

CHAPTER 5

CONCLUSIONS, DISCUSSIONS AND RECOMMENDATIONS

The research on the protective behavior from dust among workers in the lime factories and stone crushing mills in Nakhon Si Thammarat Province is a descriptive one.

This research study had been done in small to medium lime factories and stone crushing mills in Nakhon Si Thammarat Province areas. The total sample size was 211 workers, owners and operators of the lime factories and stone crushing mills in Mueang District, Khanom District, Phra Phrom District, Ron Phibun District, Chulabhorn District and Thung Song District.

The instruments used in data collection were questionnaires, interviewing forms for owners and operators of factories and mills and the observation form of dust protective device application and the environmental conditions in the factories. Such instruments had gone through calibration for accuracy by 3 experts. The data was collected in October 2003.

The statistics used in this data analysis were percentage, average mean, standard deviation and Chi-square.

5.1 The Conclusions of the Research Performances Consisted of 3

Parts as Follows:

1. Data in part of workers in the lime factories and stone crushing mills.
2. Data in part of the owners and operators of the lime factories and stone crushing mills.
3. Data in part of the behavior observation of the dust protective devices application and environmental condition within factories and mills.

1. Data in part of workers in the lime factories and stone crushing mills.

Consisted of the factors on the socio-demographic data, protective behavior from dust, health belief factor and the relationship between socio-demographic factor, health belief factor with protective behavior from dust. The research discovered many facts, and the result discussion could be made with the following essences.

1.1 Socio-demographic character can be concluded as follows:

- 1.) Gender: Majority of workers (72.2%) are male and 27.8% are female.
- 2.) Age: The higher percentage of the respondents (33.8%) are in between 35-44 years old, 30.3% are in between 25-34 years old and 19.2% are in between 45-54 years old respectively.
- 3.) Marital status: Most workers (83.4%) are married, 13.1% are single and 3.5% are either divorced or separated.

- 4.) Educational levels: The higher percentage of the respondents (51.5%) are having education in the elementary school level, 25.3% are in the lower secondary educational level and 9.1% are in the higher secondary education and Technical Education Certificate or Vocational Education Certificate respectively.
- 5.) Family income: The higher percentage of the respondents (44.4%) earned their income in between 2,000 – 4,000 baht, 41.5% in between 4,001 – 6,000 baht and 9.6% in between 6,001 – 8,000 baht respectively.
- 6.) Period of time to work in lime factories and stone crushing mills: The higher percentage of samples (31.3%) had been working in the lime factories stone crushing mills for the period of 4-6 years, 30.8% less than 3 years and 23.3% had been working for the period of 7-9 years respectively.
- 7.) Employment in other lime factories/stone crushing mills. Most workers (78.8%) had never been working in other lime factories/stone crushing mills before while 21.2% had been working in other lime factories/stone crushing mills before.
- 8.) Length of employment in other lime factories/stone crushing mills: The higher percentage of the respondents (35.7%) had been working in other factories for the period of less than 3 years, 33.3% had been working in other factories for longer than 7 years and 31% had been working in other factories for the period of 4-6 years respectively.

- 9.) Job characteristic: The higher percentage of the respondents (33.3%) are working in the lime transport department, 25.3% are working in other positions like security guards, mechanics and clerks, 15.7% are working in the rock grinding department respectively.
- 10.) Working duration per week: The higher percentage of the respondents (40.4%) are working 6 days a week, 30.3% are working everyday, 13.1% are working 3 days a week respectively.
- 11.) Working duration per day: The higher percentage of the respondents (68.2%) are working 5-8 hours a day, 23.7% are working 2-4 hours a day and 8.1% are working 9-12 hours a day respectively.
- 12.) Smoking behavior: The higher percentage of the respondents (59.6%) are smoking cigarettes and 40.4% have never smoked.
- 13.) Number of cigarettes smoked per day: The higher percentage of the respondents (40.4%) are smoking 5-10 cigarettes per day, 9.1% are smoking 5 cigarettes per day and 8.6% are smoking 11-20 cigarettes per day respectively.
- 14.) Workers' illness: The higher percentage of the respondents (64.6%) are sick or used to be sick of common cold, 20.2% are sick or used to be sick of allergy and 13.1% are sick or used to be sick of sore throat respectively.

