

CHAPTER 2

LITERATURE REVIEW

In this chapter will mention the concept and theories on:

- 2.1 Dust and dangers from dust
- 2.2 Silicosis
- 2.3 Health behavior and each belief model
- 2.4 Concept on health promoting workplace

2.1 Dust and Dangers from Dust

The meaning of “**Dust**” on the environment means hard particulate of liquid with the diameter between 0.3-100 microns diffused in the atmosphere for long time called suspended particulate matter. The dust with the size less than 10 micron is called PM 10 can pass through the body through the respiratory system from the nose to the gullet. For dust or particulate with the size between 0.3-6.0 microns can reach the pleural. This particulate is called respirable particulate matter. The particulate with the size between 0.5 –2.5 microns will be stuck in the lungs, while the particulate that is less than 0.5 microns can fly out of the lungs freely.

The component of particulate is a compound mixture of organic and inorganic substances suspended in the atmosphere. The difference of the compositions depending on the sources of the dust in lime plants or rock crushers are mostly inorganic substances.

How much will the general dust have effects on the body depends on the type of dust? Some may have severe effect on the body, e.g. causing fibrous tissue at the lungs, which disables the lungs and can cause cancer. Some types of dust can have small effect to the body, e.g. causing allergy. The hardening of lungs from inhaling dust is called pneumoconiosis, which means the abnormality that used to be called the lung diseases from inhaling dust from the atmosphere to accumulate in the lungs. The characteristics of the disease will have rather hard fiber stuck with the lungs irritating the lungs. The more inhalation of dust into the lungs the more chance of developing the pneumoconiosis with increasing severity. If the pneumoconiosis is developed the efficiency of the lungs will be reduced. The primary symptom of the pneumoconiosis is difficulty in breathing.

Dust in the atmosphere, if inhaled will have effect on the respiratory system, which will have effect or show various symptoms depending on concentration, size and chemical composition, chemical and physical properties. Examples of the diseases from inhaling dust are as follows: pneumoconiosis is a disease caused by inhaling the inorganic dust to cause fibrosis. The lungs lose the function on working that causes this disease. There are several diseases that are called by the names of the dust.

Physiology of the respiratory system involved.

Department of Occupational Health (1998) said the process of eliminating the dust foreign materials consisted of three types depending on the size of the dust:

1. Coarse filtration, this type of response is used with the dust of large size with the diameters more than 15 microns, which is visible. This dust when inhaled mostly will be trapped in the nose and neck corners by the nose hair and mucus, and forced out by coughing, sneezing, forced nasal mucus or swallowed into the esophagus
2. Fine filtration, this type of response is used with the smallest dust with the diameter is less than 15 microns but larger than 5 microns. This type of dust can pass through the nose and neck to the bronchiole, later trapped by the mucus that lines the trachea, and the fanning cells blow it to the upper respiratory system taking 20 minutes and forced out by coughing and sneezing.
3. Cellular level defense, the very small dust with the diameter is less than 5 micron, respirable dust is breathed with the air through the air passage the upper part to the trachea and air sacs. Part of it will be exhaled with the air. While being exhaled another part w

and blown back to the respiratory system for coughing and sneezing out. While another part will be moved to the lymphoducts and eliminated through the lymphatic system.

Absorption of substances through the respiratory system: the particulates mixed with the air, and with the diameters from 5 microns and up, when inhaled will be accumulated at the air passage and mouth and forced out by sneezing. While the particulate with the diameters between 2-5 microns will be accumulated at the seams between the large and small trachea of the lungs, which are forced out of the lungs by sneezing or coughing in the phlegm. While the particulate that is smaller than 1 micron go to the air sacs and can be absorbed in the blood stream or swallowed by the macrophages.

Elimination of toxic substances that go to lung sacs has three methods.

1. Elimination of this particulate accumulated at the liquid level of the alveoil and pushed up to the top and forced out by coughing or sneezing with the phlegm.
2. Elimination by cell swallowing of the macrophages, which found at the lung sacs.
3. Absorption into the lymphoducts, which find that water, electrolyte and protein with the size of albumin, can seep through the caterpillars and the channels among the cells, air sacs and lymph.

Cause of the pathology of the respiratory system when received toxic dust:

1. Pathological condition of the respiration, which is on the beginning part, with no exchange of gas with the occurrence as follows:

1.1 Simple irritation, when there is inhalation of dust that causes more irritation to the mucus of the respiratory tract, the mucus glands will divide themselves and expand to produce more mucous substances in the trachea and narrow it. Elimination of the mucus substance will cause inflammable of the trachea, which in its frequent occurrences can cause chronic inflammable trachea.

1.2 Allergic and immune reactions, when dust enters the respiratory system in some patients, there may be instant response by combining the cells of eosinophil and mast cells, which release substances that cause contraction of the trachea asthma, which these patients tend to have a history of tiredness on exposing to the dust until they have to stop working in the occupation.

2. Pathology of the air sacs and lung tissue being pathology of the respiratory system on the part that exchanges gas. The pathology of the respiratory system on the lower level resulted from the small dust with the diameter less than 5 microns. The cause of the different pathology depends on the chemical properties, shape, size and volume, including specific characteristics of each type of dust to cause pathology as follows:

2.1 Diffuse interstitial fibrosis is fibrous tissue stay in space between the lung tissue and air sacs by spreading along the two lungs. This

dust destroys the macrophages in the lungs, which is the main cause to accelerate the cells of fibrous to grow abnormally fast. The patient will have abnormal tiredness, as the lungs cannot fully expand.

