among the workers at Nam Đinh Textile Company

The prevalence of otorhinolaryngology diseases among workers in Nam Dinh textile and garment factory is 62,3% (the prevalence of workers in the textile factory is 76,1% and in Song Hong garment company is 55,2%).

The prevalence of allergic rhinitis caused by cotton dust among workers in Nam Dinh textile and garment factory is 14,3%.

The prevalence among workers in the textile factory is higher than in the garment company *(22,0% và 10,4%) with p<0,05.*

The prevalence of allergic rhinitis caused by cotton dust among females (12,7%) is lower than that in males (17,9%) with (p<0,05).

2. Factors associated to allergic rhinitis caused by cotton dust

Multivariate analysis results:

Male workers were 1.7 times more likely to suffer from allergic rhinitis caused by cotton dust than those who were female (95% CI = 1.13 to 2.60, p <0.05).

Workers who had a individual history of allergy were 2.4 times more likely to suffer from allergic rhinitis caused by cotton dust than those who hadn't (95% CI = 1.61-3.63, p <0.001).

Workers who had a family history of allergy were 17.6 times more likely to suffer from allergic rhinitis caused by cotton dust than others (95%CI=9,14-33,96; p<0,001).

3. Intervention results

   - The correct knowledge, correct practice of allergic rhinitis

caused by cotton dust among the workers after the intervention has increased markedly.

- The percentage of workers who practice nasal irrigation increased after intervention.

- Intervention is best for mild and moderate symptoms (both symptoms and signs)

- Subclinical intervention efficacy: The Montelukast group had a statistically significant decrease in IgE levels> 20% (good) at 83.3% (p <0, 05) compared with those receiving only meducation intervention (39.6%).

RECOMMENDATION

From the research results, we make the following recommendations:

1. For the workers

- To maintain a regular health check-up.

- To maintain a regular medical examination to detect new allergic rhinitis early.

To maintain using of labor protection equipment to prevent dust from entering the airways.

2. For the medical staff of the factories

- To implement regular medical examination for workers to be able to detect early cases of allergic rhinitis.

- To manage of allergic rhinitis cases, counseling use montelukast in treatment and prevention.

LIST OF RELATED RESEARCH PROJECTS
PULISHED BY AUTHOR

1. Nguyen Giang Long, Nguyen Van Son, Tran Thi Thuy Ha, Duong Thi Huong, Vu Minh Thuc (2016). "Situation of allergic rhinitis caused by cotton dust and factors associated among workers at the textile companies in Nam Dinh province in 2016". *Vietnam journal of preventive medicine.* Vol 14(187), 2016.

2. Nguyen Giang Long, Tran Thi Thuy Ha, Nguyen Van Son, Duong Thi Huong, Vu Minh Thuc (2016). "Pattern of diseases of workers at the textile companies in Nam Dinh province in 2016". *Vietnam journal of preventive medicine.* Vol 14(187), 2016.

3. Nguyen Giang Long, Tran Thi Thuy Ha, Vu Minh Thuc, Duong Thi Huong, Tran Nhan Thang (2018). "Effectiveness of Motelukast drug intervention for allergic rhinitis caused by cotton dust of textile workers in Nam Dinh province, 2016". *Vietnam journal of preventive medicine.* Vol 4(28), 2018.