1.2 Protective behavior from dust can be concluded as follows:

- 1.) Use of dust protective devices: The higher percentage of the respondents (62.6%) used the dust protective devices and 37.4% did not use.
- 2.) Type of the dust protective devices: Most workers 93.6% used pieces of cloth to close their noses and mouths, 4% used the filtered paper mask and 2.4% used the dust molecular filtered protective devices respectively.
- 3.) Use of dust protective devices at all time while on duty: The majority workers (75.8%) used the dust protective devices at all time while on duty, 24.2% did not.
- 4.) Adjustment of dust protective devices to snug fit with their faces at all time: Most workers (93.5%) adjusted their dust protective devices to snug fit with their faces at all time and 6.5% did not do it at all times.
- 5.) Sharing of dust protective devices together with others: The higher percentage of the respondents (56.5%) did not share dust protective devices together with others, 43.5% did.
- 6.) Cleaning the dust protective devices at all time after use: Most workers (86.3%) cleaned their dust protective devices at all time after use and 13.7% did not do it.
- 7.) Storage of dust protective devices away from dust: Majority workers (83.1%) stored their dust protective devices away from dust after use, 16.9% did not.

- 8.) In case of feeling uncomfortable while using dust protective devices workers would inform their supervisors immediately: The higher percentage of the respondents (61.3%), in case of feeling uncomfortable while using dust protective devices, would inform their supervisors immediately, 38.7% would not.
- 9.) Prompt seeking the new dust protective devices to replace the old unworkable ones: Most workers (87.9%) would promptly seek the new dust protective devices to replace the unworkable ones and 12.1% would not.
- 10.) Selection of using dust protective devices that can be assured of protection: Most workers (90.3%) would choose to use the dust protective devices that could be assured of dust protection while 9.7% would not.
- 11.) Avoidance of directly inhaling the dust into the lung: Most workers (74.2%) would avoid to directly inhale the dust into their lungs and 25.8% would not.
- 12.) Distribution of factory's dust protective devices: The higher percentage of the respondents (50.5%) did not receive the factory's dust protective devices, 49.5% received the factory's dust protective devices.
- 13.) Use of dust protective devices given by factory: The higher percentage of the respondents used the dust protective devices given by factories, 31.3% did not use.

Levels of protective behavior from dust: The higher percentage of the respondents (50.5%) were having the protective behavior from dust in the low level, 29.8% were having the protective behavior from dust in the high level and 19.7% were having the protective behavior from dust in the medium level.

Levels of protective behavior from dust of workers in lime factories : The higher percentage of the respondents (53.1%) were having the protective behavior from dust in the low level, 31.3% were having the protective behavior from dust in the medium level and 15.6% were having the protective behavior from dust in the high level.

Levels of protective behavior from dust of workers in stone crushing mills : The higher percentage of the respondents (49.3%) were having the protective behavior from dust in the low level, 36.6% were having the protective behavior from dust in the high level and 14.2% were having the protective behavior from dust in the medium level.

1.3 Health belief data consisted of the perceived susceptibility on having the diseases from dust, perceived severity, perceived benefits and barriers of performing, can be concluded as follows:

1.3.1 The research on the perceived susceptibility on having diseases from dust can be concluded as follows:

- 1.) Overall average mean (\bar{X}) of the perceived susceptibility on having diseases was equal to 3.51 which was in the medium level, the standard deviation (S.D.) was equal to .85.
- 2.) The statement with the highest average mean was the statement which said “If you have a choice you would choose to work for other works as you’d have taken less risk to have dust in your lung” that had the average mean equal to 3.99. Next was the statement that said “Working in the lime factories/stone crushing mills is the work harmful to health” that had the average mean equal to 3.97 and the statement “The work you’re now doing is risky to having the dust in your lung” had the average mean equal to 3.78 respectively.
- 3.) The statement with the lowest average mean was the statement to say “You have the good and strong health, so the lung disease wouldn’t have come to visit you” that had the average mean equal to 3.14. Next was the statement that said “To keep yourself to be healthy and strong at all time would have been difficult for you to get the lung disease caused by dust” had the average mean equal to 3.19 and the statement of “You have been working in the factory for long time until you’re familiar with the dust, so you would not have gotten the lung disease by dust” had the average mean equal to 3.27 respectively.

1.3.2 Level of the perceived susceptibility on having diseases: The higher percentage of the respondents (51.5%) were having the perceived susceptibility on having diseases in the high level, 47% were in the medium level and 1.5% were in the low level.

