# WORKING ENVIRONMENT AND RESPIRATORY PROBLEMS AMONG EMPLOYEES IN 2 GARMENT FACTORIES IN UBON RATCHATHANI PROVINCE

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Public Health Program in Public Health
College of Public Health Sciences
Chulalongkorn University
Academic Year 2010

# สิ่งแวดล้อมการทำงานกับปัญหาระบบทางเดินหายใจของพนักงานในสองโรงงานเย็บผ้า ในจังหวัดอุบลราชธานี

นางสาววัลย์ลิยา กันยารัตน์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต
สาขาวิชาสาธารณสุขศาสตร์
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2553

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| Thesis Title | WORKING ENVIRONMENT AND RESPIRATORY PROBLEMS AMONG EMPLOYEES IN 2 GARMENT FACTORIES IN UBON RATCHATHANI PROVINCE |
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| Field of Study | Public Health |
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วัลย์ลิยา กันยารัตน์ : สิ่งแวดล้อมการทำงานกับปัญหาระบบทางเดินหายใจของพนักงานในสองโรงงานเย็บผ้าในจังหวัดอุบลราชธานี (WORKING ENVIRONMENT AND RESPIRATORY PROBLEMS AMONG EMPLOYEES IN 2 GARMENT FACTORIES IN UBON RATCHATHANI PROVINCE) อ. ที่ปรึกษาวิทยานิพนธ์หลัก : Robert S. Chapman, M.D., M.P.H., 74 หน้า

การศึกษาครั้งนี้มีจุดประสงค์เพื่อระบุปัจจัยด้านสิ่งแวดล้อมการทำงานที่มีความสัมพันธ์กับความหลากหลายของอาการทางระบบทางเดินหายใจของพนักงานโรงงานเย็บผ้าสองแห่งในภาคตะวันออกเฉียงเหนือ ประเทศไทย ปัจจัยด้านลักษณะทางประชากร และพฤติกรรมได้ถูกนำมาทดสอบด้วย การศึกษาครอบคลุมพนักงานจำนวน 380 ราย ( ไม่รวมเจ้าหน้าที่บริหาร) อาการทางระบบทางเดินหายใจ ได้แก่ ไอ มีเสมหะ หายใจลำบาก หายใจตื้นแน่นหน้าอก หายใจเสียงวี๊ด และจมูกอักเสบ ความหลากหลายของอาการในโรงงานหนึ่ง (โรงงาน B) มีมากกว่าอีกโรงงานหนึ่ง (โรงงาน A) โรงงาน A มีการระบายอากาศ ในขณะที่โรงงาน B ไม่มี นอกจากนี้ การปรากฏของฝุ่นที่มองเห็นได้ยังมีมากกว่า และสัดส่วนของพนักงานเย็บผ้าฝ้าย (ซึ่งตรงข้ามกับผ้าชนิดอื่น เช่น ผ้าใยสังเคราะห์)ในโรงงาน B มีมากกว่าโรงงาน A คนงานในโรงงาน B มีอายุการทำงานยาวนานกว่าโรงงาน A จากการทดสอบปัจจัยด้านลักษณะทางประชากร พบว่า เพศหญิงมีความสัมพันธ์กับมีความหลากหลายของอาการที่เพิ่มขึ้น อย่างไรก็ตาม การสูบบุหรี่ไม่มีความสัมพันธ์กับความหลากหลายของอาการทางระบบทางเดินหายใจที่เพิ่มขึ้น

ผลจากการศึกษาให้ข้อเสนอแนะที่ชัดเจนว่าปัจจัยด้านสิ่งแวดล้อมการทำงานมีความสัมพันธ์กับความหลากหลายของอาการทางระบบทางเดินหายใจของคนงานในโรงงานเย็บผ้า แต่เนื่องจากการวิเคราะห์แบบหลายตัวแปรไม่ได้นำมาใช้ ปัจจัยเฉพาะด้านจึงไม่สามารถนำมาเปรียบเทียบได้โดยวิธีการทางสถิติ การวิจัยต่อไปในหัวข้อนี้จึงเป็นสิ่งจำเป็นเพื่อให้ทราบถึงนโยบายซึ่งจะทำให้คนงานในโรงงานเย็บผ้าของประเทศไทยมีความมั่นใจในความปลอดภัยในการทำงาน

สาขาวิชา สาธารณสุขศาสตร์ ลายมือชื่อนิสิต……..

ปีการศึกษา 2553 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก…….

## 5279140953 : MAJOR PUBLIC HEALTH
KEYWORDS : RESPIRATORY PROBLEMS OF SAWING EMPLOYEES
WANLIYA GANYARUT : WORKING ENVIRONMENT AND RESPIRATORY PROBLEMS AMONG EMPLOYEES OF 2 GARMENT FACTORIES IN UBON RATCHATHANI PROVINCE. THESIS ADVISOR : ROBERT S. CHAPMAN, M. D., M. P.H., 74 pp.

This study aimed to identify workplace environmental factors associated with prevalence of respiratory symptoms among employees in 2 garment factories in northeastern Thailand. Sociodemographic and behavioral factors were also examined. The study included 380 workers (excluding administrators). Respiratory symptoms included cough, phlegm, difficulty breathing, shortness of breath, chest tightness, wheeze, and rhinitis. Symptom prevalence was consistently higher at one factory (factory B) than the other (factory A). Factory A had air ventilation, whereas factory B did not. Also, presence of visible dust was more pronounced, and a higher proportion of workers sewed cotton fabric (as opposed to other types such as polyester), at factory B than factory A. Workers at factory B had also worked longer than those at factory A. Among sociodemographic factors, female gender was consistently associated with elevated prevalence. Surprisingly, smoking was not associated with increased respiratory symptom prevalence, possibly due to confounding in the data.

Study results suggest strongly that workplace environmental factors are associated with symptom prevalence in garment factory workers. However, because multivariable analysis was not conducted, the specific contributions of individual factors could not be compared with confidence. Further research on this topic is needed to inform policies that will ensure the safety of garment workers in Thailand.

Field of Study : Public Health Student's Signature : ……..

AcademicYear : 2010 Advisor's Signature : ……..

# ACKNOWNLEDGEMENTS

This thesis had been completed successfully with an excellent support from Robert S. Chapman, M.D., M.P.H, a thesis advisor who provided suggestion in various aspects, revising the thesis and giving a mental support to the researcher. There fore the researcher would link to give a grateful thank to Robert S. Chapman, M.D., M.P.H, for him entire support.

Grateful thanks to Assist. Prof. Prathurng Hongsranagon**,** Wattasit Siriwong, Ph.D., Assist. Prof. Dr. Ratana Somrongthong and Apaporn Siripornprasarn, Ph.D. Members of Thesis Examination Committee who scarified their time and gave comments on improving the thesis to be more correctly and completely.

Grateful thanks to Mr. Santiphong Booncom and Mr. Narawuth Khamhom my researcher assistants for him invaluable advice and interview of this thesis.

Grateful thanks to father, mother, grandmother, brother, and friends for mine who have provided a great support to me.

Grateful thank to manufacturers and employees of 2 garment factories, who kindly took part in the study and provided the vital information on which the study was based.

Further, I am particularly thankful to the college of public health Sciences Chulalongkorn university for the partial thesis grant, which enabled me to undertake this study.

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# CHAPTER I

# INTRODUCTION

## 1.1 Background and Rationale

According to the best available estimates 100 million workers are injured and 200 000 die each year in occupational accidents and 68-157 million new cases of occupational disease arc attributed to hazardous exposures or workloads. Estimates of prevalence of industrial byssinosis and other chronic Lung Diseases are Cotton textile, Jute and other organic fibers industries range from about 30 –38%. Such high numbers of severe health outcomes contribute to one of the most important impacts on the health of the world's population. Occupational injuries and diseases play an even more important role in developing countries where 70% of the working population of the world lives. By affecting the health of the working population, occupational injuries and diseases have profound effects on work productivity and on the economic and social well-being of workers, their families and dependents. According to recent estimates, the cost of work-related health loss and associated productivity loss may amount to several percent of the total gross national product of the countries of the world.

Every year about 10 million of the 150 million workers in the European Community are affected by accidents or diseases at work and must charge direct at 20 billion ECU per year . Every year about 2,000 lives are lost through occupational disease or injury, about 20,000 major industrial injuries occur and there are about 200,000 injuries result in an absence from work at least 3 day. While only about 300 workers receive disablement benefit for industrial dermatitis every year, there may be between 15,000 and 60,000 new cases of this condition every year. Extrapolation from the UK Labor Force Survey suggest that in a year at least one million people believed they had ill health caused by work and a further million believed they had ill

health made worse by work.

The study in Karachi on June 2006 was conducted in a spinning mill , from 83 workers, around 35% workers complained of having respiratory ailments of which 19% (16 workers) closely matched byssinotic symptoms. Pulmonary Function Tests confirmed 13 of 16 workers to be byssinotics. Prevalence of byssinosis in spinning and textile workers of Karachi, Pakistan, among 362 textile workers, the authors found the prevalence of byssinosis to be 35.6% ( Memon et al., 2008).

Population in working age are the main population production building and must take care the other age population of country so status of population working age can indicate health status of all Thai population, accounting for more than half of the total population of country most of population working age 51%-56% agricultural work, the remaining work in the industry 16% and administration department. According to the survey found 85% of the population working age think that they are healthy. The factors effecting health were age sex behavior environment residential and occupation.

Health status of the population working age as a whole are likely to improve however in various risk groups has important health problem in many. Especially problem cause by work, this is the urgent need to remedy and prevent. The important method is developing occupational health service system and must expand its services to cover the risk even more. Including the development of the law, enforcement and a campaign to educate the population working age.

Today development personal of industry and agriculture in Thailand is rapidly, effect are occupation diseases, environment pollution both chronic and acute, several times with severe disability and death which these are preventable by workers and interest of all parties involved.

From studied of The Occupational Health Division, in collaboration with Dr. Praparn Yongchaiyut and colleagues, in 1987, conducted a study on 229 thread spinning workers in a textile industry in Samut Prakan Province found that a

19.7 percent byssinosis prevalence. In 1990, revealed that in a textile industry in Phitsanulok Province, the overall prevalence rate of byssinosis was 20.2 percent; and at different sections, the rates were 29.4 percent in the weaving section, 12.1 percent in the spinning section, and 9.6 percent in the dyeing section.