2.2 Nodular fibrosis is the fibrous tissue forming nodules where there is dust left in the lungs. In some cases may be combined to cause large fibrous tissue later. The evidence is in lung diseases caused by silica and coal dust, which macrophages in the lungs are destroyed by this dust and caused this pathology. The usual symptoms are tiredness from incomplete expansion of the lungs together with the tiredness from obstructive lung disease.

2.3 Emphysema is found in some diseases, e.g. dust, silica, coal dust, which tend to occur to people who receive large amounts of dust for a long time. The emphysema occurs near the fibrous tissue surrounding this dust. While the walls of the air sacs and the ends of the trachea are destroyed slowly due to the different cells of the polymorphonuclear releasing toxins against them. These cells found to increase abnormally together with the increase of macrophages. The symptoms happen in the form of tiredness due to chronic obstructive lung diseases.

3. Lung degeneration, Athit (19 82) studied for relations between the dust that can enter the respiratory tract and the lung performance of the traffic police in Bangkok metropolis. By collecting the air samples using the general data questionnaire, work history, smoking and symptoms of the

respiratory system, testing of lung performance and results from collections of samples. We found that there were high contents of dust that can enter the respiratory system, where there is high air pollution as well, twice of the low air pollution. The tests of the lung performance found that the working period has correlation with the lung performance. Results of the study indicated that the lung performance in the highly susceptible groups had lower value than the lower susceptible groups.

Dangers from the dust with effects on the health

1. Pneumoconiosis caused by inhaling the dust that reaches the lungs and reacts with the lung tissue and causes the tissue to be toughened like fibrosis. So that area loses the ability on exchanging the air and the ability to expand of the lungs reduced. This disease is called differently according to the characteristics of the dust that causes it. For example, inhaling sand dust with quartz or silica causes silicosis.
2. Allergic effects, mostly caused by organic substances, e.g. cotton, baggage, pollen dust, and the allergic effects are in the form of asthma and inflammable air sacs.
3. Irritant effects here include irritation to eyes and respiratory mucus, and the irritation appears as the blocked trachea with phlegm, sneezing and coughing, etc.
4. Systemic toxic effects when dust entering the lungs can reach the blood circulation. It can also enter the alimentary canal by swallowing dust in

the saliva or phlegm, then spread it to the various system of the body, e.g. liver or kidneys.

5. Skin effects, such as the dust particulate of the heat insulation type, e.g. fiber, causes skin inflammation or rash.

2.2 Silicosis

Generally, the amount of dust will have varying effects on the body depending on the types, some dust may have effect to the body severely, e.g. to develop fibrous at the lungs, disable the lungs and they become cancer eventually. Some dust does not effect the body very much, e.g. just causing allergy. Pneumoconiosis caused by inhaling dust, which means abnormal lungs, from inhaling dust from the atmosphere to accumulate in the lungs. Pneumoconiosis has rather hard fiber attaches to the lungs due to irritation of the dust we inhaled and the lungs secrete fibrous tissue to cover the lungs to relieve the irritation. The more we inhale the dust into the lungs the more chance of having the pneumoconiosis. If the disease develops the lungs will lose their basic efficiency, that is, having breathing difficulty. However, the older people may have the same symptom, which is not caused by dust only, but have other supplementary causes, e.g. silicosis is another type of pneumoconiosis from breathing free silica dust. Sometimes, the people with silicosis do not show the symptoms clearly.

The dust that is embedded on the air sacs will stimulate the body to have a response with the macrophages slowly reacting against the dust. Finally, the macrophages will digest themselves without destroying the silica with macrophage continuously. As the results from such process the body may build the collagen tissue

and becomes fibrous eventually. Especially, at the end of the respiratory system and the lympho ducts around the hilar, but the said process takes between 3-20 years to develop. Thus, some patients may have clinical improvement after they are not involved with the silica dust.

Clinical characteristics

Silicosis is divided into types with the following factors:

1. Exposing time with the pure silica crystals.
2. Content of pure silica crystal received each time and the total net content.
3. Factors from the patients, having chronic diseases, e.g. tuberculosis, smoking history.

Form the said factors silicosis can be divided into 2 types:

1. Acute type

This group of patients received silica crystals in large amounts in a short time. The patients give the history of direct contact with silica, and after the exposure 1-2 weeks the patients will have difficulty in breathing followed by dry coughing. In the next 1-2 months they will have tight chest and panting. The physical check-up may find cyanosis or restrictive movement of the chest and may have late respiratory rate. Moreover, the patient may come to see the doctor with the symptom of collagen and blood veins, e.g. scleroderma, SLE, respiratory failure or corpulmonale. In Thailand silicosis is found among sand blasters, as in the case of the patients at Khao Soon, Nakhon Si Thammarat Province.

2. Chronic type

The patients in this group receive pure silica crystals for no less than 6 months and up to one year. Initially the patients may show no symptoms, but later on they feel easily tired, and such conditions are generally found in the elderly. While the physical check-up also may not reveal any abnormalities, the diagnosis will require laboratory help.

3. Silicosis and tuberculosis

In the early 20th century there were reports of workers involving the quartz work in England to have more chance to develop tuberculosis than the general population. The people who work in crowded conditions or unsuitable air ventilation have the high incidence of tuberculosis. The reaction of tissue to pure silica causes the body immunity and mononuclear phagocyte in the lungs to have reduced efficiency. Therefore, if the workers in the vulnerable groups to silicosis with fever or the body weight reduced abnormally or coughing with blood the doctor should think of the silico-tuberculosis condition as well.