The research on the perceived severity of having diseases can be concluded as follows:

- 1.) The overall average mean (\bar{x}) of the perceived severity of diseases was equal to 3.42, the standard deviation (S.D.) was equal to .84.
- 2.) The statement with the highest average mean was the statement of “The chest pain symptom is considered as normal for workers employed in the lime factories/stone crushing mills” had the average mean equal to 3.75. The statement of “Those who have the lung disease from dust shall be easy to have the complication diseases” had the average mean equal to 3.73 and the statement of “The lung disease from dust has the same condition as the common cold, so it would not be frightening” had the average mean equal to 3.66 respectively.
- 3.) The statement with the lowest average mean was that of “The dust in the factory is equally harmful to health as those in general” had the average mean equal to 2.81. The statement of “Getting the lung disease from dust would have caused the patient to die within the short time” had the average mean equal to 3.19 and the statement

of “Treatment of the lung disease from dust would require the great amount of money” had the average mean equal to 3.24 respectively.

Levels of perceived severity of diseases: The higher percentage of the respondents (60.6%) were having the perceived severity of disease in the medium level, 38.4% were in the high level and 1% were in the low level.

1.3.3 The perceived benefits and barriers of performing. The research can be concluded as follows:

- 1.) The overall average mean (\bar{X}) of the perceived benefits and barriers of performing was equal to 3.60, and the standard deviation (S.D) was equal to .98.
- 2.) The statement with the highest average mean was “The use of dust protective devices at work is quite necessary” had the average mean equal to 4.17. The statement of “Though feeling annoyed to use the dust protective device you can be tolerated with it for your own safety” had the average mean equal to 3.97 and the statement of “You’d better take the risk of having the lung disease from dust than being tolerated in using the dust protective device” had the average mean equal to 3.89 respectively.
- 3.) The statement with the lowest average mean was that of “Use of the dust protective device causes you hardly to communicate with others” had the average mean equal to 2.94. The statement of “Use

of the dust protective device while on duty would cause you feeling annoyed” had the average mean equal to 3.05, and the statement of “Maintenance of the dust protective device after used is too complicated and waste to time” had the average mean equal to 3.15 respectively.

Levels of perceived benefits and barriers of performing: The higher percentage of the respondents (58.1%) were having the perceived benefits and barriers of performing in the high level, 37.9% were in the medium level and 4% were in the low level.

1.4 The research on the relationship between the socio-demographic factor, health belief factor with the protective behavior from dust among workers can be concluded as follows:

1.4.1 The relationship between the socio-demographic factor and the protective behavior from dust among workers can be concluded as follows:

1.) The relationship between gender and the protective behavior from dust among workers.

The higher percentage of female workers (50.9%) were having the protective behavior from dust in the low level, 27.3% were in the high level and 21.8% were in the medium level.

The higher percentage of male workers (50.3%) were having the protective behavior from dust in the low level, 30.8% were in the high level and 18.9% were in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that gender had no relation with the protective behavior from dust among workers in the lime factories and stone crushing mills.

2.) The relationship between age and the protective behavior from dust among workers.

The higher percentage workers (52.6%) with 35-50 and 18-34 years old were having the protective behavior from dust in the low level, workers with 51 years old and up were having the protective behavior from dust in the high level (52.2%) and workers with 18-34 years old were having the protective behavior from dust in the high level (29.5%) respectively.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that age had no relation with the protective behavior from dust among workers in the lime factories and stone crushing mills.

3.) The relationship between the marital status and the protective behavior from dust among workers.

The higher percentage of the respondents with married status (48.5%) were having protective behavior from dust in the low level, 39.4% were having the protective behavior from dust in the high level and 12.1% were in the medium level respectively.

The single status workers with the higher percentage of the respondents (50.9%) were having the protective behavior in the low level, 27.9% were having the protective behavior dust in the high level and 21.2% were in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the marital status had no relation with the protective behavior from dust among workers in the lime factories and stone crushing mills.

4.) The relationship between educational level and the protective behavior from dust among workers.

The higher percentage of the respondents (48.1%) with the elementary school level were having the protective behavior from dust in the low level, (28.3%) were in the high level and (23.6%) were in the medium level.

Workers with the education level higher than the elementary level, was found that the higher percentage of the respondents (53.3%) have protective behavior from dust in the low level, (31.5%) was found in the high level and (15.2%) in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the educational level had no relation with the protective behavior from dust among workers.