In 2001 reported by the Annual Epidemiology Surveillance, from occupation patients 3,035 found nuemoconiosis is 3.4 percent. The occupation lung diseases (Annual Epidemiology Surveillance Report [AESR], 2005: online) , in 2005 reported from the Bureau Epidemiology found 137 cases, morbidity 0.22 per hundred thousand population which is higher than all last years (1993-2005) and no reported death, the northeast region has highest morbidity 0.28 per hundred thousand population followed by the central, north and south regions are 0.22, 0.18 and 0.13 per hundred thousand population respectively, Samootsakhorn has highest morbidity 6.04 per hundred thousand population followed by Lampang, Rayong, Ubonratchathanee, Trad, Si Sa Ket , Srakaew, Trang, Surathanee are 2.19, 1.45, 1.41, 0.92, 0.83 0.75, 0.67, 0.64 and 0.54 per hundred thousand population respectively, the patients who are with occupation lung diseases found 50 females and 78 males, the ratio female per male was 1 per 1.17, when considering that age group found that age group over 35 years (93 cases) has highest morbidity that is 0.33 per hundred thousand population followed by 25-34 years(31 cases) and 15-24 years (13 cases) has morbidity 0.28 and 0.13 per hundred thousand population respectively. Kind of dust classification of the sickness in this year found that mineral dust 1 case, silica dust 17 cases, bagasse dust 10 cases, cotton dust 17 cases and unknown kind, not indentified 92 cases ( AESR, 2005: online).

The Northeast sector is one sector has to development industrial rapidly and lack care system about health of workers safety that is industrial garment which from step of process, many threats to health problem of workers were light, cotton dust, noise, chemical dye or wash clothes and unbalance condition of work with workers in ergonomic. Such as in 2005 reported by the Bureau Epidemiology found that the northeast region has highest morbidity of occupational lung disease in Thailand, 0.28 per hundred thousand population ( AESR, 2005: online) and in 2006

found that the north region has highest morbidity followed by the northeast central south and central region (AESR, 2005 : online).

Ubon Rachathani province is a big province in the Northeastern of Thailand and it has population of a large number immigrants living because of one channel to connect trade with neighboring countries where is connect trade in all the time, many famous tourist attractions where are popular for foreigners and Thais, many academies and many hospital where are many medical specialties. Consequently possibility all business is growing rapidly which include the garment factory then these was built almost every year. Owing to industry increased rapidly can result in employees health care underserved. However it have not a study in this issue in Ubon Rachathani province.

From above problem so that the researcher is interested to study the problem of garment industry for help the workers in garments factories to reduce disease from working, can work effectively and productively fully follow. A previous study in Songkhla Province, Thailand suggested increased rates of respiratory problems in cotton sewing workers, even though these workers may have only moderate cotton dust exposure. The researcher intends to assess this issue in garment factory workers in Ubon Rachathani Province, Thailand, to help assess the public health burden of moderate cotton dust exposure. The study has conducted in 2 garment factories, one of which has relatively good ventilation (uses air vacuum cleaners), and one of which has relatively poor ventilation (uses only fans). The socioeconomic situation of workers is similar between these two factories.

**1.2 Research questions**

1. What is the working environment, and the personal and behavioral characteristics, of garment factory workers in Ubon Rachathani?

2. What is the prevalence of respiratory problems relation to cotton dust exposure?

Exposure metrics

- Factory (ventilation)
- Nature of work in the factory
- Amount of visible dust
- Duration working in factory
- Protective behavior (mask)
- Past history of high exposure (spinning, weaving cotton)

3. What are the personal, behavioral and working environment factors of employees who have respiratory problems in Ubon Rachathani province?

4. What is the relationship of personal and behavioral factors to respiratory symptoms?

**1.3 Research Objectives**

1. To study the prevalence of respiratory problems relate to exposure to cotton dust .
2. To identify associations of cotton dust exposure metrics and other independent variables with prevalence of health problems in Ubon Ratchatani Province.
3. To indentify correlation between duration of exposure and respiratory Problems of employees garment factories in Ubon Rachathani province.

**1.4 Research Limitation**

All employees who work in 2 garment factories in Ubon Rachathani province that is 380 cases only. Study results may not be generalizable beyond Ubon Rachathani Province.

**1.5 Problems and Obstacles**

Did not receive cooperation from 2 administration of garment factories (All 4 factories).

## 1.6 Conceptual framework

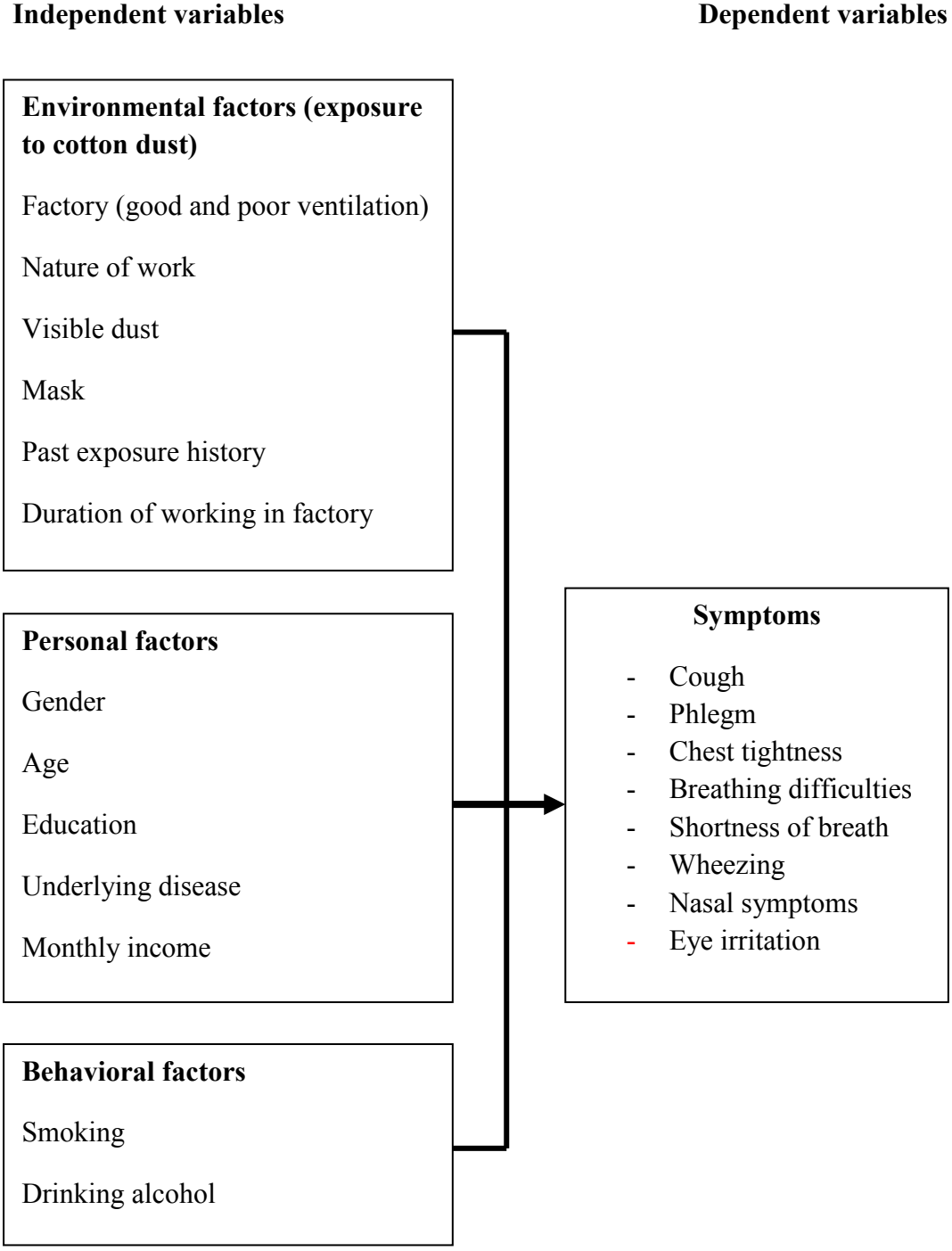


Figure 1 Conceptual framework of the factors associated with respiratory problems of employees garment factories

## 1.7 Operational Definitions

In this study, there are both independent and dependent variables

### 1.7.1 Independent Variable

#### 1.7.1.1 Environmental factors

**Factory** refers to good ventilation and poor ventilation, factory A has relatively good ventilation (uses air vacuum cleaners) and factory B has relatively poor ventilation (uses only fans).

**Nature of work** in present work place include sewing, packing, store, screen, ironing, supervisor, homemaker, repair maintenance, Q.C., other and included kind of dust those are cotton, jeans, linen, nylon, polyester and other.

**Visible dust** refers to amount of dust in sector of employees working, these are do not see dust in the air or on the floor, see dust in the air but not on the floor, see dust on the floor but not in the air and see dust in the air and on the floor.

**Mask** refers to wearing a mask duration of working, wear and not wear the mask.

**Past exposure history** refers to nature of work of past worked before move in new place which as a spinner of cotton yarn and a cotton weaver.

**Duration of working in factory** is since start work until present that are less than 5 years and more than 5 years.

#### 1.7.1.2 Personal factors

**Gender** refers to male and female.

**Age** refers to age workers in the factory.

**Educational level** refers to the relationship between respiratory problems and education level will be measured by categorizing people into the following groups: no

school, primary school, secondary school, high school education, diploma and bachelor's degree or higher.

**Underlying disease** refer to urticaria**,** the skin rash or chronic dermatitis, allergy, chronic bronchitis, asthma, byssinosis, tuberculosis, hypertension, diabetes mellitus, heath disease.

**Monthly income**- refer to less than 10,000 baht and 10,000 baht or more.

#### 1.7.1.3 Behavioral factor

**Smoking** refers to smoking and not smoking in usually routine.

**Alcohol consumption** refers to drink and not drink in usually routine.

### 1.7.2 Dependent Variables

**Respiratory problems** are disorder sign and symptom in respiratory system, there are prevalences of cough, phlegm, chest tightness**,** breathing difficulties, Shortness of breath and wheezing, Prevalences of nasal symptoms and eye irritation will also be assessed. Participants will be asked about recent history of medication to help make breathing easier.

# CHAPTER II

# LITERATURE REVIEW

## 2.1 Theoretical overview

### 2.1.1 Working environment

**working environments** refer to difference atmospheric which this will have the aid or support operations such as buildings work properly, the materials are modern equipments and adequate performance.

**Safe and healthy environment** refers to environment both physical and psychological that is working condition must not look to be too risky and must help worker fell comfortable and not harmful to health.

In the management of an organization to succeed need good human resources management so that allow with dedication and commitment to work witch the one factor that makes people dedicate commitment to work that is the environment to work property so that the workers fell satisfied with their work environment.

### 2.1.2 Type of environment that effect to performance

**Physical environment**

Light air vibration sound radiation machines and equipment these will involve work on total health such as the volume if the work is less than 7 hours must have the volume 91 dB (A) if work 7-8 hours the volume must be 90 dB (A) and if more than 8 hours the volume will be reduced to respectively.

**Environment Chemical**

Chemical substance use as raw materials productivity or to eliminate waste generally these chemicals may be in form vapor, dust, smock, gas or substance in liquid form such as acidity, basidity solvent etc.

**Environment Biological**

Environment biological refers to the living and dead such as fungi, bacteria, viruses, worm these are the living all part environment biological of the images are dead wood dust, cotton dust.

**Environment Social Psychological**

This environment refers to economic operation including the pace of work to compete with time and labor wages that are not appropriate that causing street at work considered a total environment in social psychology.