Criteria on diagnosis and analysis of the disease

1. The clear work record of the patient related to exposure of pure silica dust with the working period for a long period at least working between 1-6 months.
2. Check-up and laboratory test, and if there is an initial test results of the employee from the beginning of work to compare with, it will make the diagnosis more accurate.
3. Working condition

Treatment

Silicosis is a chronic disease taking the incubation time between no less than 3-20 years to show the clinical symptom clearly. Thus, some patients may come to see the doctor with the present work history that is not involved exposing to the pure silica. So it is necessary to search for the past working history as well, as Thai people tend to change job all the times. The pathology of the silicosis patients results from a response of the tissue against the silica crystals, which cause fibrosis in the lungs. It cannot be cured completely, due to the response that keeps continuing.

Prevention

Silicosis cannot be cured completely, so prevention is an important measure to reduce the incidence or implications of the disease with the guidelines as follows:

1. Protection on the work environment

The principle measure is the control the dust, so that it does not destroy the general public first is the best measure. Control of the sources of dust or particulate using engineering principle, if this is not possible other methods may be adopted. The general methods used are as follows:

- a. Covering the sources or points of high dust, e.g. installation of air ventilation specifically at the sources. This system requires the suitable calculation for the size without leaking the dust ventilation and may be eliminated later.
- b. Separation of the process or machinery with more dust from the area with many people working, if the process cannot be isolated it must find a way to reduce the workers in that process.

- c. Substitution by choosing less dangerous materials to replace the more dangerous materials.
 - d. Introducing more moisture or wet system to help, e.g. drilling, polishing using water cooling to cause less dust or spray water in mist to reduce dust by falling on the floor.
 - e. Building of the elimination system or air ventilation with efficiency in eliminating dust, e.g. polishing process of metal with suction of metal to be kept in storage or packing of powder to be installed the dust collector.
 - f. Regular cleaning can help reducing the dust greatly.
 - g. Reducing the time of exposing to the dust.
 - h. Using personal protection gear.
2. Personal protection having the guidelines to implement as follows:
- a. Having pre-placement examination.
 - b. Having periodic medical examinations.
 - c. Requiring a check-up before leaving the job, except those who come to work less than six months.
 - d. Having environmental assessment
 - e. Using personal protective device such as a dust mask or face mask with the air-feeding apparatus.

The personal protective device is equipment used in protection of the respiratory system, classified according to the use characteristics into two types. One is the air-purifying respirator to eliminate foreign materials from the respiratory system. The

other is the atmospheric-supplying respirator, sending air from the supplementary source, not depending on the contaminated air in that area.

Particular filtering respirator

The filter mask is equipment to protect the respiratory system against dust, vapor, smoke and dust, having the air passes through the mask filtering the contaminated material out of the filtering fiber. The chance of each particulate to be caught depends on several aspects, e.g. the size of the particulate that correlates with the size of the fiber, the speed of the passing particulate. In some cases it depends on the width, components and shape of the particulate, the charge of the particulate and fiber. The present material does not like to use the one that can filter 100 percent, because it is hard to breathe through it. Thus, the manufacturer tries to use filtering materials with high efficiency and low resistant on breathing. The filtering masks used for filtering dust, foam and dust can be divided into the following types:

1. Replaceable or reusable dusty and mist filter designed for protection against the permissible exposure limit of no less than 5.05 mg per air cubic meter or no less than 2 million particulate per air cubic meter.
2. Replaceable fume filter is a filter designed for protection of the respiratory system from various metallic fumes with the permissible concentration of no less than 0.05 mg per air cubic meter.
3. Replaceable dust fume and mist filter is designed for protection of the respiratory system from dust, fumes, and mist of substances with permissible exposure limit of no less than 0.05 mg per air cubic meter.

4. This disposable filtering mask is for one-time use, and is designed to protect the respiratory system from irritation and development of pneumoconiosis and fibrosis from the dust.

Cleaning and disinfection are necessary. The filter for the respiratory protection system that is for single person should be cleaned after use each day, and leaves it to dry at a clean place. It should be stored at a place free of dust and contaminants and ready to be used again. Together with this, it must be inspected for defects and shortcomings of the protective gear constantly so that it has the efficiency on use with the long life of the equipment itself.

2.3 Health Behavior and Health Belief Model

Health behavior

Health behavior means practice or display of the person on the conduct or suspension on things with bad effects on health using knowledge, understanding and health practice that correlates suitably, for example, behavior and roles on the sickness. (Yaowalak Anulak et al. 1999: 21)

According to the concept, the theory and analysis of behaviors or factors involved, the persons to have voluntary health behavior must have the belief in the following matters.

- Belief that s/he is susceptible to that disease if does not perform it.
- The diseases are dangerous to him/her and may be fatal or disabled.

- Belief that if s/he performs it may receive the benefit of not getting sick or not developing the disease.
- S/he has the motive and supporters on the impetus for such behavior.
- S/he receives regular stimulants such as news from various reliable channels to practice regularly.
- Such behaviors depend on the influence of different factors, e.g. age, sex, personality as well (Yaowalak Anulak et al. 1999: 13-14).

