A STUDY TO ASSESS THE EFFECT OF USING FACE MASK AND DEEP BREATHING EXERCISE ON PEAK EXPIRATORY FLOW RATE AND SELF REPORTED RESPIRATORY PROBLEMS AMONG COTTON MILL WORKERS IN A SELECTED COMMUNITY

M.Sc (Nursing) DEGREE EXAMINATION

BRANCH IV – COMMUNITY HEALTH NURSING

R.V.S. COLLEGE OF NURSING

SULUR, COIMBATORE

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI – 600 032

MASTER OF SCIENCE IN NURSING

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Examination : M.Sc (Nursing) Degree Examination

Examination Month and Year:______________________________

Branch and Course : Branch IV – Community Health Nursing

Register No. : R.V.S. College of Nursing Sulur, Coimbatore

Sd______________________ Sd___________________________

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Internal Examiner External Examiner

Date : Date :

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY
CHENNAI – 600 032

CERTIFICATE

This is to certify that this dissertation titled '**A STUDY TO ASSESS THE EFFECT OF USING FACE MASK AND DEEP BREATHING EXERCISE ON PEAK EXPIRATORY FLOW RATE AND SELF REPORTED RESPIRATORY PROBLEMS AMONG COTTON MILL WORKERS IN A SELECTED COMMUNITY'** is the bonafide work done by Ms. R. Uma Maheswari, R.V.S. College of Nursing, R.V.S. Educational Trust, Sulur, Coimbatore. Submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai – 600 032, in partial fulfillment of the requirement for the award of the degree of M.Sc. (Nursing) Branch – IV – Community Health Nursing under our guidance and supervision during the academic period form 2010-2012.

Prof. Mrs. Saramma Samuel M.Sc. (N)

Principal, R.V.S. College of Nursing, R.V.S.
Educational Trust, Sulur,
Coimbatore,
Pin Code – 641 402.

“A Study to Assess the Effect of using Face Mask and Deep Breathing Exercise on Peak Expiratory Flow Rate and Self Reported Respiratory Problems among Cotton Mill Workers in a Selected Community”

Approved by the Dissertation committee on ____________________

1. Professor in Nursing Research

   Dr. (Mrs) Annamma Prabhakar, M.Sc. (N), Ph.D,
   Visiting Professor,
   R.V.S. College of Nursing,
   R.V.S. Educational Trust,
   Sulur, Coimbatore.

2. Professor in Clinical Speciality

   Prof. Mrs. Saramma Samuel M.Sc. (N)
   Principal,
   R.V.S. College of Nursing,
   R.V.S. Educational Trust,
   Sulur, Coimbatore.

3. Medical Expert

   Dr. R. Anantha Kumar, M.B.B.S., M.D.
   Pulmonary Medicine,
   Consultant Pulmonologist and Allergic Specialist,
   R.V.S Hospital,
   Sulur, Coimbatore.

A Dissertation Submitted to The Tamil Nadu Dr. M.G.R. Medical University,
Chennai – 600 032,
in partial fulfillment of the requirement for the award of the degree of
Master of Science in Nursing

April – 2012

ACKNOWLEDGEMENT

I thank the ***God Almighty*** with my whole heart and soul for his abundant grace which strengthened me in each and every step throughout this endeavor.

First I would like to appreciate and thank the respondents for their participation and co-operation to conduct this study successfully.

It is my long felt desire to express my profound gratitude and exclusive thanks to Prof. ***Dr. (Mrs) Annamma Prabhakar, M.Sc. (N), Ph.D,*** Visiting Professor, R.V.S. College of Nursing, R.V.S. Educational Trust, Sulur, Coimbatore. It is a matter of fact that without her esteemed suggestions, highly scholarly touch and piercing insight from inception till completion of the study, this work could not have taken shape.

I express my sincere and heartfelt thanks to Prof. ***Mrs. Saramma Samuel, M.Sc.*** (Nursing), my guide and Principal, R.V.S. College of Nursing, R.V.S. Educational Trust, Sulur, Coimbatore, for her intuitive excellent guidance and motivation in all matters large and small since the inception of this thesis.