### 2.1.3 Occupation hazard

Health and career both have to relationship this is first career make to healthy and at the same time the professionals that we can have good health require both physical and mental both these things need to be together to work effectively. The second are negative relationship that is career negatively impact health and with diseases so that necessary to control and prevent disease and occupation hazard in addition should the study, teaching people to secure employment.

### 2.1.4 Respiratory diseases by occupational

Decreased, functioning of the lung will lose, sand dust lung disease = damage lung tissue, cough, tiredness, gasp, asbestos lung disease = lung cancer, pleura cancer. Cotton dust lung disease = bronchial narrow, cough, chest pain, chronic bronchitis, tiredness, airbag aneurysm.

Respiratory diseases by occupational is common because of toxins into the body by through the respiratory tract in particles which can enter respiratory system at different levels according to the size of the particles and cause respiratory diseases from upper respiratory system such as inflammation of the lining of the nose, clod, sore throat until the lower respiratory system which cause various pneumoconiosis. In addition, these particles may be to stimulate the immune system in the body, secrete substances to stimulate the narrowing of the trachea which cause asthma or secretion of water out of the air sac can cause pneumonia.

Pathogenesis of respiratory disease of occupation, beginning from inhalation of chemical into respiratory system in different particle size if the size is less than 3 microns into the trachea to the end into the air sac. These particle cause irritation from the nose, back of nose, bronchia, air tube and air sac cause irritation of the upper respiratory system, narrowing of the trachea, inflammation in the lung and air sacs cause by respiratory diseases.

### 2.1.5 Occupational Lung Diseases

Occupational lung diseases repeated and long-term exposure to certain irritants on the job can lead to an array of lung diseases that may have lasting effects, even after exposure ceases. Certain occupations, because of the nature of their location, work, and environment, are more at risk for occupational lung diseases than others. Contrary to a popular misconception, coal miners are not the only ones at risk for occupational lung diseases. For instance, working in a car garage or textile factory can expose a person to hazardous chemicals, dusts, and fibers that may lead to a lifetime of lung problems if not properly diagnosed and treated (The Ohio State University Medical Center[OHIO], 2010 : online).

#### 2.1.5.1 Byssinosis

Byssinosis is a disease caused by the inhalation of cotton, flax, and hemp fibers while working (Kobayashi et al., 2003). Byssinosis may cause wheezing

and tightness in the chest, usually on the first day of work after a break. Unlike with asthma, the symptoms tend to diminish after repeated exposure, and the chest tightness may disappear by the end of the workweek. However, after a person has worked with cotton for many years, the chest tightness may last for 2 or 3 workdays or even the whole week. Prolonged exposure to cotton dust increases the frequency of symptoms (wheezing, chest tightness) and leads to permanent lung disease, which can sometimes be disabling (Newman, 2008: online).

**Definition**

Byssinosis is a disease of the lungs brought on by breathing in cotton dust or dusts from other vegetable fibers such as flax, hemp, or sisal while at (Kaufman, 2009: online).

**Alternative Names**

Cotton worker's lung, Cotton bract disease, Mill fever, Brown lung (Kaufman, 2009: online) and Monday fever (Suchata Chinajit, 2006: online).

**Risk for Byssinosis**

People who work in the textile industry are at risk due to their exposure to dust. Being exposed to the dust many times can lead to chronic lung disease and shortness of breath or wheezing. Smoking increases the risk for this disease (OHIO, 2010 : online) and related to the severity of respiratory illness (Da Costa et al., 1998).

**Causes**

Breathing in the dust produced by raw cotton can cause byssinosis. It is most common in people who work in the textile industry. Those who are sensitive to the dust can have an asthma-like condition after being exposed. In those with asthma, being exposed to the dust makes breathing more difficult, but in byssinosis, the symptoms usually go away by the end of the work week. After long periods of exposure, symptoms can continue throughout the week without improving. Byssinosis is still common in developing countries. Smoking increases the risk for this disease.

Being exposed to the dust many times can lead to chronic lung disease and shortness of breath or wheezing.

**Signs and symptoms**

**Symptoms** get worse at the beginning of the work week and then improve while workers are away from the workplace, or later in the work week. Symptoms are chest tightness and dyspnea that lessen with repeated exposure. Symptoms develop on the first day of work after a weekend or vacation and diminish or disappear by the end of the week. With repeated exposure over a period of years, chest tightness tends to return and persist through midweek and occasionally to the end of the week or as long as the person continues to work. This typical temporal pattern distinguishes byssinosis from asthma.

**Signs** of acute exposure are tachypnea, breathing difficulties, chest tightness (Churerut Bunjonglikhitkul, 2001: online) wheezing and coughing. Patients with more chronic exposure may have crackles.

**Breathing difficulties**

Breathing difficulty can be a symptom of a variety of mild to serious disorders, diseases or conditions. Breathing difficulty is also called dyspnea and can result from infection, inflammation, trauma, malignancy, airway obstruction and other abnormal processes. Breathing difficulty can occur in any age group or population. Breathing difficulty can result from a relatively mild condition that is easy to resolve, such as wearing restrictive clothing around the abdomen. Breathing difficulty can also accompany a moderate condition, such as hyperventilation or an anxiety attack.

Breathing difficulty combined with rapid breathing, more that about 16 breaths per minute for an adult, is called tachypnea. Tachypnea can be a symptom of a serious or life-threatening respiratory condition. These include pneumothorax, pneumonia acute bronchitis, bronchiolitis, asthma, COPD, pulmonary embolism and pulmonary edema. Breathing difficulty can also occur just before respiratory arrest, in which breathing becomes completely ineffective or stops altogether. Breathing difficulty can also be a symptom of lung cancer.

**Chest tightness**

Chest pain is discomfort or pain that you feel anywhere along the front of your body between your neck and upper abdomen.

**Wheezing**

Wheezing is an abnormal sound made during breathing that can be compared to a high-pitched whistling sound. Wheezing is a type of breathing difficulty can be a symptom of a variety of disorders, diseases or conditions. Wheezing can result from infection, inflammation, and airway obstruction and other abnormal processes. Wheezing is made as air passes through narrowed areas in the respiratory tract. Wheezing due to a narrowed trachea (windpipe) is often the result of croup or a foreign body in the throat and partial airway obstruction. Wheezing due to narrowed airways in the lungs is often the result of diseases, such as asthma, COPD, bronchitis, bronchiolitis, or pneumonia. Wheezing can also result from an allergic reaction or the more serious anaphylactic reaction. Wheezing is often made during exhalation, but can be made during inhalation as well. Wheezing is a high-pitched whistling sound during breathing. It occurs when air flows through narrowed breathing tubes (Kaufman, 2009: online).

**Coughing**

Coughing is an important way to keep your throat and airways clear. However, excessive coughing may mean you have an underlying disease or disorder. Some coughs are dry, while others are considered productive. A productive cough is one that brings (Kaufman, 2009: online).

**Diagnosis of Byssinosis**

Diagnosis is based on history and pulmonary function tests that show typical airflow obstruction and a reduction in ventilatory capacity, especially if measured at the start and end of a first work shift. Hyperresponsiveness to

methacholine is also often observed. Surveillance measures, including symptom reporting and spirometry in textile workers, can aid in early detection (Churerut Bunjonglikhitku, 2001 : online).

**Exams and Tests**

Tests that detect decreasing lung capacity during the workday are used to diagnose byssinosis. Obstructive patterns are likely in patients who have had recurrent symptoms for more than 10 years.

**Treatment**

Treatment includes avoidance or reduction of exposure and use of asthma drugs.

**Prevention**

Controlling dust, using face masks, and other measures can reduce the risk. Stop smoking, especially if you work in textile manufacturing. (Kaufman, 2009: online)

#### 2.1.5.2 Occupational asthma

Occupational asthma is a form of lung disease in which the breathing passages shrink, swell, or become inflamed or congested as a result of exposure to irritants in the workplace. Occupational asthma is a lung disorder characterized by attacks of breathing difficulty, wheezing, prolonged exhalation, and cough, which is caused by various agents found in the work place. These symptoms are usually due to spasms of the muscles lining the airways, which cause them to narrow excessively (Agius, 2007: online).

**Definition of Asthma:**

Asthma is an inflammatory disorder of the airways, which causes attacks of wheezing, shortness of breath, chest tightness, and coughing.

**Causes, incidence, and risk factors:**

Asthma is caused by inflammation in the airways. When an asthma attack occurs, the muscles surrounding the airways become tight and the lining of the air passages swell. This reduces the amount of air that can pass by, and can lead to wheezing sounds.

Most people with asthma have wheezing attacks separated by symptom-free periods. Some patients have long-term shortness of breath with episodes of increased shortness of breath. In others, a cough may be the main symptom. Asthma attacks can last minutes to days and can become dangerous if the airflow becomes severely restricted.

In sensitive individuals, asthma symptoms can be triggered by breathing in allergy-causing substances (called allergens or triggers).

**Common asthma triggers include:**

- Animals (pet hair or dander)
- Dust
- Changes in weather (most often cold weather)
- Chemicals in the air or in food
- Exercise
- Mold
- Pollen
- Respiratory infections, such as the common cold
- Strong emotions (stress)
- Tobacco smoke

**Signs and Symptoms**

Symptoms include shortness of breath, chest tightness, wheezing, and cough, often with upper respiratory symptoms such as sneezing, rhinorrhea, and tearing. Upper airway and conjunctival symptoms may precede the typical asthmatic symptoms by months or years. Symptoms may develop during work hours after specific dust or vapor exposure but often do not become apparent until several hours

after leaving work, thereby making the association with occupational exposure less obvious. Nocturnal wheezing may be the only symptom. Often, symptoms disappear on weekends or during vacations, although with ongoing exposure temporal exacerbations and relief become less apparent.

**Wheezing**

-Comes in episodes
-May be worse at night or in early morning
-May go away on its own
-Gets better when using drugs that open the airways (bronchodilators)
-Gets worse when breathing in cold air
-Gets worse with exercise
-Gets worse with heartburn (reflux)
-Usually begins suddenly

**Emergency symptoms**

-Bluish color to the lips and face
-Decreased level of alertness such as severe drowsiness or confusion, during an asthma attack
-Extreme difficulty breathing
-Rapid pulse
-Severe anxiety due to shortness of breath
-Sweating

**Additional symptoms that may be associated with this disease:**

-Abnormal breathing pattern -breathing out takes more than twice as long as breathing in

-Breathing temporarily stops

-Chest pain

-Nasal flaring

-Tightness in the chest

**Diagnosis of Occupational asthma**

-Occupational history of allergen exposure

-Immunologic testing

-Sometimes, inhalation challenge test

Diagnosis depends on recognizing the link between workplace allergens and asthma. Diagnosis is suspected on the basis of an occupational history of allergen exposure. A materials safety data sheet can be used to identify potential allergens, and substances listed can be used to direct immunologic testing of suspected antigens to demonstrate that an agent in the workplace is affecting a person. An increase in bronchial hyperresponsiveness after exposure to the suspected antigen is also helpful in making the diagnosis. In difficult cases, a carefully controlled inhalation challenge test done in the laboratory confirms the cause of the airway obstruction. Such procedures should be done only at centers experienced in inhalation challenge testing and capable of monitoring and treating the sometimes severe reactions that can occur. Pulmonary function tests or peak expiratory flow measurements that show decreasing airflow during work are further evidence that occupational exposure is causative. Methacholine challenge tests can be used to establish the degree of airway hyperreactivity. Sensitivity to methacholine may decrease after exposure to the occupational allergen has ceased.