Health behavior has received very much interest during the earlier decade of (1950-1960), which was regarded as the beginning of the development of patterns on health. Since then the management of public health has put emphasis on prevention more than treatment. They faced the problem of less people coming to seek the service on prevention, while it cost nothing or cost much less. Therefore, the behaviorists and the public health workers were interested in understanding what was the cause and in what proper situation to have the people practice prevention. It is necessary for people to go for the check-ups to screen or diagnose the diseases before the onset of the diseases, e.g. in case of the check-ups for tuberculosis, cervical cancer, periodontal diseases, rheumatism, polio and influenza, etc.

Health Belief Model

It is a form or model developed from the theoretical side on social psychology used for explaining the decision of people involved on the health behavior on the first time. It is used for predicting and explaining the preventive health. Later, it was adapted to explain the illness behavior and sick-role behavior.

Development of the health belief model

During the 20th century the educators began to be interested on the behaviors of the human beings very much, due to the belief that the behaviors of the humans could be understood and controlled by a scientific method.

The development on the health belief model resulted from the people who studied and researched the conditions of the health services such as Godfrey M. Hochbaum, S Stephen Kegeles, Howard Levental and Irwin M. Rosenstock. Since Rosenstock wrote and disseminated the health belief model to other people to understand the model very much, so the name of Rosenstock (1966) as the initiator of the health belief model was more familiar and referred to more than other people. The health belief model was influenced by the social psychology theory of Kurt Lewin, who explained that the life space of people has both positive valence and the negative valence and the relative neutral. The positive valence attracts people to the goals they desired, while the negative valence pushes the people away from the undesirable things. The relative neutral is the balance between the positive and negative forces or display of the people, and is regarded as the process of pulling by the positive valence and pushed by the negative valence. Moreover, Lewin also explained the setup of the target on people in the situation with difficulty and simplicity to attain the different target, for the person to choose. The comparison of the advantages and disadvantages or failures and the opportunity to attain the success, which Lewin and associates set up hypothesis that the behaviors of the people resulted from two variables. They are value of the results of action and expectation of the people on the chance of generating results of those actions (Maiman and Becker, 1974).

Rosenstock (1974) explained the concept of the health belief model that the person shall show any of his health behaviors to avoid having the disease. Such person must have the belief that (1) He is at risk of having the disease. (2) At least that disease must have severity on his life considerably. (3) Such practice is to avoid having the disease, to give good results to him by reducing the chance of having the disease or reducing the severity of the disease. If the disease has developed such practice should not have obstacle on the psychology with the influence on his practice, e.g. expense, time, inconvenience, fear, shyness, etc. Later Rosenstock (1976) presented additionally that on explaining the behavior of check-up to diagnose the disease in the initial stage, other than must consist of such factors, it also increases the factor on the belief that he can be sick even though there is no symptom whatsoever.

The research on the health behavior in the later stages found other than the factor on the belief or recognizance; there are other factors with relation to the health behavior. Becker and associates (1974) improved the health belief model used to explain and predict the preventive behavior of the people. By increasing the common factors and things leading to the practice, which are factors other than the recognition of the people that found to have influence on the prevention of the diseases.

While Kasl and Cobb (1966) gave the definition on the health – related behavior as the “health behavior or preventive health behavior.” It is an activity of the people that believe the preventive health behavior is activity of the people that believe they have good health with the objective to prevent diseases or diagnose the diseases at the onset that has no symptoms of the “illness behavior.” It is activity of the individual who

do not feel good with the objective to seek suitable diagnosis and remedy. The “sick – role behavior” is the activity that the people feel that they were sick with the objective to be cured from the illness. From such meaning it can be seen that the behavior involves the health in several types, which are different from not at all sick, while feeling unwell, and developing the disease already. So there was an improvement on the health belief formerly used to explain the preventive behavior to be able to explain and predict other more suitable health behavior.

Kasl and Cobb modified the health belief model to be used on predicting the health behavior by giving priority to the sickness, which compared as the representative of the threatening thing he faces. At the same time the sickness symptom contributes to stimulation of motivation or practice, which is like conducive to practice. In the explanation of the decision to show the behavior of the sick person will involve four factors, which are (1) Motivation on health from food experience, which shows the level of interest of person’s health. (2) Threat from food that is dangerous to body and disturbance to functions. (3) Benefits or value of action to reduce the threats and, (4) Obstacle or expenses from such actions.

Factors Involving Health Belief Model

The important health belief model used in explaining and predicting the behavior on prevention of diseases and behaviors of the patients in five aspects are as follows:

- 1. Perceived severity** means the belief that the patient evaluates himself on the severity of the disease on the body, causing disability, death, and

difficulties and long time for treatment. On treatment if there is an implication or impact on the social role with severity on the disease mentioned might be different from the severity of the diseases evaluated by the doctor.

2. Perceived Susceptibility means belief or speculation that the patient has how much the chance of having the disease or health problem. If it is recognition of the patient it means belief on the correct diagnosis of the doctor, expectation on the chance of recurrence and the feeling of the patient if s/he is more susceptible to the disease.

Realization on the chance of having the disease jointly with the recognition of the disease severity can give the person on the perceived threat of the diseases, which threatened the person on the undesirable part, and has the tendency to avoid the perceived susceptibility.

The numerous studies and researches that report the results of relations on the positive between the chance of having the diseases and the preventive behavior. They found that the belief on the risk of having the disease correlates with the receipt of immunity and health check-up at the initial stages, e.g. cervical cancer and breast cancer. For realization of the chance to have the disease in the patients found to have correlation with the behavior of the patients according to the recommendation of the doctor or compliance as well, in the positive relation on treatment of the individual's disease.