5.) The relationship between family income and the protective behavior from dust among workers.

The higher percentage of the respondents (64.3%) with income more than 6,001 baht/month were having the protective behavior from dust in the low level, workers with income in between 4,001 – 6,000 baht/month were having the protective behavior from dust in the low level (42.7%) and workers with income in between 2,00-4,000 baht were having the protective behavior from dust in the low level (53.4%) respectively.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the family income and the protective behavior from dust among workers found to have the statistical significance at $p < 0.05$.

6.) The relationship between the length of period of time to work in the factories and the protective behavior from dust among workers.

Most workers (70%) with the length of employment period in the factories with less duration of employment period than 7 years were having the protective behavior from dust in high level, 20% were in the medium level and 10% were in the low level.

The higher percentage of the respondents (52.7%) with from 7 years and up were having the protective behavior from dust in the low level, 27.7% were in the high level and 19.7% were in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the length of employment found to have the statistical significance at $p < 0.05$.

7.) The relationship between the job characteristic and the protective behavior from dust among workers.

The higher percentage of the respondents (53.2%) who were working in the lime transport department/lime burning department were having the protective behavior from dust in the low level, 28.6% were in the high level and 18.2% were in the medium level.

The higher percentage of the respondents (33.8%) working in the lime sun drying/lime filling/stone grinding/stone drilling positions were having the protective behavior from dust in the high and low level, 32.4% were in the medium level

Most of the respondents (70%) working in other positions such as mechanic, security guard, clerk, were having the protective behavior from dust in the low level, 26% were in the high level and 4% were having the protective behavior from dust in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the working positions was found to have the statistical significance at $p < 0.001$.

8.) The relationship between the illness and the protective behavior from dust among workers.

The higher percentage of the respondents (66.7%) who were sick or used to be sick of common cold/asthma were having the protective behavior from dust in the low level, 23.5% were in the medium level and 19.7% were in the high level.

The higher percentage of the respondents (50%) who were sick or used to be sick of sore throat/allergy were having the protective behavior from dust in the high level, 37.9% were in the low level and 12.1% were in the medium level.

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the illness was found to have the statistical significance at $p < 0.001$.

The relationship between the socio-demographic factor and the protective behavior from dust among workers can now be concluded that the factor on socio-demographic data such as family income earning, period of time to work, working positions and workers' illness were relating to the protective behavior from dust among workers. Age, gender, marital status and educational level had no relation with the protective behavior from dust among workers.

1.4.2 The research on the relationship between the factor on the health belief and the protective behavior from dust can be concluded as follows:

- 1.) The relationship between the perceived susceptibility on having diseases from dust and the protective behavior from dust among workers.

The higher percentage of the respondents (46.1%) with the perceived susceptibility on having diseases from dust in the high level were having the protective behavior from dust in the low level, 36.3% were in the high level, 17.6% were in the medium level.

The higher percentage of the respondents (54.8%) with the perceived susceptibility on having diseases from dust in the medium level were having the protective behavior from dust in the low level, 23.7% were in the high level and 21.5% were in the medium level.

The samples with the perceived susceptibility on having diseases in the low level were having the protective behavior from dust in the low level (66.7%) and 33.3% were having the protective behavior from dust in the medium level .

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the awareness of the perceived susceptibility on having diseases from dust had no relation with the protective behavior from dust among workers.

2.) The relationship between the perceived severity of diseases from dust and the protective behavior from dust among workers.

The higher percentage of the respondents (44.7%) with the perceived severity of diseases from dust in the high level were having the protective behavior in the low level, 40.8% were in the high level and 14.5% were in the medium level.

The higher percentage of the respondents (60.6%) with the perceived severity of diseases from dust in the medium level were having the protective behavior from dust in the low level, 23.3% were in the high level and 21.7% were in the medium level.

The sample with the perceived severity of diseases from dust in the low level were having the protective behavior from dust in the medium level (2%).

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the perceived severity of disease from dust was found to have the statistical significance at $p < 0.01$.

3.) The relationship between the perceived benefits and barriers of performing.

The higher percentage of the respondents (41.7%) with the perceived benefits and barriers of performing in the high level were having the protective behavior from dust in the high level, 40% were in the low level and 18.3% were in the medium level.