Differentiation from idiopathic asthma is generally based on the pattern of symptoms, demonstration that allergens are present in the workplace, and the relationship between exposure to allergens and symptoms and physiologic worsening.

**Signs and tests**

Allergy testing may be helpful in identifying allergens in people with persistent asthma. Common allergens include pet dander, dust mites, cockroach allergens, molds, and pollens. Common respiratory irritants include tobacco smoke, pollution, and fumes from burning wood or gas.

The doctor will use a stethoscope to listen to the lungs. Asthma-related sounds may be heard. However, lung sounds are usually normal be

**Treatment**

Treatment is the same as for idiopathic asthma, including inhaled bronchodilators and corticosteroids. Treatment should also include removal of the patient from ongoing exposure to the causative agent.

**Prevention**

Dust suppression is essential. However, elimination of all instances of sensitization and clinical disease may not be possible. Once sensitized, patients with occupational asthma may react to extremely low levels of airborne allergen. Patients who return to environments in which the allergen persists generally have a poorer prognosis, with more respiratory symptoms, more abnormal lung physiology, a greater need for drugs, and more frequent and severe exacerbations. Whenever possible, a symptomatic person should be removed from a setting known to produce symptoms. If exposure continues, symptoms tend to persist. Occupational asthma can sometimes be cured if it is diagnosed early and exposure ceases.

### 2.1.6 Prevention of occupational pulmonary diseases

Prevention of occupational and environmental pulmonary diseases centers on reducing exposure (primary prevention). Exposure can be limited by the use of

-Administrative controls (eg, limiting the number of people exposed to hazardous conditions)

-Engineering controls (eg, enclosures, ventilation systems, safe clean-up procedures)

-Product substitution (eg, using safer, less toxic materials)
-Respiratory protection devices (eg, respirator, dust mask, gas mask)

### 2.1.7 Prevent lung disease from working

1. Management environment amount of dust in the standard.
2. Provide appropriate protective equipment.
3. Workers must health check every 6 months.

## 2.2 Review of Related Literature

Vichai Palitnondakiat and Seksan Akkawasai,1997 studied on the manufacturing processes of these kinds of factories might be directly harmful to the health and safety of the workers. Poor working conditions, for example, dust, smoke and noise pollution, might not only affect the health and safety of these workers but also affected the health of their family members and communities.

Jaded chaovilai, 2003 found female workers who were ill with pneumonia from cotton dust of Bangkok textile factory from being violated by employers since started to work, compressed wage, no defense health and safety, without any benefits when sick most are not treated properly because doctor lack and hospital that has expertise in diseases related to work.

Wichai jaikaow et al. 1997 have to showed the result that all six factories got standard environment. There were, abnormal lung function test in 123 cases (27.1%). The abnormal health problems had significant correlation with the duration of exposure.

Srisamorn Kamonped et al. 2005 The results revealed that 11 occupational asthma cases were found (prevalent rate was 7.79%) The mean duration of working period for occupational asthma cases was significantly longer than (8.95 years) those in the control group. The illness history, rash or chronic dermatitis and asthma, were significantly related to occupational asthma while the relative risk were 10.91 and 7.71 respectively. All measurements employed in this study might not be sufficient to detect the cases.

Li et al., 2005 found risk of NPC is associated with cumulative exposure to cotton dust. The hazard ratio for women cumulatively exposed to >143.4 mg/m3 x years of cotton dust was 3.6 (95% CI 1.8 to 7.2) compared with unexposed women. Trends of increasing risk were also found with increasing duration of exposure to acids and caustics ($p = 0.05$), and with years worked in dyeing processes ($p = 0.06$). Women who worked at least 10 years in dyeing processes had a 3.6-fold excess risk of NPC (95% CI 1.0 to 12.1).

Wang, et al., 2002 Among cotton workers, the cumulative incidence of byssinosis and chest tightness was 24% and 23%, respectively, and was significantly more common in smokers than in non-smokers. A high proportion of symptoms was found to be intermittent, rather than persistent. Among silk workers, no typical byssinosis was identified; the incidence of chest tightness was 10%. Chronic bronchitis, cough, and dyspnoea were more common and persistent in the cotton group than in the silk group. Significantly lower odds ratios for symptoms were observed in cotton workers who left the cotton mills; risk was also related to years since last worked. Multivariate analysis indicated a trend for higher cumulative exposure to endotoxin in relation to a higher risk for byssinosis.

Kassahun, Abera and Gail, 2007 found the highest prevalence of respiratory symptoms was found in the carding section - cough 77%, phlegm 62%, chest tightness 46% and dyspnea 62%. The Overall prevalence of chronic bronchitis was 32%. About 11% of byssinotics developed severe chronic FEV1 changes.

Le Van et al., 2005 found exposure to dusts from cotton, wood, metal, minerals, and/or asbestos was associated with nonchronic cough and/or phlegm (odds ratio (OR) = 1.19, 95% confidence interval (CI): 1.08, 1.30), chronic bronchitis (OR = 1.26, 95% CI: 1.01, 1.57), and adult-onset asthma (OR = 1.14, 95% CI: 1.00, 1.30). Cotton dust was the major contributor to respiratory symptoms.

Pitchaya Phakthongsuk et al. 2006 found that the sewing workers reported more symptoms of phlegm, chest tightness and eye irritation than persons of the control group. Neither clinical investigations nor respiratory disorders under study provided evidence for a significant difference between the sewing workers and the control group. Of the 22 subjects, 2 (9.1%) showed occupational asthma and 4 (18.2%) mucous membrane irritation and organic dust toxic symptoms. The total and

respiratory dust was within normal limits, but the dust concentration measured by the elutriator was above the limit value of 0.34 +_ 0.09 mg/m3. After ventilation improvements, the dust level decreased to 0.19 +_ 0.06 mg/m3. This study suggests that even low to moderate occupational cotton dust exposure can produce respirator.

# CHAPTER III

# RESEARCH METHODOLOGY

## 3.1 Research Design

This research was designed as a cross-sectional study.

## 3.2 Study Area

Area of this research were 2 garment factories Ubon Rachathani province. The factory A has relatively good ventilation (uses air vacuum cleaners). The factory B has relatively poor ventilation (uses only fans).

## 3.3 Study Population

The population of this study were all employees working in these 2 garment factories in Ubon Rachathani province that were totally 380 cases, 200 cases from good ventilation factory A and 180 cases from poor ventilation factory B, respectively.

### 3.3.1 Inclusion Criteria

They could participate in the research, if they

- work in factory A or factory B
- voluntarily participate in this research
- were not factory administrators and security guards.
- present at work

### 3.3.2 Exclusion Criteria

They could not participate in the research, if they

- did not voluntarily participate in this research
- were factory administrators and security guards.

- absent at work

### 3.4 Sampling Technique

All 380 employees who work in 2 garment factories in Ubon Rachathani province had been invited to participate in this study. Subjects had free to withdraw at any time. Even so, it is expected that very few people was withdraw, because the factory owners had already given the researcher permission to do the study in their factories. The study could accommodate a withdrawal rate of over 10%. For example, assuming a respiratory symptom prevalence of 33%, 45 people (12% of 380) could withdraw and the confidence level of the remaining sample (335 people) would still exceed 95%. Thus, the researcher was confident that the proposed sampling technique was appropriated.

### 3.5 Sample and Sample size

The sample and sample size were totally 380 employees who are work in 2 garment factories in Ubon Rachathani province.

### 3.6 Measurement Tools

**1) Tools used**

The tool used this research was a standardized interviewer-administered questionnaire that ascertains personal, environmental, and health characteristics of study participants.

**2) Pilot study**

A pilot study was conducted with 30 workers at a garment factory in Roi-Et Province. The draft questionnaire had administered to these workers. Before the full-scale study in Ubon Ratchathani, the questionnaire was revised for clarity as appropriated.

### 3.7 Data Collection

Data collection to personal data, behavior data and environment data witch researcher and 2 researcher assistants who are public health officers interviewed after work employees and received permission from owner establishments by 2 researcher assistants trained from the researcher to understand interview method, research process, detail of Questionnaire and time for interviewed all 7 day. For specialize and same standard in interviewed face to face.

### 3.8 Data Analysis

Data analysis a descriptive component and an analytical component. In the descriptive component, workers' personal and occupational characteristics had presented. Respiratory symptom rates was also described. Frequency distributions had given for categorical variables. For continuous variables that are normally distributed, means and standard deviations were given. For non-normally distributed continuous variables, medians and percentiles were given.

The main purpose of the analytical component was to evaluate symptom rates in relation to cotton dust exposure metrics. Exposure will be assessed in the following ways: (a) comparing the factories with relatively good and relatively poor ventilation; (b) comparing according to the amount of visible dust that workers report; (c) comparing according to presence or absence of previous high risk of cotton dust exposure (history of cotton spinning and cotton weaving); (d) comparing according to duration of employment in the present garment factory; (e) comparing according to use of face mask at work. Each symptom were evaluated in relation to these exposure metrics. The dependent variables are presence or absence of the respective respiratory symptoms. These are dichotomous (yes, no) variables, and analysis was conducted accordingly. Chi-square tests was performed for categorical

independent variables. Logistic regression will be performed for continuous independent variables.

Similar analyses had also conducted for symptom rates in relation to personal and socioeconomic characteristics such as gender, age, and education. This was enable the researcher to assess whether any observed associations between cotton dust exposure and respiratory symptoms are subject to confounding by these other characteristics.

Data analysis were conducted using SPSS for Windows.

### 3.9 Ethical Consideration

This study was research in humans focuses research for the purpose of employees directory, others people, society and academic progress then to follow ethical guidelines of research in human, the researcher was detailed information research process and form application consent participate in this study of both owner establishments and employees so that they got information before decided participate in this research, anonymous participate and at the end of research the owner establishments and employees signed on form application showing consent before publishing information contained in the research and all participant had advice about to prevention respiratory problems. However all procedures were received ethical approval from the Ethical Review Committee for Research Involving Human Subjects, Health Science Group, Chulalongkon University.