3. Perceived benefits and costs When the persons have belief on the chance of risking to have the disease and believed if the disease has severity or causes disadvantages, including time, inconvenience, shyness, risk on safety and implications. The people can evaluate the expenses and relate with the existing or acquiring resources, including the past experience on such matter. Even though the person may try to avoid such threat by seeking protection or treatment as the person accepts and implements such thing, resulted from the belief that such method is the good solution, causing good results with most benefits and suitability. That it will not cause the disease or recovered from such disease, while that person must believe that the expense is the disadvantage or obstacle on prevention and treatment is less compared with the benefits to be received.

4. Health motivation means the interest in and concern about health matters, and the desire to maintain the health and avoid sickness. This motivation may result from the interest in health of the general people or stimulation of the belief on the risk of developing the diseases. The belief on the severity of the disease resulted from implementation, including external stimulus e.g. information, doctor's recommendations, which can stimulate the inspiration on the health of the people.

The inspiration can be measured from the interest on the general health, the intention to comply with recommendations and activities to promote health with the

research report that the mothers of the children were interested in the general health of their children. For example, to have anxiety on the health of the children; to supply of vitamins to their children; possessing thermometers to measure the temperature of their children. These groups of mothers had complied with the recommendations of the doctors very well. From the study it was found that the patients intended to comply with the doctor's recommendations on taking medicines, coming to see the doctors regularly more than the groups without the intentions.

5. Modifying factors are contributing or obstructing the person to do to prevent diseases or complying with the recommendation on curing the disease. They consist of the variable on population, e.g. age, sex and race of the people. The variable on the structure, e.g. complexity and side effects of the treatment, simplicity of providing the service, the variable on reactions, e.g. type, quality, continuity and regularity of relations between the service providers and the service receivers. The variables on the support (mentioned in the health belief model for the behavior of the patients) or cues to action (mentioned in the health belief model for the behavior on prevention against diseases). They are triggers that lead to suitable practice, and these variables may be things inside the persons, e.g. uncomfortable, pains, fatigue happened inside the person. Or being external stimulus, e.g. campaigns or news from mass media, recommendations from the authorities or others, sources of giving recommendations, appointment cards or post cards warning sickness of members inside the family, pressure or social support, etc.

Induction for practice or stimulant must be consistent with the behavioral intensity of the stimulants to cause suitable behavior differently. The level of readiness on the mind of the person to show behavior change, that is, if the readiness on the mind is less it depends more on the conducive; however, if there is readiness on the mind it requires a little stimulant only.

Concept on the health belief in summary has explained the behavior of the persons to practice disease prevention. Disease treatment must have recognition on the risky chance of developing the disease, recognition on the severity of the diseases, which it will help to push the person from the threat of the disease. By choosing the best alternative by comparing the advantages to be received, and the expenses or obstacles to incur. Moreover, the incentive on the health and other factors, e.g. variables on the population structure, reactions and incentives to practice are the factors affecting the health performance of that person. It can be summarized as in figure 1.

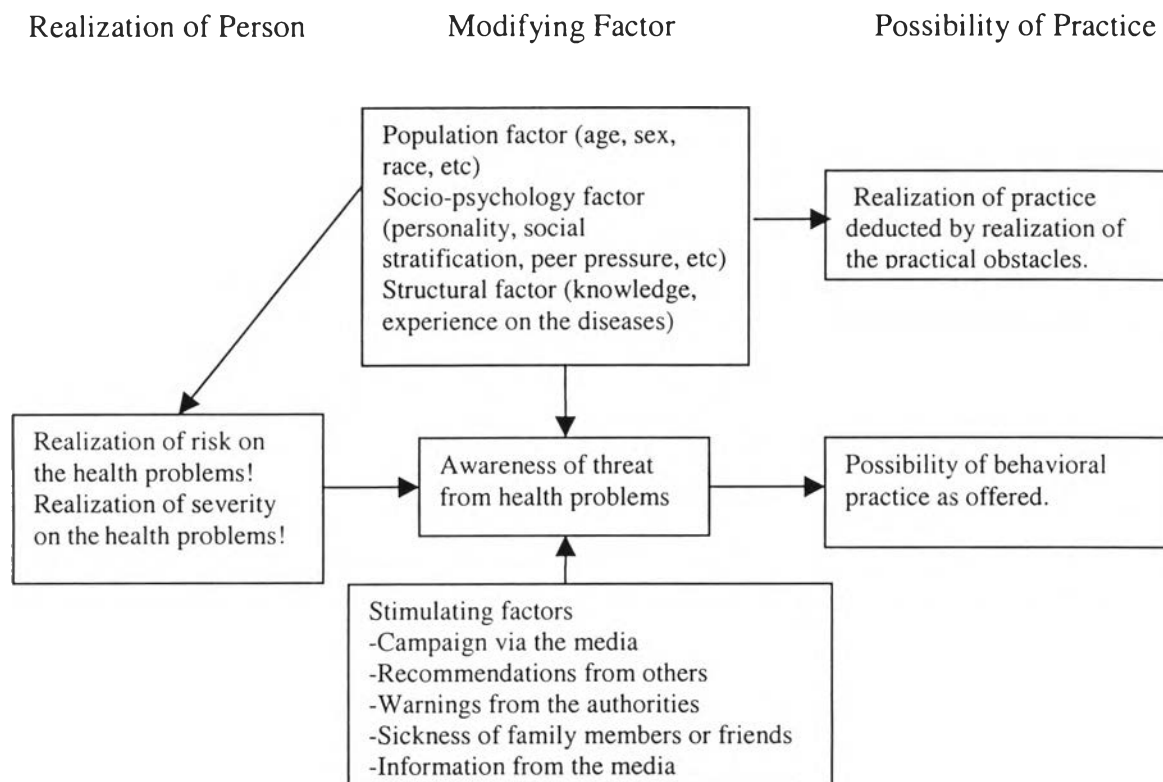


Figure 1: Relations among factors of the health belief model
(Walla Tantayothai, 2000:31)