I wish to express my sincere thanks to ***Mrs. Emerensia, M.Sc. (Nursing)***, R.V.S. College of Nursing, R.V.S. Educational Trust, Sulur, Coimbatore for extending her support to conduct my study.

My sincere gratitude to ***Dr. Anandakumar***, Consultant Pulmonologist, ***M.B.B.S., M.D.,*** R.V.S. Hospital, Sulur, Coimbatore for validating the tool and for his constant guidance.

I express my gratitude to ***Prof. Nobel Jebakumar, M.A., M.Phil.,*** Head, Department of English, JJ College of Engineering and Technology, Tiruchirapalli for his careful editing of the report.

I express my sincere thanks to ***Mrs. Suja Santhosh, M.Sc., (Statistics)***, B.Ed, Sulur, for her expert guidance in statistical analysis.

I am deeply grateful to Mr. Kannan, Mr. Senthura Pandian, Mr. Mohan and Mrs. Stella, Librarians, R.V.S. College of Nursing, R.V.S. Educational Trust, Sulur, Coimbatore for their help in availing reference materials.

I wish to extend my thanks to my friends **Mrs. Revathy and Mrs. Bincy**, for their timely help. Finally I wish to acknowledge my beloved parents, father in law, mother in law and my husband (***Dr. T. Veemaraj, M.Sc., M.Phil., Ph.D.,*** Assistant Professor (S.G), Department of Chemistry, JJ College of Technology, Trichy – 620 009), for their prayers, love, affection, valuable suggestions, constant encouragement and support throughout my research study.

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CHAPTER – I

INTRODUCTION

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BACKGROUND OF THE STUDY

Occupational hazards for cotton mill workers

Occupational health is nothing but a public health which applied according to the work environment. Such an orientation requires serious efforts aimed in preventing and controlling occupational disease, even in the absence of definitive scientific knowledge. Failure to apply this fundamental approach to the hazards of the workplace has contributed to the continuing political, economic, and scientific controversies over byssinosis, a disabling lung disease of cotton mill workers. Powerful economic interests, reinforced by medical and scientific uncertainty has delayed and undermined effective measures for the prevention, control of, and compensation for this industrial disease. This, in turn has resulted in placing the burdens of hazardous employment in the cotton industry on the party least able to bear the weight of public and corporate inaction.

The accumulation of knowledge concerning byssinosis, in the United States as well as in other countries, continues to be impeded by variations in the quality of cotton, the different methods for cotton harvesting and the different definitions of the disease. Also the interpretation of the studies which have been reported has been influenced by the economic interests most served. At present, the primary debate centers on whether exposure to cotton dust is a direct cause of chronic respiratory disease and disability. This debate is not simply a scientific question. It has spilled over into the public arena by virtue of three recent developments. First, the National Research Council (NRC) of the National Academy of Sciences has published a report, commissioned by the US Department of Agriculture that made an effort to separate the scientific issues from the political debate about the best measures for protecting the health of cotton textile workers. The effort was only partially successful, however agreement could not be reached about the interpretation of the background information upon which future research priorities should be based. In the end, individual members of the NRC Committee differed so widely in their interpretation of published data relating the acute and chronic effects of cotton dust that the academy took the unusual step of publishing a minority report as an addendum to the main report.

Second, the publication of a Commentary in the Journal of the American Medical Association (JAMA) in which the authors started by identifying several of the scientific problems in understanding cotton-related chronic lung disease, but then proceeded to address a variety of additional topics, including whether the lay term "brown lung" is appropriate, whether cotton dust causes lung cancer, and the interaction of smoking and asbestos in causing lung cancer. The Commentary concluded, not only with a call for clarification of the scientific issues, but also with the premature and unsubstantiated assertion that: "It is difficult to conceive the legislative need for compensation of a disease that rarely reaches irreversible degrees among ex-smokers or non-smokers who continue to work under the same cotton dust exposure." It is just such comments which further confuse the scientific issues, and hamper the understanding of state and federal governments and the lay public concerning the disability of cotton workers.