# CHAPTER IV

# RESULTS

## 4.1 Introduction

This chapter presents research results. The chapter is divided into two sections, descriptive and analytical. The descriptive section gives frequency distributions of environmental, sociodemographic, and behavioral characteristics (independent variables). There are 12 independent variables in all. Of these, six are environmental: factory, presence of an air ventilation device, presence of visible dust, having sewing as main job, sews cotton fabric at work, and duration of employment at the factory. Four are socioedmographic: gender, age, education, and income. Two are behavioral: cigarette smoking and alcohol drinking. The descriptive section also gives prevalences of symptoms in the preceding 6 months (dependent variables). There are eight symptoms in all. Of these, seven are respiratory: cough, phlegm, difficulty breathing, shortness of breath, chest tightness, wheeze, and rhinitis. The final symptom is eye irritation.

The analytical section presents associations of symptom prevalences with the independent variables. It also presents a summary of directions of statistically significant associations between the independent variables and the eight types of symptoms. Finally it, presents distributions of independent variables by factory, in an effort to explore possible confounding in the data.

## 4.2 Descriptive results

Distributions of independent variables are presented in table 1. 47.6% of subjects had an air ventilation device in their workplace. 60.3% reported visible dust both in the air and on the floor (as opposed to dust in the air or on the floor, or no

visible dust). Sewing was the main job for 75.0% of subjects, and 45.0% sewed cotton fabric. 81.3% of subjects were females, and 42.9% had a primary school education. 7.1% had income of 10,000 baht or more per month. 8.9% of subjects smoked cigarettes and 36.8% drank alcohol.

Table 1. Frequeny distributions of environmental, sociodemographic, and behavioral characteristics in all 380 subjects.

| Characteristic | Count | Percent |
|---|---|---|
| Environmental | | |
| Factory | | |
| A | 200 | 52.6 |
| B | 180 | 47.4 |
| Air ventilation device* | | |
| No | 198 | 52.1 |
| Yes | 181 | 47.6 |
| Dust in air and on floor | | |
| No | 151 | 39.7 |
| Yes | 229 | 60.3 |
| Main job is sewing | | |
| No | 95 | 25.0 |
| Yes | 285 | 75.0 |
| Sews cotton | | |
| No | 209 | 55.0 |
| Yes | 171 | 45.0 |
| >5 yrs working at factory | | |

| | | |
|---|---|---|
| No | 224 | 58.9 |
| Yes | 156 | 41.1 |
| Sociodemographic | | |
| Gender | | |
| Female | 309 | 81.3 |
| Male | 71 | 18.7 |
| Age (yrs) | | |
| ≤30 | 165 | 43.4 |
| 31-40 | 160 | 42.1 |
| >40 | 55 | 14.5 |
| Education | | |
| Primary | 163 | 42.9 |
| ≤Secondary 3rd yr | 146 | 38.4 |
| Higher | 71 | 18.7 |
| Monthly income (baht) | | |
| <10,000 | 353 | 92.9 |
| ≥10,000 | 27 | 7.1 |
| Behavioral | | |
| Smokes cigarettes | | |
| No | 346 | 91.1 |
| Yes | 34 | 8.9 |
| Drinks alcohol | | |
| No | 240 | 63.2 |
| Yes | 140 | 36.8 |

*total=379

Prevalences of self-reported symptoms are shown in table 2. Reported prevalences were generally quite high. Prevalences of cough, phlegm, and rhinitis were greater than 50%, and prevalence of eye irritation was nearly 50%. Prevalences of shortness of breath and wheeze were 24.2% and 15.0%, respectively.

Table 2. Prevalences (percent) of symptoms during the preceding 6 months in all 380 subjects..

| Symptom | Count | Percent | Factory A(%) | Factory B(%) |
|---|---|---|---|---|
| Cough | 217 | 57.1 | 113 ( 56.5) | 104 (57.8) |
| Phlegm | 207 | 54.5 | 99 (49.9) | 108 (60) |
| Difficulty breathing | 111 | 29.2 | 42 (21.0) | 69 (38.3) |
| Shortness of breath | 92 | 24.2 | 29 (14.5) | 63 (35.0) |
| Chest tightness | 112 | 29.5 | 45 (22.5) | 67 (37.2) |
| Wheeze | 57 | 15.0 | 22 (11.0) | 35 (19.4) |
| Rhinitis | 224 | 58.9 | 135 (67.5) | 89 (49.4) |
| Eye irritation* | 187 | 49.2 | 90 (45.0) | 97 (54.8) |

* total=377

**4.3 Analytical results**

Associations of independent variables with prevalence of cough in the preceding 6 months are shown in table 3. Among the 12 independent variables, only alcohol drinking was statistically significantly associated with cough prevalence. Specifically, cough prevalence was significantly higher in subjects who drank alcohol than in those who did not. No environmental or sociodemographic variable was significantly associated with cough prevalence.

Table 3. Prevalences of cough in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 56.5 | 113 | 0.06 | 0.802 |
| B | 57.8 | 104 | | |
| Air ventilation device | | | | |
| No | 58.1 | 115 | 0.20 | 0.654 |
| Yes | 55.8 | 101 | | |
| Dust in air and on floor | | | | |
| No | 57.6 | 87 | 0.03 | 0.870 |
| Yes | 56.8 | 130 | | |
| Main job is sewing | | | | |
| No | 60.0 | 57 | 0.43 | 0.510 |
| Yes | 56.1 | 160 | | |
| Sews cotton | | | | |
| No | 58.4 | 122 | 0.31 | 0.581 |
| Yes | 55.6 | 95 | | |
| >5 yrs working at factory | | | | |
| No | 56.3 | 126 | 0.16 | 0.686 |
| Yes | 58.3 | 91 | | |
| Sociodemographic | | | | |
| Gender | | | | |

| | | | | |
|---|---|---|---|---|
| Female | 58.6 | 181 | 1.46 | 0.227 |
| Male | 50.7 | 36 | | |
| Age (yrs) | | | | |
| ≤30 | 57.0 | 94 | 0.61 | 0.738 |
| 31-40 | 58.8 | 94 | | |
| >40 | 52.7 | 29 | | |
| Education | | | | |
| Primary | 51.5 | 84 | 3.81 | 0.149 |
| ≤Secondary 3rd yr | 60.3 | 88 | | |
| Higher | 63.4 | 45 | | |
| Monthly income (baht) | | | | |
| <10,000 | 57.8 | 204 | 0.95 | 0.329 |
| ≥10,000 | 48.1 | 13 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 57.8 | 200 | 0.77 | 0.380 |
| Yes | 50.0 | 17 | | |
| Drinks alcohol | | | | |
| No | 52.5 | 126 | 5.64 | 0.018* |
| Yes | 65.0 | 91 | | |

Associations of independent variables with prevalence of phlegm in the preceding 6 months are shown in table 4. Working in factory B and presence of dust both in the air and on the floor were significantly associated with increased phlegm prevalence. Presence of an air ventilation device was marginally associated with decreased prevalence (p=0.067). Male gender and cigarette smoking were significantly associated with decreased phlegm prevalence.

Table 4. Prevalences of phlegm in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence (%) | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 49.5 | 99 | 4.21 | 0.040* |
| B | 60 | 108 | | |
| Air ventilation device | | | | |
| No | 59.1 | 117 | 3.35 | 0.067 |
| Yes | 49.7 | 90 | | |
| Dust in air and on floor | | | | |
| No | 45.7 | 69 | 7.79 | 0.005* |
| Yes | 60.3 | 138 | | |
| Main job is sewing | | | | |
| No | 51.6 | 49 | 0.43 | 0.513 |
| Yes | 55.4 | 158 | | |
| Sews cotton | | | | |
| No | 51.2 | 107 | 2.01 | 0.156 |
| Yes | 58.5 | 100 | | |

| | | | | |
|---|---|---|---|---|
| >5 yrs working at factory | | | | |
| No | 54.9 | 123 | 0.04 | 0.838 |
| Yes | 53.8 | 84 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 57.3 | 177 | 5.26 | 0.022* |
| Male | 42.3 | 30 | | |
| Age (yrs) | | | | |
| ≤30 | 52.1 | 86 | 0.76 | 0.684 |
| 31-40 | 55.6 | 89 | | |
| >40 | 58.2 | 32 | | |
| Education | | | | |
| Primary | 49.1 | 80 | 3.53 | 0.172 |
| ≤Secondary 3rd yr | 57.5 | 84 | | |
| Higher | 60.6 | 43 | | |
| Monthly income (baht) | | | | |
| <10,000 | 54.1 | 191 | 0.27 | 0.604 |
| ≥10,000 | 59.3 | 16 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 56.4 | 195 | 5.54 | 0.019* |
| Yes | 35.3 | 12 | | |
| Drinks alcohol | | | | |
| No | 52.9 | 127 | 0.64 | 0.425 |
| Yes | 57.1 | 80 | | |

Associations of independent variables with prevalence of difficulty breathing in the last 6 months are shown in table 5. Working in factory B, dust in air and on floor, sewing cotton fabric, and monthly income ≥10,000 were significantly associated with increased prevalence of difficulty breathing. Working >5 years at the factory, and monthly income ≥10,000 baht, were marginally significantly associated with increased prevalence. Presence of air ventilation device was significantly associated with decreased prevalence. Male gender was significantly associated, and drinking alcohol was marginally associated, with decreased prevalence.

Table 5. Prevalences of difficulty breathing in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 21 | 42 | 13.77 | <0.001* |
| B | 38.3 | 69 | | |
| Air ventilation device | | | | |
| No | 35.4 | 70 | 7.37 | 0.007* |
| Yes | 22.7 | 41 | | |
| Dust in air and on floor | | | | |
| No | 19.2 | 29 | 12.13 | <0.001* |
| Yes | 35.8 | 82 | | |
| Main job is sewing | | | | |
| No | 32.6 | 31 | 0.72 | 0.397 |
| Yes | 28.1 | 80 | | |

| | | | | |
|---|---|---|---|---|
| Sews cotton | | | | |
| No | 21.5 | 45 | 13.25 | <0.001* |
| Yes | 38.6 | 66 | | |
| >5 yrs working at factory | | | | |
| No | 25.4 | 57 | 3.74 | 0.053 |
| Yes | 34.6 | 54 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 33.0 | 102 | 11.54 | 0.001* |
| Male | 12.7 | 9 | | |
| Age (yrs) | | | | |
| ≤30 | 32.1 | 53 | 9.07 | 0.011* |
| 31-40 | 21.9 | 35 | | |
| >40 | 41.8 | 23 | | |
| Education | | | | |
| Primary | 29.4 | 48 | 7.52 | 0.023* |
| ≤Secondary 3rd yr | 34.9 | 51 | | |
| Higher | 16.9 | 12 | | |
| Monthly income (baht) | | | | |
| <10,000 | 28.6 | 101 | 0.86 | 0.053 |
| ≥10,000 | 38.0 | 10 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 29.8 | 103 | 0.58 | 0.445 |

| | | | | |
|---|---|---|---|---|
| Yes | 23.5 | 8 | | |
| Drinks alcohol | | | | |
| No | 32.5 | 78 | 3.41 | 0.065 |
| Yes | 23.6 | 33 | | |

Associations of independent variables with prevalence of shortness of breath in the preceding 6 months are shown in table 6. Working at factory B, presence of dust in the air and on the floor, sewing cotton fabric, working at the factory for >5 years, were all significantly associated with increased prevalence. Presence of an air ventilation device was significantly associated with decreased prevalence. Male gender and alcohol drinking were also significantly associated with decreased prevalence of shortness of breath. Prevalence increased significantly with increasing age.