The higher percentage of the respondents (61.3%) with the perceived benefits and barriers of performing in the medium level were having the protective behavior from dust in the low level, 24% were in the medium level and 14.7% were in the high level.

The sample with the perceived benefits and barriers of performing in the low level were having the protective behavior from dust in the low level (8%).

When the Chi-square (X^2 – test) was analyzed, it could be concluded that the perceived benefits and barriers of performing and the protective behavior from dust was found to have the statistical significance at $p < 0.001$.

The relationship between the health belief factors and the protective behavior from dust among workers could be concluded that the factors on the health belief which consisted of the perceived severity of diseases and the perceived benefits and barriers of performing were having the relationship with the protective behavior from dust among workers. But the perceived susceptibility on having diseases from dust had no relationship with the protective behavior from dust among workers.

2. Data in part of the owners and operators of the lime factories and stone crushing mills.

Data analytical result in part of the owners and operators of the lime factories and stone crushing mills consisted of the characteristic on the socio-demographic aspect, supportive environment to health provided by factories and the health promotion policy which could be concluded as follows:

2.1 The research on the socio-demographic characteristic could be concluded as follows:

- 1.) Gender: Majority of the owners and operators of the lime factories and stone crushing mills (76.9%) were found to be male while 23.1% were female.
- 2.) Age: The higher percentage of the the respondents (46.2) were in between 34-40 years old, 30.8% were in between 50-60 years old and 23.1% were in between 41-50 years old respectively.
- 3.) Positions: The higher percentage of the respondents (61.5%) were the factory owners, 23.1% were both the ownership and executives, 15.4% were the factory executives respectively.
- 4.) Educational levels: The higher percentage of the respondents (53.8%) were having the educational level at the elementary school, (23.1%) earned bachelor degree, (15.4%) earned Higher Vocational Education Certificate or diploma and (7.7%) earned the certificate of higher secondary school respectively.
- 5.) Marital status: The majority of owners and operators of the lime factory and stone crushing mills were married (100%).
- 6.) Length of factory business engagement: The higher percentage of the respondents (69.2%) have been engaged in the factory business for the period of 5-10 years, 15.4% more than 10 years and 7.7% less than 5 years respectively.

2.2 The supportive environment to health provided by factories and health policy could be concluded as follows:

- 1.) For the policy concerning the health maintenance for workers in writing, none of the lime factories and stone crushing mills were having the health maintenance policy in writing.
- 2.) For the issuance of regulations to enforce workers to use the dust protective mask while on duty, it was found that majority of factories (92.3%) issued the regulations to enforce workers to wear the dust protective mask while on duty and 7.7% failed to have the regulations to enforce workers to wear dust protective mask while on duty.
- 3.) For the notification of policy or regulations for acknowledgement to all workers or posting the announcement at the place where it could be clearly seen, majority factories (92.3%) were found to notify all workers of the policy or regulation while 7.7% failed to notify.
- 4.) For the responsible persons for enforcing workers to wear the dust protective mask at all time while on duty, it was found that majority factories (76.9%) failed to provide the responsible persons for enforcing workers to wear the dust protective mask at all time while on duty, only 23.1% were enforcing their workers to do so.
- 5.) For the availability of the annual health examination for workers, majority number of factories (84.6%) failed to provide the annual health examination for workers while 15.4% provided them with the annual health examination.

- 6.) For the preparation of the dust protective devices for workers, it was found that most factories (76.9%) failed to provide the dust protective devices for workers and 23.1% provided such devices to the workers.
- 7.) For the recommendation relating to the danger as the result of the operation and the prevention method to the workers before entering into the factories, it was found that majority of the factories (76.9%) failed to provide the recommendation relating to the danger as the result of the operation and the prevention method before starting to work and 23.1% provided the said recommendation to the workers.
- 8.) For the importance of workers health when working in the factories, it was found that most factories (84.6%) saw that the workers' health was important to their working performances while 15.4% deemed that their workers' health was very important to their working performances.
- 9.) On the responsible persons who gave advices with respect to the danger as the result of the operation and the protective method to workers, it was found that the factories provided the supervisors for each department to be responsible for it. Each supervisor would give the advices to workers who were newly working in the factories about the job descriptions as well as the application of the dust protective devices.