Finally, the Occupational Safety and Health Administration (OSHA) of the US Department of Labor has recently published a proposed rule-making "Reevaluation of the Cotton Dust Standard'" in which OSHA questions whether cotton dust exposures should be controlled by engineering methods, or whether there are more cost-effective ways to reduce cotton-related lung disease. Although the proposal includes an evaluation of the impact of new production technology, which may be a useful undertaking, it also reopens the issue of using respiratory protection equipment as a permanent control measure (a position advocated publicly by OSHA). Another part of the OSHA proposal discusses eliminating pre-employment physical examinations because they are burdensome. Currently, the provision of a pre-employment examination assures a true baseline evaluation of each new employee, and its removal substantially reduces the effective medical surveillance of those workers who develop lung disease but who do not experience the typical symptoms of byssinosis. With these recent developments as background, it is important to evaluate the major scientific issues and the information that is already available which may guide measures to control and prevent the acute and chronic respiratory effects related to cotton dust exposure.

Current Status of the scientific debate for more than a century, it has been known that workers in cotton textile mills suffer from acute respiratory symptoms on returning to work after weekends. These symptoms consist of cough, chest tightness, and wheezing which are most pronounced on Monday mornings and then disappear over the course of the week only to reappear the following Monday. With time, some symptomatic workers notice that their symptoms persist later into the week until. Finally, they develop persistent coughing and breathlessness both at work and away from work. But not all individuals who become disabled show this sequence of events: some workers seem to develop chronic lung disease more insidiously and may never experience the classical "Monday tightness". Traditionally, however, the term "byssinosis" has been applied to the acute symptoms on exposure to cotton dust after a period off work, although obviously it is the more chronic form of the disease (with or without a history of acute symptoms) that is more important in relation to a worker's disability.

Several surveys of cotton operatives have shown an acute decrease in ventilatory function associated with the acute symptoms of byssinosis. The nature of the respiratory effects resembles in some respects an occupational asthma. Although the responsible agent or agents in cotton dust has not been identified, it is likely that a component of the tract fraction exerts a direct or indirect pharmacologic action on bronchial smooth muscle, resulting in contraction of the muscle and narrowing of the airways. In support of this view, it has been shown that inhalation of an aerosol of cotton dust extract causes reversible airways constriction in most of a sample of healthy people never exposed to cotton dust.

Hendrick and Weill (1981), have concluded that "Irritant or pharmacologic mechanisms are consequently favoured over those of hypersensitivity in the aetiology of byssinosis." In other words, although individuals may show varying degrees of response to cotton dust exposure, it is highly unlikely that byssinosis requires an idiosyncratic predisposition to this disease. It is possible that endotoxins from bacteria contaminating the cotton may contribute to the acute symptoms. The acute symptoms of byssinosis and the associated changes in ventilatory function are unquestionably more prevalent among cotton textile workers in the dustiest jobs (such as stripping and carding) compared with those in less dusty operations (such as spinning and weaving). Furthermore, the prevalence of symptoms is related to the grade of cotton used: the lower grades, which are associated with higher dust levels and are contaminated with greater amounts of "trash" (parts of the cotton other than the desired fiber fraction), carry the greatest risks of byssinosis. Thus there is broad evidence for an exposure-response relationship with respect to the acute respiratory effects which has been supported quantitatively by direct measurements of dust levels in relation to symptoms". While general agreement exists concerning the nature of the acute effects and their relationship to cotton dust, the chronic sequellae of working with cotton have been greatly debated. When compared with reference populations, cotton textile workers have on average lower ventilatory function. This is found particularly among workers who smoke cigarettes. Nevertheless, it is also found among nonsmoking cotton workers.

Longitudinal studies of cotton operatives have indicated an accelerated decrease in their pulmonary function, more marked in smokers but again present in non-smokers. It should be noted that there have been only a few longitudinal studies (covering periods of three to ten years) and that cotton workers have not been followed for more extensive periods. Lifetime loss in pulmonary function must be estimated by projecting the measured rate of loss to that expected for the full working period (40-45 years). Nonetheless, the results are sufficiently consistent and coherent to enable one to conclude that chronic exposure to cotton dust can be permanently deleterious to lung function.