Table 6. Prevalences of shortness of breath in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 14.5 | 29 | 21.70 | <0.001* |
| B | 35.0 | 63 | | |
| Air ventilation device | | | | |
| No | 33.3 | 66 | 18.51 | <0.001 |
| Yes | 14.4 | 26 | | |

| | | | | |
|---|---|---|---|---|
| Dust in air and on floor | | | | |
| No | 17.2 | 26 | 6.68 | 0.010* |
| Yes | 28.8 | 66 | | |
| Main job is sewing | | | | |
| No | 25.3 | 24 | 0.08 | 0.782 |
| Yes | 23.9 | 68 | | |
| Sews cotton | | | | |
| No | 16.7 | 35 | 14.10 | <0.001* |
| Yes | 33.3 | 57 | | |
| >5 yrs working at factory | | | | |
| No | 19.2 | 43 | 7.48 | 0.006* |
| Yes | 31.4 | 49 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 27.5 | 85 | 9.80 | 0.002* |
| Male | 9.9 | 7 | | |
| Age (yrs) | | | | |
| ≤30 | 18.2 | 30 | 10.80 | 0.005* |
| 31-40 | 25.0 | 40 | | |
| >40 | 40.0 | 22 | | |
| Education | | | | |
| Primary | 27.0 | 44 | 4.92 | 0.086 |
| ≤Secondary 3rd yr | 26.0 | 38 | | |
| Higher | 14.1 | 10 | | |

| | | | | |
|---|---|---|---|---|
| Monthly income (baht) | | | | |
| <10,000 | 23.8 | 84 | 0.47 | 0.495 |
| ≥10,000 | 29.6 | 8 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 25.1 | 87 | 1.84 | 0.175 |
| Yes | 14.7 | 5 | | |
| Drinks alcohol | | | | |
| No | 29.2 | 70 | 8.72 | 0.003* |
| Yes | 15.7 | 22 | | |

Associations of independent variables with prevalence of chest tightness in the preceding 6 months are shown in table 7. Working at factory B, sewing cotton fabric, and working at the factory for >5 years and income of ≥10,000 baht or more per month were all significantly associated with increased prevalence of chest tightness. Presence of dust in the air and on the floor was marginally associated with increased prevalence. Presence of an air ventilation device was significantly associated with decreased prevalence. Male gender, alcohol drinking and smokes cigarettes were also significantly associated with decreased prevalence of chest tightness. Prevalence decreased marginally significantly with increasing education.

Table 7. Prevalences of chest tightness in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 22.5 | 45 | 9.88 | 0.002* |
| B | 37.2 | 67 | | |
| Air ventilation device | | | | |
| No | 34.8 | 69 | 5.59 | 0.018* |
| Yes | 23.8 | 43 | | |
| Dust in air and on floor | | | | |
| No | 24.5 | 37 | 2.98 | 0.084 |
| Yes | 32.8 | 75 | | |
| Main job is sewing | | | | |
| No | 33.7 | 32 | 1.08 | 0.299 |
| Yes | 28.1 | 80 | | |
| Sews cotton | | | | |
| No | 23.0 | 48 | 9.46 | 0.002* |
| Yes | 37.4 | 64 | | |
| >5 yrs working at factory | | | | |
| No | 23.2 | 52 | 10.29 | 0.001* |
| Yes | 38.5 | 60 | | |
| Sociodemographic | | | | |
| Gender | | | | |

| | | | | |
|---|---|---|---|---|
| Female | 33.3 | 103 | 11.85 | 0.001* |
| Male | 12.7 | 9 | | |
| Age (yrs) | | | | |
| ≤30 | 27.9 | 46 | 4.75 | 0.093 |
| 31-40 | 26.9 | 43 | | |
| >40 | 41.8 | 23 | | |
| Education | | | | |
| Primary | 33.7 | 55 | 4.68 | 0.096 |
| ≤Secondary 3rd yr | 29.5 | 43 | | |
| Higher | 19.7 | 14 | | |
| Monthly income (baht) | | | | |
| <10,000 | 28.0 | 99 | 4.88 | 0.027* |
| ≥10,000 | 48.1 | 13 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 30.9 | 107 | 3.92 | 0.048* |
| Yes | 14.7 | 5 | | |
| Drinks alcohol | | | | |
| No | 34.6 | 83 | 8.18 | 0.004* |
| Yes | 20.7 | 29 | | |

Associations of independent variables with prevalence of wheeze in the preceding 6 months are shown in table 8. Working at factory B was significantly associated with increased prevalence. Presence of dust in the air and on the floor showed a marginally significant positive association with wheeze prevalence

(p=0.097). Presence of an air ventilation device was significantly negatively associated with prevalence. Prevalence was significantly lower in males than in females, and increased significantly with increasing age and income.

Table 8. Prevalences of wheeze in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 11.0 | 22 | 5.30 | 0.021* |
| B | 19.4 | 35 | | |
| Air ventilation device | | | | |
| No | 18.7 | 37 | 4.32 | 0.038* |
| Yes | 11.0 | 20 | | |
| Dust in air and on floor | | | | |
| No | 11.3 | 17 | 2.75 | 0.097 |
| Yes | 17.5 | 40 | | |
| Main job is sewing | | | | |
| No | 15.8 | 15 | 0.06 | 0.803 |
| Yes | 14.7 | 42 | | |
| Sews cotton | | | | |
| No | 12.4 | 26 | 2.39 | 0.122 |
| Yes | 18.1 | 31 | | |
| >5 yrs working at factory | | | | |
| No | 13.4 | 30 | 1.11 | 0.293 |

| | | | | |
|---|---|---|---|---|
| Yes | 17.3 | 27 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 16.8 | 52 | 4.34 | 0.037* |
| Male | 7.0 | 5 | | |
| Age (yrs) | | | | |
| ≤30 | 9.7 | 16 | 8.80 | 0.012* |
| 31-40 | 16.9 | 27 | | |
| >40 | 25.5 | 14 | | |
| Education | | | | |
| Primary | 12.3 | 20 | 3.25 | 0.197 |
| ≤Secondary 3rd yr | 19.2 | 28 | | |
| Higher | 12.7 | 9 | | |
| Monthly income (baht) | | | | |
| <10,000 | 13.9 | 49 | 4.88 | 0.027* |
| ≥10,000 | 29.6 | 8 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 14.7 | 51 | 0.21 | 0.651 |
| Yes | 17.6 | 6 | | |
| Drinks alcohol | | | | |
| No | 13.8 | 33 | 0.80 | 0.372 |
| Yes | 17.1 | 24 | | |

Associations of independent variables with prevalence of rhinitis in the preceding 6 months are shown in table 9. Somewhat unexpectedly, directions of associations of environmental variables with rhinitis prevalence were generally opposite to those for other types of symptoms. Working at factory A, presence of an air ventilation device, sewing cotton, working at the factory for >5 years and income <10,000 baht were significantly associated with increased prevalence. Prevalence was negatively associated with age. Prevalence was marginally elevated in females.

Table 9. Prevalences of rhinitis in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence, % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 67.5 | 135 | 12.76 | <0.001* |
| B | 49.4 | 89 | | |
| Air ventilation device | | | | |
| No | 51.5 | 102 | 9.18 | 0.002* |
| Yes | 66.9 | 121 | | |
| Dust in air and on floor | | | | |
| No | 63.6 | 96 | 2.21 | 0.136 |
| Yes | 55.9 | 128 | | |
| Main job is sewing | | | | |
| No | 60.0 | 57 | 0.06 | 0.810 |
| Yes | 58.6 | 167 | | |
| Sews cotton | | | | |

| | | | | |
|---|---|---|---|---|
| No | 66.5 | 139 | 10.97 | 0.001* |
| Yes | 49.7 | 85 | | |
| >5 yrs working at factory | | | | |
| No | 63.4 | 142 | 4.46 | 0.035* |
| Yes | 52.6 | 82 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 61.2 | 189 | 3.36 | 0.067 |
| Male | 49.3 | 35 | | |
| Age (yrs) | | | | |
| ≤30 | 61.8 | 102 | 6.24 | 0.044* |
| 31-40 | 61.2 | 98 | | |
| >40 | 43.6 | 24 | | |
| Education | | | | |
| Primary | 58.3 | 95 | 2.04 | 0.361 |
| ≤Secondary 3rd yr | 56.2 | 82 | | |
| Higher | 66.2 | 47 | | |
| Monthly income (baht) | | | | |
| <10,000 | 60.6 | 214 | 5.77 | 0.016* |
| ≥10,000 | 37.0 | 10 | | |
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 59.8 | 207 | 1.24 | 0.266 |
| Yes | 50.0 | 17 | | |
| Drinks alcohol | | | | |

| | | | | |
|---|---|---|---|---|
| No | 57.9 | 139 | 0.29 | 0.593 |
| Yes | 60.7 | 85 | | |

Associations of independent variables with prevalence of eye irritation in the preceding 6 months are shown in table 10. Sewing cotton was significantly associated with increased prevalence. working at factory B, and working at the factory for >5 years, were marginally associated with increased prevalence. Prevalence was significantly lower in males than females, in smokers than non-smokers, and in alcohol drinkers than non-drinkers. Prevalence decreased marginally with increasing education.