- 10.) On the dust protective devices, it was found that the dust protective devices in the forms of the masks to close noses and mouths were given to workers while on duty.
- 11.) On the annual health examination, it was found that the annual health examination for workers was provided by the factories under the public health officials' responsibility. In case of illness, that worker would be ordered to stop working and took a rest or was sent to the hospital for further treatment. The workers' health examination records were not be available at the factories, however, the factories agreed that the workers' health was very important to the working performance in the factories.
- 12.) On the support from the public health division; it was found that the factories needed the support on the workers' health examination services from the public health division at least once or twice a year.

3. Data in part of the behavior observation of the dust protective devices application and environmental condition within factories and mills.

Observation data of workers' behavior in using the dust protective devices and the supporting environment to health of the factories could be concluded as follow:

- 1.) On the dust protective devices for workers while on duty, the higher percentage of the respondents (53.8%) owned the dust protective devices while on duty while 46.2% did not and the dust

protective devices used by workers were the mask made of filtered paper and piece of cloth to close nose and mouth.

- 2.) The factory to post the policy or regulations in the place where it can be seen clearly. Most factories (92.3%) failed to post the policy or regulations in the places where they could be clearly seen while only 7.7% did so.
- 3.) The factory to have fence of it own surrounding the factory. The higher percentage of factory (76.9%) did not have fences while 23.1 did.
- 4.) The factory to have the nursing room. Most factory failed to provide workers the nursing room (100%).
- 5.) The factory to take care of workers. Most factories (100%) had no nurses to take care of workers.
- 6.) Workers to use dust protective devices. Workers in most factories (76.9%) were found to use dust protective devices and 23.1% of the factories found no workers to use dust protective devices.
- 7.) Workers to use dust protective devices properly. The higher percentage of samples (69.3%) found the workers to use dust protective devices improperly and 30.8% found their workers to use dust protective devices properly.

5.2 Discussing the Research Results

The discussion of the research performances consisted of 2 parts as follows:

1. Result discussion in part of workers in the lime factories and stone crushing mills.
2. Result discussion in part of the owners, operators and behavior observation of the dust protective devices application and environmental condition within factories of the lime factories and stone crushing mills.

1. **Result discussion in part of workers in the lime factories and stone crushing mills.** Consisted of the factors on the socio-demographic data, protective behavior from dust, health belief factor and the relationship between socio-demographic factor, health belief factor with protective behavior from dust. The research caused many facts to be discovered and the result discussion could be made with the following essences.

1.1 Factors on the socio-demographic data of workers in the lime factories and stone crushing mills.

Majority workers are male with their ages in between 35-44 years old, married and having education in the elementary school level and their family income are in between 2,000-4,000 baht. This showing that the education is important. If they had higher education than elementary school level, they would have gained better choice to work in the better positions, resulting in the better family income.

Majority workers had never been working in other factories before and their employment period were in between 4-6 years. They worked 6 days a week with 5-8 hours a day, working on the lime transport. Most workers were taken ill with common cold, sore throat and allergy and having smoking behavior of about 5-10 cigarettes per day. This showed that the opportunity for the workers to get involved with dust while working was rather high since they had to work in the factories continuously for long period of time and smoking caused these workers to face with health problem relating to the respiratory system.

1.2 Protective behavior from dust among workers

Most workers used piece of cloth to close their noses and mouths. In case of the dust protective devices distributed by factories, workers would select to use such devices. They had the protective behavior from dust in the high level which showed that whether or not they used the dust protective devices properly depending on supportive factors such as dust protective devices prepared by factories which was in consistence with the idea of the customary belief in health which said the supportive variables or something that lead to the action was the factor effecting the health practice of that person.

1.3 Factor on the Worker's health belief

Workers in the lime factories and stone crushing mills had the average points of the perceived susceptibility, perceived severity of diseases and perceived benefits and barriers of performing in the medium level which was in consistence with the study of Nichanonda (2001) who discovered that the workers in the textile mills were having the

awareness of the risk opportunity on danger from cotton dust, severity and benefits and obstacles of the danger protective from cotton dust in the medium level and also found that majority workers were having their education in the elementary school level as well.

1.4 The relationship between the factor on socio-demographic data and the protective behavior from dust.

The relationship between gender and the protective behavior from dust among workers was found not to be related to each other at all, which was in consistence with the study of Nichanonda (2001) who found that gender had no relationship with the workers' protective behavior from danger of the cotton dust since today both male and female workers have equal opportunity to be informed of information and are more independent in leading their lives, thus the difference between gender has no effect against the workers' protective behavior from dust.