2.4 Concept on Health Promoting Workplace

Meaning of health promotion

According to the concept of Green and Krauter citation , promotion of health means the aggregate of the educational support and environmental support to have effects on action and conditions of living. It can generate the perfect health and such actions may be of individuals, communities, policy makers, employers, educators or other groups, which such action may have influence on the health of the individuals, communities and collective societies (Green and Kreuter, 1991:4).

Although there are support on the environment, social policy, organization, economic policy, legislation, bylaws and other measures to promote the people, family and society to have good health, if no activity on health education is included it may not be successful. Health education will help the persons to have realization, interest, including stimulation for the persons to have desirable behavior, sensing that they have obligations and duties to develop the society together. It can be said if no health education work, the health promotion will be things to change the society. In fact, such changes do not take place from democratic guidelines. Health education can help to change the elements of the society to be achievable. Meanwhile, if no support on the policy to cause such changes the health education will have insufficient potential to help people to achieve the goals on health, although the attempt to change the individual behavior is successful.

From the principle on health building according to the Ottawa Charter on health promoting, which has several factors to fortify and accelerate good health among the employees, these are recommended strategies for implementing health promotion:

1. Building health public policy
2. Creating supportive environment
3. Strengthening community action
4. Developing personal skills
5. Reorienting public health services

Development and improvement of these factors in the workplace according to the five guidelines can be used as better indicators that any organizations have more or less progress on health building (Anuwat Supphachutikul, 1998: 3-7).

Strategy 1 Building healthy public policy

The policy that augments good health has importance on health creativity, because the policies are statements showing the intention of the organizations to have things in there. Written policies can help all those involved on the managerial level, employees and guests to know and implement on the involved parts to be consistent with the policies.

Policies are obligations the organizations have given, and they must be a stimulant to push things to comply with the specified intentions, e.g. setting sub-policies to supplement the main policy, adapting the rules to be consistent with the policy. Also prescribing the plan on activity projects and allocations of resources, so that the operations will go in the direction of the set policy.

Policies are tools to help the authorities at various levels to decide on the involved matters confidently, easily and rapidly. They can be used as references to specify plans and allocate resources.

Policy on the health of the organization should show intention to protect the health of its people, visitors or those who work for it, including the consumers and the community.

Strategy 2 Creating supportive environment

The environment in here means the things around the people in the organization that are tangible, such as buildings, work equipment, tools, machinery, raw materials,

products and wastes, including lighting, colors, heat, radiation, dust and microorganisms, etc.

As mentioned above they all have influence on the health of the operators positively and negatively, e.g. the workplace that is stuffy, hot and insufficient light, and too small can easily cause accident, and those working in those areas suffer as a result. If the space is not suitable with the operator it can easily cause fatigue, and in the long term can have bad effects on the muscles, ligaments and bones. As for the machines if they produce loud noises, then are hazardous to the hearing nerves, causing hard of hearing. If the machines cause dust or toxic vapor would be dangerous to the exposed persons corresponding to the properties of those toxic substances, etc.

The environment has changed periodically, e.g. degeneration of the building, tools, and the good machine turns bad and can become defective. While in case of the raw material, there may be a change to use a new kind of raw material; therefore, there must be a monitoring system or survey of the problem that may occur for continuous improvements.

Things that are not directly involved, e.g. kitchen, dining room should be arranged to meet the hygienic requirements. The food provided for the employees should be wholesome, no bad effects and healthy, e.g. low-fat foods, etc. The exercise place, if possible, should be provided to promote the employees to see the value on exercise and practice habitually.

Strategy 3 Strengthening community action

It promotes the employees/community to be self-help and making the decision, including mobilizing resources inside the community for them to receive news on health. It adds community empowerment for sustainable development, e.g. providing advice to those with health problems and exercise, etc.

After the organization employs an employee to work, s/he has the duty to do the assignments, and the organization has the duty to give wages, interest and health care and safety. The relations between the organization and the employees can have problems in several points, starting from job assignment, how much the employee has knowledge and interest in such job. Is the scope of work specified, and has the employee got the corresponding understanding?. If there is a problem in these two points the work results may not be as the organization expects or there is pressure to create more stress on the employees.

Strategy 4 Development of personal skills

There is an increase of empowerment to the employees, so they can control their health and the environment. There are more alternatives by providing news, information, and promotion of learning and training of skills to manage for living in the health-promoted method, such as regular exercise, eating right, avoid the risky behavior. Also to have skills on living with other people peacefully, learning how to preserve the environment to augment the health, have spiritual development to achieve the goodness, reduction of selfishness, having good learning, including knowing how to seek and use health information to the advantage. Plus monitoring their health, and the health of their family members and neighbors.