Table 10. Prevalences of eye irritation in the preceding 6 months, at different levels of independent variables

| Independent variable | Prevalence % | Count | $X^2$ statistic | p-value |
|---|---|---|---|---|
| Environmental | | | | |
| Factory | | | | |
| A | 45.0 | 90 | 3.61 | 0.057 |
| B | 54.8 | 97 | | |
| Air ventilation device | | | | |
| No | 52.3 | 102 | 1.31 | 0.253 |
| Yes | 46.4 | 84 | | |
| Dust in air and on floor | | | | |
| No | 47.3 | 71 | 0.51 | 0.474 |
| Yes | 51.1 | 16 | | |

| | | | | |
|---|---|---|---|---|
| Main job is sewing | | | | |
| No | 51.1 | 48 | 0.11 | 0.744 |
| Yes | 49.1 | 139 | | |
| Sews cotton | | | | |
| No | 44.7 | 93 | 4.44 | 0.035* |
| Yes | 55.6 | 94 | | |
| >5 yrs working at factory | | | | |
| No | 45.7 | 102 | 3.26 | 0.071 |
| Yes | 55.2 | 85 | | |
| Sociodemographic | | | | |
| Gender | | | | |
| Female | 54.2 | 166 | 14.03 | <0.001* |
| Male | 29.6 | 21 | | |
| Age (yrs) | | | | |
| ≤30 | 46.1 | 76 | 1.56 | 0.467 |
| 31-40 | 51.9 | 82 | | |
| >40 | 53.7 | 29 | | |
| Education | | | | |
| Primary | 52.2 | 85 | 5.34 | 0.069 |
| ≤Secondary 3rd yr | 52.4 | 76 | | |
| Higher | 37.1 | 26 | | |
| Monthly income (baht) | | | | |
| <10,000 | 49.3 | 173 | 0.20 | 0.654 |
| ≥10,000 | 53.8 | 14 | | |

| | | | | |
|---|---|---|---|---|
| Behavioral | | | | |
| Smokes cigarettes | | | | |
| No | 51.6 | 177 | 6.01 | 0.014* |
| Yes | 29.4 | 10 | | |
| Drinks alcohol | | | | |
| No | 54.6 | 130 | 6.51 | 0.011* |
| Yes | 41.0 | 57 | | |

Directions of association for statistically significant associations of independent variables with symptoms are shown in table 11. Working at factory B was generally positively associated with prevalences of respiratory symptoms (with the exception of cough). Presence of dust both in the air and on the floor was also associated with increased prevalence, although not quite as strongly as was working at factory B. Having an air ventilation device was generally associated with reduced symptom prevalence, as was male gender. Sewing cotton was also associated with increased prevalence, although having sewing as a main job was not. Surprisingly, cigarette smoking was not associated with increased symptom prevalence. Somewhat unexpectedly, alcohol drinking was negatively associated with prevalence more often than it was positively associated with prevalence. Also somewhat unexpectedly, directions of association of environmental variables with rhinitis were generally the reverse of directions for other respiratory symptoms.

Table 11. Directions of association between independent variables and symptom prevalences, for statistically significant associations only.

| Characteristic | Cough | Phlegm | Difficulty breathing | SOB* | Chest tightness | Wheeze | Rhinitis | Eye irritation |
|---|---|---|---|---|---|---|---|---|
| Environmental | | | | | | | | |
| Factory B | | Pos† | Pos | Pos | Pos | Pos | Neg | |
| Ventilation device | | | Neg† | Neg | Neg | Neg | Pos | |
| Dust in air and on floor | | Pos | Pos | Pos | | | | |
| Main job sewing | | | | | | | | |
| Sews cotton | | | Pos | Pos | Pos | | Neg | Pos |
| >5 yrs working at factory | | | | Pos | Pos | | | |
| Sociodemographic | | | | | | | | |
| Female gender | | Pos | Pos | Pos | Pos | Pos | | Pos |
| Age | | | Com† | Pos | | Pos | Neg | |
| Education | | | Com | | | | | |
| Income | | | | | Pos | Pos | Neg | |
| Behavioral | | | | | | | | |
| Smokes | | | | | Neg | | | Neg |
| Drinks alcohol | Pos | Neg | | Neg | Neg | | | Neg |

* Shortness of breath

† Pos=positive, Neg = negative, Com=complex association, no consistent direction.

Distributions of independent variables by factory were generated, to explore possible confounding in the data. These distributions are shown in table 12. All environmental variables were significantly associated with factory. Specifically,

nearly all subjects at factory A, but none at factory B, had a ventilation device. Presence of dust in the air and on the floor, and proportions of subjects whose main job was sewing, who sewed cotton fabric, and who had been employed for >5 years, were all significantly higher at factory B than factory A. Subjects at factory B were older on average, and had higher monthly income, than those at factory A.

Table 12. Distribution of environmental, sociodemographic, and behavioral characteristics, by factory.

| | Factory A | Factory B | | |
|---|---|---|---|---|
| Characteristic | Count (%) | Count (%) | $X^2$ statistic | p-value |
| Environmental | | | | |
| Has air ventilation device | 181 (91.0) | 0 (0.0) | 313.38 | <0.001* |
| Dust in air and on floor | 71 (35.5) | 158 (87.8) | 108.12 | <0.001* |
| Main job is sewing | 135 (67.0) | 151 (83.9) | 14.41 | <0.001* |
| Sews cotton | 1 (0.5) | 170 (94.4) | 337.82 | <0.001* |
| >5 yrs working at factory | 52 (26.0) | 104 (57.8) | 39.53 | <0.001* |
| Sociodemographic | | | | |
| Females | 156 (78.0) | 153 (85.0) | 3.06 | 0.080 |
| Age (yrs) | | | 6.68 | 0.035* |
| ≤30 | 96 (48.0) | 69 (38.3) | | |
| 31-40 | 83 (41.5) | 77 (42.8) | | |
| >40 | 21 (10.5) | 34 (18.9) | | |
| Education | | | 0.06 | 0.971 |
| Primary | 85 (42.5) | 78 (43.3) | | |
| ≤Secondary 3rd yr | 78 (39.0) | 68 (37.8) | | |
| Higher | 37 (18.5) | 34 (18.9) | | |

| | | | | |
|---|---|---|---|---|
| Income ≥10,000 baht/month | 4 (2.0) | 23 (12.8) | 16.67 | <0.001* |
| Behavioral | | | | |
| Smokes cigarettes | 22 (11.0) | 12 (6.7) | 2.18 | 0.139 |
| Drinks alcohol | 76 (38.0) | 64 (35.6) | 0.24 | 0.622 |

# CHAPTER V

# SUMMARY DISCUSSION AND RECOMMENDATIONS

## 5.1 Summary

From this study in both factories found male 81.3%, age 30 or more 43.4%, primary school 42.9%, main job is sewing 77.1%, monthly income less than 10,000 baht 92.8% , work more than 5 years 41.1%, smokes cigarettes 8.94% and drinks alcohol 36.8%. For prevalences of respiratory symptoms, rhinitis 224 (58.9%), cough 217 (57.1%), phlegm 207 (54.5%), chest tightness 112 (29.5%), difficulty breathing 111 (29.2%), shortness of breath 92 (24.3%), wheeze 57 (15%), and eye irritation 187 (49.2%). Environment sector, see dust in the air and on floor 60.3% by factory B showed highest and sewing cotton is subject than factory A 170 (94.4%) were significant ($p<0.001$). Factory B where is poor ventilation had higher prevalence of respiratory symptoms than factory A where ventilation is better than at factory B.

For association between characteristic of environment in 2 garment factories found factory B was association with prevalence of phlegm, difficulty breathing, shortness of breath, chest tightness and wheeze. Thus, not surprisingly, presence of a ventilation device was generally associated with reduced symptom prevalence. Dust in the air and on the floor was association with prevalence of phlegm, difficulty breathing and shortness of breath. Main job sewing was associated with prevalence of respiratory symptoms. This, too, is not surprising, since the main fabric used at factory A was polyester, whereas the main fabric at factory B was cotton. Sewing cotton was associated with prevalence of difficulty breathing, shortness of breath and chest tightness. Duration of work found work more than 5 years was association with prevalence of shortness of breath and chest tightness. Sociodemographic, female was associated with prevalence of phlegm, difficulty breathing, shortness of breath, chest tightness, wheeze and eyes irritation, age was association with prevalence of shortness of breath and wheeze, education was

generally not associated with prevalence of respiratory symptoms. income was associated with prevalence of wheeze and chest tightness. Regarding behavioral factors, smoking and drinking were sometimes negatively associated with prevalence. This finding was unexpected, especially for smoking.

**5.2 Discussion**

In this study, environmental factors were quite consistently associated with respiratory symptoms (except cough) and eye irritation. Specifically, working at factory B, presence of visible dust both in the air and on the floor, sewing cotton, and longer duration of working at the factory, were generally associated with elevated symptom prevalence. Having an air ventilation device was generally associated with lower prevalence. Male gender was also generally associated with lower prevalence. Somewhat surprisingly, cigarette smoking was not associated with increased prevalence of respiratory symptoms.

It is not clear why smoking was not associated with increased symptom prevalence. Frequency of smoking was not measured, and it is possible that most smokers were light smokers, thus reducing smoking-related risk of symptoms. The nature of cigarettes smoked is also not known. For example, it is not known whether cigarettes were hand-rolled or store-bought. It is also conceivable that smokers' environmental exposures were lighter than such exposures in non-smokers. Also, smoking prevalence was considerably higher in males (39.4%) than in females (1.9%), so confounding between smoking and gender could have been present in the data.

On balance, patterns of risk were complex. It appears that environmental factors were more closely associated with risk of symptoms than were sociodemographic or behavioral factors. At the same time, the analytical methods employed did not allow confident inference as to the relative contributions of environmental factors to risk of symptoms. Similarly, these methods did not allow

formal comparison of the impact of individual environmental factors. To address these issues effectively, multivariable analysis would be needed. Such analysis is beyond the scope of the present study.

The present study found that the majority were female this finding in line with the study by Srisamorn amonped et al, 2005 and Kassahun et al., 2007. The age ranged of the factory workers was less than 30 years old, their education level was primary school, and work the factories more than 5 years. Most of them work in sewing unit, which were high risk exposed with dust. These findings are consistent with the study of Wichai Jaikaow et al, 1987. Majority of them had income less than 10,000 Baht. Their home town were nearby the factories. Almost of the factory workers are the rice farmer, during raining season they leave the for their rice farm. Most of the raw materials were polyester, jean and cotton. The factory B ( no air ventilation) , most of the raw materials were cotton mean while the raw materials of factory A were less cotton. Factory B had been operated the garments products more than 25 years. In contrast, the factory A was operated for 15 years. Therefore the workers of factory B have had salary higher than factory A, likely due to the duration of working. There were few percentage of smokers in the studied factories, this is probably because the majority of workers were females. Females smoke less when compare with males, this finding in line with the study by Abac Poll Research Center, 2007: online; Tobacco Control Research and Knowledge Management Cente 1991-2006, 2008: online and Fund for Health Promotion, 2008: online.

This study found cough 217 cases (57.1%), phlegm 207 cases (54.5%) Pitchaya Phakthongsuk et al, 2007 and Kassahun et al., 2007 , eyes irritation 187 cases (49.2%) Pitchaya Phakthongsuk et al, 2007, chest tightness 112 (29.5%) Pitchaya Phakthongsuk et al, 2007and Kassahun et al., 2007.

Working environment factors, these are ventilation was statistically significantly associated with prevalence of respiratory symptoms. This is consistent with Kassahun et al., 2007. Amount of dust was statistically significantly associated

with prevalence of respiratory symptoms. This is consistent with the study by Da Costa et al., 1997. If the visible dust in factory B was largely cotton dust, then cotton dust exposure was positively associated with respiratory symptom prevalence in the present study. This is consistent with the study by Wang, 2002. And duration of work was statistically significantly associated with prevalence of respiratory symptoms; this is consistent with the study by Wichai jaikaow et al, 1987 ; Wang, 2002 and Christiani et al., 2000.

It was also found that behavioral factors, these are alcohol drinking was statistically significantly associated with increased prevalence of respiratory symptoms, this finding in not line with the study by Lebowitz, 1989; Garshick,1989. And cigarette smoking was not associated with increased prevalence of respiratory symptoms, this was inconsistent with studies by Costa et al., 1997 ; Ekburanawat, 2010 and with many other studies.