The relationship between age and the protective behavior from dust among workers was found not to have been related to each other, which was in consistence with the study of Nichanonda (2001) who found that age had no relationship with the workers' protective behavior from danger of the cotton dust.

The relationship between the marital status and the protective behavior from dust among workers was found not to be related to each other which was in consistence with the study of Changkaew (1996) who found that the marital status had no relation with the dust protective mask application behavior.

The relationship between the educational level and the protective behavior from dust among workers was found not to be related to each other, which was in consistence with the study of Nichanonda (2001) who found that the educational level had no relation with the danger protective behavior from cotton dust among workers; the same as that of Changkaew (1996) who found that the educational level had no relation with the self-protection behavior from Silicosis disease.

The relationship between family income and the protective behavior from dust among workers was found to have been related to each other, which was in consistence with the study of Inprasit (1993) who found that the family income had the health behavior predicting influence for the silicosis disease prevention of workers in the stone crushing mills in Saraburi Province.

The relationship between the period of time to work in the factory and the protective behavior from dust among workers was found to be related to each other, which was in consistence with the study of Yimwasana (1983) who found that the working experience had no affect in causing the use of fiber dust protective devices to be different, the same as the study of Inprasit (1993) who found that the length of employment had no relation with the silicosis disease protective behavior.

The relationship between the job characteristic and the protective behavior from dust among workers was found to have been related to each other, which was in consistence with the study of Inprasit (1993) who found that the job descriptions had the behavior predicting influence for the silicosis disease prevention of workers.

The relationship between the illness and the protective behavior from dust was found to have been related to each other, which was in consistence with the idea of Kasl and Cobb (1966) who said the illness behavior was the activity of person who was feeling ill with the objective to seek for proper diagnosis and treatment that would be the part in producing the driving force or the action in preventing the diseases.

It would be said the factor on the socio-demographic data among workers was part of the protective behavior from dust among workers in the lime factories and stone crushing mills in Nakhon Si Thammarat Province, such character pointed to the similarity of the socio-demographic data among workers in the lime factories and stone crushing mills, so the protective behavior from dust was so similar. Any activities made with the group of workers to change or promote the protective behavior from dust therefore should have been considered of the socio-demographic data as well.

1.5 The relationship between the factors on the health belief and the protective behavior from dust.

The relationship between the factor on the health belief which consisted of the perceived susceptibility, perceived severity of diseases and perceived benefits and barriers of performing with the protective behavior from dust among workers was found that the perceived severity and the perceived benefits and barriers of performing had been related to the protective behavior from dust among workers. In part of the perceived susceptibility on having diseases from dust had no relation with the protective behavior from dust among workers, which was in consistence with the study of Inprasit (1993) who found that majority workers in the stone crushing mills were

having the awareness of the health belief in all 3 aspects, they were the awareness of the perceived susceptibility, the awareness of the perceived severity and the awareness of the perceived benefits and barriers of performing, had been related and had the behavior predicting influence for the silicosis prevention, the same as that of Nichanonda (2001) who found that the awareness of the perceived benefits and barriers of performing had been related to the protective behavior from the cotton dust among workers.

The findings obtained from the research printed out that the awareness of the health belief which were the awareness of the perceived susceptibility on having the diseases from dust, perceived severity of disease and perceived benefits and barriers of performing were the important factors that produced the protective behavior from dust. So for changing or promoting the proper protective behavior from dust the factors on the health belief should be considered as well.

- 2. Discussion of the result in part of the owners, operators and behavior observation of the dust protective devices application and environmental condition within factories of the lime factories and stone crushing mills:** Consisted of the socio-demographic character, supportive environment to health provided by factories and health promotion policy and behavior observation of the dust protective devices application and environmental condition within factories. The research study to obtain the findings and the result could be taken for the discussion contained the following essences:

2.1 The socio-demographic character of the owner and operators of the lime factories and stone crushing mills.

The owners and operators mostly are male with the average age of 45 years old, married and having the elementary education, have been engaging in the factory business for the period of 5-10 years. This showed that the owners and operators were in the working ages, even their education was only the elementary school level, they could be working in the factory for long period of time and gained the adequate experiences in managing the factories.