It should be emphasized that longitudinal studies consider "survivor populations" and include mostly healthy workers, whereas affected individuals may leave the industry (dropouts) and not be considered. There is a bias in longitudinal studies which underestimates actual work-related effects. **Bouhuys, *et al* (1977)**, have studied a retired population which provided an indication of how longitudinal studies of survivors have underestimated the overall effects of cotton dust on lung function. One of the basic difficulties in investigating cotton related chronic lung disease is the non-specific effects of cotton dust on the structure and function of the lungs. This non-specificity has led to confusion, particularly in relation to workers' compensation claims. Post mortem examination of the lungs of cotton workers has shown emphysema and airways disease to varying degrees.

In one recent study of 44 cotton textile workers, it was asserted that emphysema was not a consequence of cotton dust but of cigarette smoking. This report, by **Pratt, *et al* (1980)**, has been the subject of several strong criticisms by world authorities on byssino-SiS. Suffice to say that **Pratt, *et al* (1980)** provided no details of the job descriptions of their cotton workers or any other details of exposures to cotton dust which is unclear whether any of their subjects experienced byssinosis or any other pulmonary disability during life. In other post mortem studies" of workers being compensated for byssinosis in the United Kingdom, emphysema was found more commonly not only in the lungs of smokers but also was found also in the lungs of nonsmokers. Some form of airway disease was found in 31 of 34 subjects, although it may well be that pulmonary emphysema was more closely related to cigarette smoking than to cotton dust exposure.

There are many industries in India, such as cotton industry leather industry *etc*., where a large number of people are employed. In every industry there are health hazards in the working environment which produces disease or disability for the workers. The global labor force is about 2600 million which 75 percent of them are from developing countries.

In India, a mean prevalence of 36-69% respiratory problems was reported in the spinning industry. The prevalence of respiratory problems is decreasing in industrialized countries and persists at high levels in developing countries. To prevent these hazards protective measures are taken by the Government and implemented through the owners of the cotton mills.

Cotton mill workers are susceptible to various morbid conditions by virtue of the work place and working conditions. Among these morbid conditions the foremost is the respiratory disease due to cotton dust inhalation **(Rejnarayan and Sanjay, 2001)**.

Some of the protective devices provided to the workers to prevent occupational health hazards are earplugs, gloves and mask. Ear muffs are provided to prevent hearing impairment, gloves to prevent contamination of hands, masks to prevent inhalation of polluted air and apron to protect the dress.

Exposure control in the cotton textile industry

When Occupational Safety and Health Administration (OSHA) promulgated its cotton dust standard in 1978, several critical principles were formulated for the control and elimination of byssinosis. Most importantly, these included primary emphasis on engineering methods for controlling exposure to cotton dust, with medical surveillance viewed as a "safety net" rather than a control measure. The proposed re-examination of the cotton dust standard jeopardizes both of these important principles. The use of engineering controls as the principal control strategy is fundamental to industrial hygiene. Although they require an initial capital investment, such controls are far more reliable than administrative measures or respiratory protection equipment.

Respirators have received attention as an alternative control device by those who are unfamiliar with the imperfect protection they provide, and their limited acceptance by workers. One of the misunderstood attractions of respirators is their apparent low cost. It is assumed that respirators are inexpensive, easy to use and easily maintained. The initial investment may well be small, but the ongoing costs for frequent respirator maintenance, regular replacement of filters, and ensuring that the equipment fits correctly and is used appropriately might run to as much as $1000 per individual per year. Furthermore, studies of respirators in actual use suggest that the rated protective factors are seldom achieved. These studies indicate that the protective factor may be 20 per cent of the formal rating or lower.