This study did not ask about the history of common cold or influenza. This is a potential limitation, because colds and flu-like illnesses often involve some of the symptoms assessed in this study (such as cough, phlegm, and sometimes wheezing). Even so, it is unlikely that history of colds and flu-like illness would have differed substantially between factory A and factory B. Thus, it is likely that such history would not be a major confounder in the findings reported here.

## 5.3 Recommendations

### 5.3.1 For policy

- Should the results of the study was to base information for suggest or the knowledge for workers and establishment owners about protecting themselves from occupational exposure. Results of the present study are not conclusive. Even so, these results, together with previous results, suggest the importance of protecting workers

from exposure to cotton dust, through such measures as using good ventilation and personal protection such as wearing a mask.

- The relevant agencies should be monitoring lung disease from working in a similar group of employees by the annual health check or before work.

### 5.3.2 For future research

- Further research should be condcted to characterize environmental health effects in garment workers in Thailand. The generalizability of results presented here to other areas is not certain. Future research should include longitudinal studies, and perhaps well-designed case-control studies, in addition to cross-sectional studies such as the one presented here.

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# APPENDIES

# APPENDIX A

**Questionnaire Number……**

## Questionnaire

**Part 1 General history**

What factory do you work in at present? ……..

1. Age …….years

2. Gender

□ male □ female

3. Level of education

□ No school education □ primary school

□ secondary school □ high school education

□ diploma □ bachelor's degree or higher

4. What is your monthly income? (Please check only one.)

□ Less than 10,000 baht □ 10,000 baht or more

5. Have you ever worked as a spinner of cotton yarn?

□ Yes □ No

5a. If yes, for how long? ……. Years

6. Have you ever worked as a cotton weaver?

□ Yes □ No

6a. If yes, for how long? ……. Years

7. What kinds of work do you do in your current factory (you may check more than one)

□ Sewing □ Packing □ Store

□ Screen □ Ironing □ Supervisor

□ Homemaker □ Repair maintenance □ Q.C. □ Other

7a. If you do sewing, what kind of cloth do you sew most often? (Please check only one.)

□ Cotton □ Jeans □ Linen

□ Nylon □ Polyester □ Other

8. What is the main type of work that you do in your current factory (please check only one)

□ Sewing □ Packing □ Store

□ Screen □ Ironing □ Supervisor

□ Homemaker □ Repair maintenance □ Q.C. □ Other

9. How long have you been working in this factory?

_____ years (if less than one year, enter zero)

10. Do you ever wear a mask while you are working?

□ Yes □ No

10a. If yes, do you usually wear a mask while you are working?

□ Yes □ No

**Part 2 Personal health history**

1. Do you smoking or not?

□ Yes □ No

2. Do you drink alcohol?

□ Yes □ No

3. Do you have ever been diagnosis from doctor on these disease or not?

| | | |
|---|---|---|
| Urticaria | □ Yes | □No |
| Skin rash | □ Yes | □ No |
| Allergy | □ Yes | □ N |
| Asthma | □ Yes | □ No |
| Chronic Bronchitis | □ Yes | □ No |
| Byssinosis | □ Yes | □ No |
| Tuberculosis | □ Yes | □ No |

Hypertension □ Yes □ No

Diabetes mellitus □ Yes □ No

Heart disease □ Yes □ No

4. In the past 6 months, have you ever had the following symptoms?

4.1 Cough □ Yes □ No

4.1.1 If yes, does it get better on the weekend 1 day ?

□ Yes □ No

4.2 Phlegm □ Yes □ No

4.2.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.3 Chest tightness □ Yes □ No

4.3.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.4 Breathing difficulties □ Yes □ No

4.4.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.5 Shortness of breath □ Yes □ No

4.5.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.6 Wheezing □ Yes □ No

4.6.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.7 Runny, stuffy, or itchy nose □ Yes □ No

4.7.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.8 Watery or itchy eyes □ Yes □ No

4.8.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

4.9 Stinging in the eyes □ Yes □ No

4.9.1 If yes, does it get better on the weekend 1 day?

□ Yes □ No

5. In the last 6 months, have you taken any medicine to help make it easier for you to breathe?

□ Yes □ No

**Part 3 Working environment**

1. In the location where you spend most of your time working, is there air ventilation (air vacuum cleaner)?

□ Yes □ No

2. In the location where you spend most of your time working, how would you describe the dust situation?

□ Do not see dust in the air or on the floor

□ See dust in the air but not on the floor

□ See dust on the floor but not in the air

□ See dust in the air and on the floor

# APPENDIX B

**แบบสัมภาษณ์ ชุดที่……**

**แบบสัมภาษณ์**

**งานวิจัย เรื่อง สิ่งแวดล้อมการทำงานกับปัญหาระบบทางเดินหายใจของพนักงานโรงงานเย็บผ้าสองแห่งในจังหวัดอุบลราชธานี**

**ส่วนที่ 1 ข้อมูลทั่วไปและประวัติส่วนตัว**

คุณทำงานในโรงงาน.....

1. อายุ.....ปี
2. เพศ □ ชาย □ หญิง
3. ระดับการศึกษา

□ ไม่ได้รับการศึกษา □ ประถมศึกษา □ มัธยมต้ม ม.3, ปวช

□ มัธยมปลาย ม. 6 □ อนุปริญญา, ปวส. □ ปริญญาตรี หรือสูงกว่า

4. คุณมีรายได้ต่อเดือนเท่าไหร่

□ ต่ำกว่า 10,000 บาท □ มากกว่า 10,000 บาท

5. คุณเคยทำงานเกี่ยวกับการปั่นด้ายเป็นเส้นหรือไม่

□ เคย □ ไม่เคย

5.1 ถ้าเคย ทำมานานแค่ไหน.....ปี

6. คุณเคยทำงานเกี่ยวกับการทอผ้าฝ้ายหรือไม่

□ เคย □ ไม่เคย

6.1 ถ้าเคย ทำมานานแค่ไหน.....ปี

7. ปัจจุบันคุณทำงานแผนกอะไรบ้าง (ตอบได้มากกว่า 1 ข้อ)

□ ตัดเย็บ □ บรรจุใส่กล่อง □ จ่ายวัสดุ อุปกรณ์ □ สกรีน

□ รีดผ้า □ ซุปเปอร์ไวเซอร์ □ แม่บ้าน □ ซ่อมแซม

□ คิว ซี □ อื่นๆ

7.1 ถ้าคุณทำงานตัดเย็บส่วนใหญ่เย็บผ้าชนิดไหน

□ ผ้าฝ้าย □ ยีนส์ □ ลินิน

□ ไนลอน □ โพลิเอสเทอร์(เส้นใยสังเคราะห์) □ อื่นๆ

8.ปัจจุบันส่วนใหญ่คุณทำงานในแผนกอะไร (ตอบเพียง 1 ข้อ)

□ ตัดเย็บ □ บรรจุใสกล่อง □ จ่ายวัสดุ อุปกรณ์

□ สกรีน □ รีดผ้า □ ซุปเปอร์ไวเซอร์

□ แม่บ้าน □ ซ่อมแซม □ คิว ซี

□ อื่นๆ

9. คุณทำงานในโรงงานแห่งนี้มาเป็นเวลานานเท่าไหร่

……..ปี (ถ้ายังไม่ถึง 1 ปี ให้ตอบ 0 )

10. คุณสวมหน้ากากป้องกันฝุ่นหรือไม่เวลาทำงาน

□ สวม □ ไม่สวม

**ส่วนที่ 2 ข้อมูลด้านประวัติสุขภาพ**

1. คุณสูบบุหรี่หรือไม่

□ สูบ □ ไม่สูบ

2. คุณดื่มแอลกอฮอล์หรือไม่

□ ดื่ม □ ไม่ดื่ม

3. คุณเคยได้รับการตรวจและหมอเคยบอกว่าเป็นโรคเหล่านี้หรือไม่

ผื่นลมพิษ □ เคย □ ไม่เคย

ผื่นแพ้ที่ผิวหนัง □ เคย □ ไม่เคย

ภูมิแพ้ □ เคย □ ไม่เคย

หอบหืด □ เคย □ ไม่เคย

หลอดลมอักเสบเรื้อรัง □ เคย □ ไม่เคย

โรคปอดฝุ่นฝ้าย □ เคย □ ไม่เคย

วัณโรคปอด □ เคย □ ไม่เคย

ความดันโลหิตสูง □ เคย □ ไม่เคย

โรคเบาหวาน □ เคย □ ไม่เคย

โรคหัวใจ □ เคย □ ไม่เคย

4. ในช่วง 6 เดือนที่ผ่านมาคุณเคยมีอาการเหล่านี้หรือไม่

4.1 ไอ □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.2 ไอมีเสมหะ □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.3 แน่นหน้าอก □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วัน หรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.4 หายใจลำบาก □ มี □ ไม่มี

-ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.5 หายใจ สั้น ตื้น □ มี □ ไม่มี

-ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.6 หายใจมีเสียงวี้ด □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.7 มีน้ำมูก,คัดจมูก,ระคายเคือง □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.8 มีน้ำตาไหลหรือระคายเคืองตา □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

4.9 ปวดเมื่อยตา □ มี □ ไม่มี

- ถ้าเคยมีอาการ อาการดีขึ้นในช่วงวันหยุดสุดสัปดาห์ 1 วันหรือไม่

□ ดีขึ้น □ ไม่ดีขึ้น

5. ในช่วง 6 เดือนที่ผ่านมาคุณเคยไปหาหมอบ่อยๆเพื่อช่วยให้ปัญหาในการหายใจของคุณดีขึ้นหรือไม่

(ในกรณีที่มีปัญหาในการหายใจในเบื้องต้น)

□ เคย □ ไม่เคย

**ส่วนที่ 3 ข้อมูลด้านสิ่งแวดล้อม**

1.ในแผนกที่คุณทำงานมีการระบายอากาศหรือไม่

□ มี □ ไม่มี

2.ในแผนกที่คุณทำงานมีฝุ่นหรือไม่ (ตอบเพียง 1 ข้อ)

□ ไม่เห็นฝุ่นทั้งในอากาศและบนพื้น

□ เห็นฝุ่นในอากาศแต่ไม่เห็นบนพื้น

□ เห็นฝุ่นบนพื้นแต่ไม่เห็นในอากาศ

□ เห็นฝุ่นทั้งในอากาศและบนพื้น

# APPENDIX C

## Time Schedule

| Research Activities | Time Frame (month in the year 2010-2011) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | April |
| Literature review | → | | | | | | |
| Conduct draft tool for data collecting | | → | | | | | |
| Content validity by experts | | | → | | | | |
| Ethical Consideration | | | | → | | | |
| Tool development for data collecting | | | | | → | | |
| Try out research tool | | | | | → | | |
| Field preparation and data collection | | | | | | → | |
| Data analysis and interpretation | | | | | | → | |
| Report writing | | | | | | | → |
| Presentation/publication | | | | | | | → |

# VITAE

| | |
|---|---|
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