2.2 The supportive environment to health provided by factories and the health promotion policy and behavior observation of the dust protective devices application and environmental condition within factories

It was found that 9 lime factories failed to provide the workers the supportive environment to health and health promotion policy as well as the responsible persons to enforce the workers to wear the dust protective mask at all time while on duty, no health examination was available and failed to provide the workers the dust protective devices, no regulations on wearing the dust protective devices was issued, no policy or regulations was to be informed to workers and no recommendations were given to workers on the risk of danger from working and the prevention method for workers before starting to work causing of the workers had preventive behavior from dust in the low level, however, the owners and operators agreed that the workers' health was so important to their working performances. This showed that the owners and operators did not realize of the importance of the workers' health by giving support and

promotion to make the factories to have the supportive environment to health for workers. This would be because these factories were small factories with inadequate support from the Government agencies, making the lime factories to have the unfavorable working condition. So the Government agencies should have lent them their hands.

All 4 stone crushing mills were found to have some traces of supportive environment to health. The regulations was issued to enforce workers to wear the dust protective masks, responsible person to supervise workers to wear dust protective devices at all time while on duty were available, the recommendation and the prevention method on danger while working were informed to workers before starting to work, annual health examination was available, however there was no health record available in the mills and was found that the mills were in favor of the importance of the workers' health, according to the except and the principle of the health promotion in the Ottawa Charter which are the constituents that help to promote and accelerate to produce good health among workers. Such constituents are the factors that have the influence to health in the creative way which consisted of the creation of public policy for good health, the creation of the supportive environment, the creation of activities for strong community, the development of personal skills, and for the change of the health service system with good health promotion to be successful it must rely on the cooperation from all parties in the Government and private sectors.

It was found that the factories mostly are post the policy or regulation in the place where it can be seen clearly

According to this research, the environment condition within factories and mills was found to be unsuitable for good health since the supportive environment to health and the health policy were the important factors in creating the workers' good health. So, the importance on the supportive environment to health and the health policy should have been given to workers by changing or improving them to have the better environment within all factories and mills.

5.3 Research Recommendations

From the research on the protective behavior from dust among workers in the lime factories and stone crushing mills in Nakhon Si Thammarat Province, we can know about the protective behavior from dust among workers in the lime factories and stone crushing mills, and based on the research results the researcher would like to provide some suggestions for consideration as follows:

1. Suggestions from the research results

The following suggestions are made according to the research results.

The development of the public policy to be supportive to the good health of workers is the important issue that has to be considered urgently, and all concerned parties should be involved, no matter whether they are the persons responsible for supervising the factories, or owners and operators of the factories, or even the workers themselves. The operation procedures should be done as follows:

- 1.1 The public health officials supervising the factories need to provide the knowledge development on health promotion for the

workers and owners and operators with respect to the proper use of the dust protective devices, the preparation of documents and media to publicize the health knowledge, provision of public health nurses to examine the health of workers annually or to arrange the project for the health problem solution and to keep workers informed for their acknowledgement, the availability of the record system with respect to the workers' health on continuous basis for monitoring and making the alert on health.

- 1.2 The owner and operators need to initiate the driving force to produce the policy, regulations, schemes or activities to be supportive to the workers' health in writing by issuing the warning notice about the policy, rules and regulations to be supportive to the workers' health for their acknowledgement and to strictly follow them to provide the resources for promoting the workers' health, for examples, to provide workers the dust protective masks while on duty, to provide the nursing room and care taker for the workers' health, to provide the place for workers to exercise, canteen, including the dust disposal for not making them to be dispersed.

This may be said that in Nakhon Si Thammarat Province, there is no factory to initiate the health promotion project. Most of them carry out on the occupational health and safety. The workers' health promotion project would be fruitful if many supports are given, for examples, the Government policy, policy and understanding, the

owners' and operators' interests, the cooperation of organizations concerning medicine/community public health, including other government and private organizations.

2. Suggestions for the further researches

- 2.1 This research result can be used as the guidelines for organizing the surveillance program for among workers who are working in the lime factories and stone crushing mills.
- 2.2 This research result is the study of the protective behavior from dust among workers in the small and medium lime factories and stone crushing mills, and the study itself should be extended to cover the group of workers in the larger factories in order to compare and to develop the health for the large number of workers.
- 2.3 The effective strategies to produce the protective behavior from diseases among the group of workers in the lime factories and stone crushing mills should be studied more thoroughly.
- 2.4 The study should be made to find the relationship between the protective behavior from diseases involving the employment whereby the workers' health examination should be made.