Strategy 5 Reoriented health services

Any development that can be succeeded and sustainable requires several people to live together, working as a team, group and club or committee, and the more groups or diversity and numbers the better will be for building good health. The organization can provide promotion, support, grouping and group activities as much as it can do. The sample of the group for health, e.g. various sports clubs, musical club, cultural and art clubs, religious club, community development club, healthy food club, anti-narcotic club, diabetes club and retirees club, etc. Other than the groups and clubs with the health goals directly the committees or work groups in the organization should be promoted, guided and considered on the health to the groups or committees. For instance, the quality control group, other than the aim to increase productivity and quality the process should consider the health too. Even considering making the health of the people in the group independently should be promoted.

From the five strategies as mentioned above it pointed out the building of health at the workplace is the duty of all sides, including the public, private and people sectors, and they should join hands. The activities or roles in promoting health at the workplace will not receive interest or implementation if there is no support and help from all sides (Manit Praphansilp, 1999:37-43).

Related researches

Yimwassana (1983) studied the knowledge, opinions and practice on protection against personal dangers of the employees of textiles factory in the metropolitan area found most female employees used protective gear against dust and yarns. The age,

education level resulted in the different use of the protective gear, while the marital status, residence, experience and duration of work in the factory did not have effects on the use of the protective equipment differently.

Tangsaeng (1988) studied the fit on the masks of full-covered and half-covered types used in the protection of the respiratory system against chlorine in the Office of Metropolitan Waterworks Authority. He found the problem on the use of the face masks of the chlorine inspectors resulted from the worries on the toxicity of the chlorine, so they felt the masks were leaked or not effective sufficiently that although they wore them, but still could be exposed to the chlorine. So they did not use the said devices.

Buaphan (1992) studied the acceptance on the use of the noise protective gear of the workers in textiles factories, a case study of Kra Thum Ban District, Samut Sakhon Province, including studying the fact on the relations of acceptance to use the protective gear from noises and obstacles. He found the acceptance on the use of the noise protective gear in the sample groups at the high level. The factors with the relations on acceptance of the noise protective gear is the level on the study of the sample group may cause difference on the use of protective gear from working statistically significant at 0.001 level. While receiving the news on the noise protective gear during working in one day may cause difference on the acceptance of the noise protective gear statistically significant at 0.01 level. The problems and obstacles on acceptance found that 66% were afraid of the colleagues to tease as cowards, or being afraid of hard of hearing. Also 63% deemed that the noise protective gear was the personal right with the option to use or not.

Prichaworawet (1992) studied the relations and ability on forecasting the factor on knowing of the hearing loss from working in the loud noise environment and conducive to use ear protective gear and the behavior of its use in textile plants, Samut Prakan Province. The results on the research found the acknowledgement on the hearing loss from working in the loud noise environment at the middle level having used the ear protective gear 45.9%. The behavior on the use of ear protective gear was below the criteria. The use of the ear protective gear is related statistically significant and the acknowledgement on the hearing loss from working in noisy environment and some conducive were loud noise in the ears, fatigue and exhaustion after work, feeling loss of hearing ability reduced. The distribution of fliers, seeing of the posters on the dangers from noises and protection, receiving advice from others to use ear plugs, knowing other textile workers suffered hearing loss, being told to have hard of hearing. Also the measurement of hearing ability, the behavior on using ear protective gear of the workers have correlation in the positive direction statistically significant on acknowledgement of the hearing loss. Acknowledgement on the severity of the hearing loss in the loud noise environment, outside conducive and realization of the risk opportunity to develop hearing loss from working in the environment with loud noises can explain the variables of the behavior on using the ear protective gear of the workers 30.44 %.

Inprasith (1993) studied the relations between the belief on the health and health behavior in protection against silicosis of the rock crusher plant in Saraburi, the research results found the realization on the disease and its severity was in the middle level at 70.5 and 70.0% respectively. Realization on the benefits-obstacles were in the

middle and rather low at 57.9%, and the health behavior on protection against silicosis was at the middle level. The workers in the rock crusher plants had realization on the health belief on three sides were realization on the risk to the cause at the middle level at 63.3%. The factor with the positive relation on the health behavior on disease protection statistically significant was the job characteristics. The job that was exposed to the dust directly had the health behavior on protection against the jobs that were exposed to the dust indirectly. The factors with the positive relation with the health behavior in protection against the disease were realization-obstacles. The factor that could predict the health behavior on protection against silicosis was the job empowerment on prediction at 13.7%. When combined with the realization-obstacles and the prediction empowerment increased to 23.5%, combined with the last factor, that is, the severity of the disease can predict the health behavior on protection against silicosis 25.2%.

Boonkusol and his associates (1994) studied and compared the protective behavior against the health problem caused by rock dust of the people with the difference on personal, social and economic factors in the rock crusher plants in Saraburi Province. He found the protective behavior against the health problems depends on knowledge and attitude of individuals.

Changkeo (1996) studied the relations between the factor on the health belief and the behavior on the use of the mask protecting against dust of Chon Prathan Cement Factory employees, Cha-um District, Phetchaburi Province, numbering 180 persons. Collection of the data uses questionnaires and data analysis, Pearson statistic

correlation and multiple regression of procedures. The research results found the employees had the behavior on the use of dust masks at a high level, and the common factor that predicted the behavior on the use of the dust masks the best was external conducive and realization of the severity of dangers from dust.

Suwan et al. (1997) studied the behavior and conditions on the environment to promote the health of the people in the groups of youths, housewives and plant workers found the majority samples had the attitude on the health and health promotion in the positive side. They had the belief in their power on the health higher than the belief in the external powers and fate, had satisfaction on the current living at the middle level (Not good-not bad) up to the best. They gave the meaning on “good health” means “no sickness,” the value on health promotion at a a little higher level than the “middle” level as follows. Eating, exercise, management of stress, prevention against accident severity, building of social network, interest on health knowledge. Most of the youth group, housewives and plant workers gave the values middle-low values on the health promotion behavior. The sample group from Bangkok metropolis gave high value on eating the foods advertised as health foods, more than the sample groups from the Provinces. The sample groups from the Provinces gave the high value on the behavior of not using analgesic medicines, exercise, anger management, mind training, not working in a hurry or too much haste, having friends/reliable friends to consult problems more than the sample groups from Bangkok metropolis. The groups of youths, housewives and plant workers gave the value on health promotion behavior on the overall at the middle – low. The common health promoting behaviors 50% of all sample groups stated to have practiced regularly was not to eat half-cooked foods.

While other behaviors, e.g. no smoking, no alcohol, not using analgesic medicines, use of helmets on riding a motorcycle and use of safety belts, only some groups at 50% did not practice regularly. It shows that all the three groups had common health risks must be corrected in a hurry.

Kanungnit Nichanon (2001) studied the factors with results on the behavior of protection against dangers from cotton dust of textile workers in Samut Prakan areas found the behavior protecting against cotton dust of the workers were practiced at the middle level. The socio-occupational factors such as marital status and duration of working has correlation with the behavior on protecting against cotton dust of the workers statistically significant at 0.001 and 0.01 level respectively. The leading factors were knowledge on silicosis, realization on the benefits and obstacles on protection had the correlation with the behavior of protection against the dangers from cotton dust of the workers were statistically significant at 0.05 and 0.01 level respectively. The supportive factors were the cotton dust protective gear and the supplementary factors were support on the news from various sources with correlation with the behavior of protection against cotton dust of the workers were statistically significant at 0.001 level. The variables with the highest prediction were receiving advice from the foremen or safety officials in the plants. The common variables for the prediction were the cotton dust protective gear, receipt of information from the warning signs in the plant, and realization of benefits and obstacles from the protection from the four variables. They can jointly predict the behavior on protection against the dangers from cotton dust of the workers at 24.6%.

It can be said although the dust, regardless of coming from yarns or cement dust must have danger on the health, especially on the respiratory system of the workers in the short term and long term. However, these workers can protect themselves from the dangers by several methods, the simplest form is using the dust protective gear. While the people to have the behavior of protecting against dust or not depends on several factors, e.g. factor on health belief, environmental factors that helps on the health, including the factor on the policy of promoting health of the factories. It can be seen that these matters were interesting to study to benefit on promoting the health of the workers. In this research, the researcher was interested to study the factors comprising the population and society, health belief, the environment that help the health promotion. The factors on health promoting policy and the behavior of the workers to protect dust in the lime factories and rock crusher plant in Nakhon Si Thammarat Province with the details are shown in figures 2.

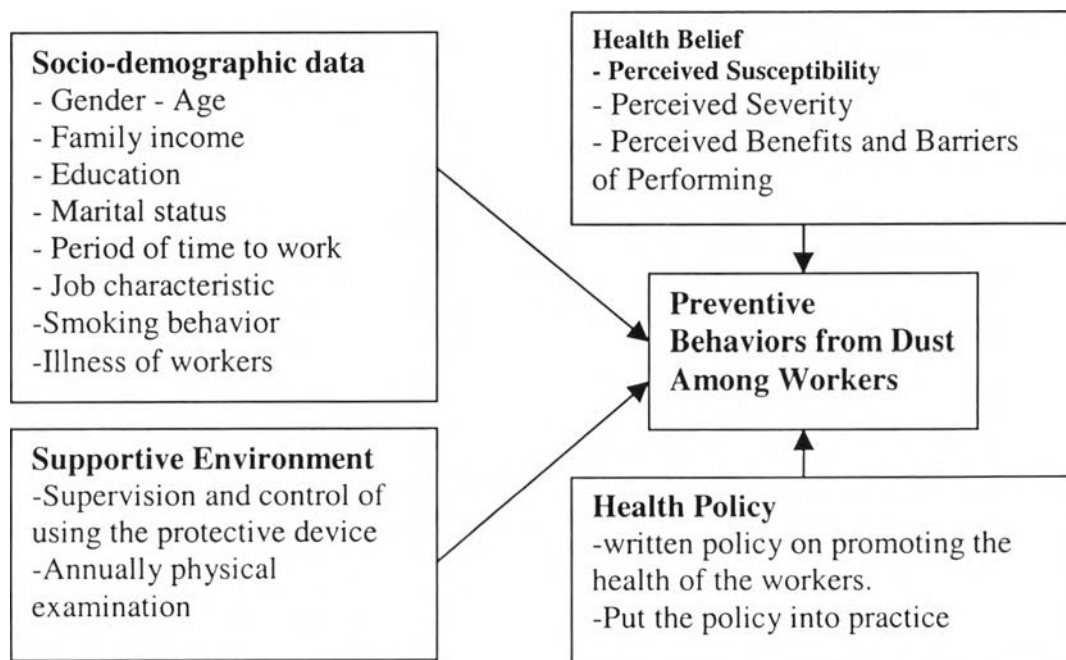


Figure 2: Research Conceptual Framework