In a limited study of disposable respirators worn for short periods of time (2 hours) close to the published protective rating was reported. This study, however, was done under highly controlled conditions on a small number of cotton workers and was designed to evaluate the effectiveness of respirators, not of a respirator program. Finally, in commenting on the generally poor acceptance of respirators by workers, the noted industrial hygienist **Breslin (1966)** has stated "Industrial hygienists have long recognized the difficulties attendant on enforcing the wearing of respirators for long periods. Respirators are uncomfortable, impose resistance to inhalation, obstruct vision and are somewhat encumbering. Because of these factors, workers are reluctant to wear respirators, and if the required periods of use are overlong, they may remove the respirators when not under direct supervision or wear the respirator loosely so that no protection is afforded. Time periods for which respirator use is tolerable vary with temperature, humidity, work effort and nature of the aerosol, but, in general, periods in excess of one hour are extreme, and it is preferable to hold times of use to 20 minutes or less. As a general rule, the use of respirators should be held to the minimum and carefully regulated". Medical surveillance alone cannot be considered an adequate control measure. The reason Occupational Safety and Health Administration (OSHA) originally regarded surveillance as a "safety net" and not as a primary control was because the examination of a worker does nothing to eliminate the hazard. Moreover, to function in the protective factor is defined as the ratio of the concentration of contaminant outside the mask to that inside the mask.

Any way as a means of control, medical surveillance would necessarily focus on the individual (and would emphasize the concept of individual susceptibility) by doing so, surveillance becomes in effect, a form of blaming the victim for the crime. This approach minimizes the importance of disease prevention and accepts the unsubstantiated assumption that accelerated decrements in lung function are exclusively an idiosyncratic, hyper-susceptibility phenomenon or a consequence of cigarette smoking, and not a general exposure response experience. Studies to date as described above indicate that, cotton dust related acute disease does show a dose-response relationship independently of smoking and that the effects of cotton are likely to be much more than a hyper susceptibility phenomenon. Medical surveillance, therefore, should continue to be seen as a second line of protection for the worker and a means by which the effectiveness and progress of engineering controls can be evaluated. The World Health Organization (WHO) has recently reviewed the place of medical surveillance in general according to the work environment: "Examinations must be considered as secondary measures which are indicated when there are defects in the technical development of hygiene at the place of work. Technical improvements should be considered first, and the goal should be to make examinations unnecessary".

Benefits of face mask

Due to occupational hazards, wearing a face mask properly offers satisfactory protection against inhalation of dust through respiratory tracts among cotton mill workers. If you have a respiratory tract infection which helps prevent the spread of illness. People with respiratory illness symptoms those who should wear a facemask. Members of the public may wear a face mask for self protection.

Benefits of deep breathing exercise

Deep breathing is a most useful technique for respiratory efficiency. When you bring air down into the lower portion of the lungs, where the oxygen exchange is most efficient, as heart rate slow down, blood pressure decreases, muscles relax and anxiety reduce, lung capacity expand by strengthen in the respiratory muscles, reduce stress, relieve aches and discomforts, promotes sleep

According to **Baljinder Singh Bal (2010),** to determine the effects of deep breathing exercise on Vital Capacity and Maximal Ventilatory Volume, thirty (N = 30) randomly selected male students aged 18 - 26 years volunteered to participate in the study from D.A.V. Institute of Engineering and Technology, Jalandhar (Punjab), India. They were randomly assigned into two groups: A (experimental) and B (control). The subjects were subjected to the eight week deep breathing exercise. The between-group differences were assessed using the Student's t-test for dependent data. The level of p = 0.05 was considered significant. The vital capacity and maximal ventilator volume significantly improved in group A compared with the control B. Deep breathing exercise training programme may be recommended to improve vital capacity and maximal ventilatory volume.

NEED FOR THE STUDY

In Tamil Nadu 50% of the people are working in cotton mills, most of the workers working in these cotton mills are from lower educational and economic status. The investigator observed that, though the protective devices were available some of the workers working in the cotton mills did not use them, while often used them. Some of the reasons given by the workers for not using the protective devices were that they felt some amount of discomfort while using them. The researcher was interested to assess the effect of using face mask and deep breathing exercises among cotton mill workers to improve the respiratory function.

Substantial scientific questions remain about the etiology of byssinosis, the mechanism by which cotton dust acts on the lung, and the relationship between acute and chronic stages of the disease. None of these questions, however, presents a significant barrier to the effective control of disease: engineering methods for minimizing the exposure of workers to cotton dust are accepted as feasible both technically and economically. In addition these questions should not stand in the way of reasonable compensation to workers already injured by employment in cotton mills. **Bouhuys, *et al* (1970),** has estimated that in the United States alone approximately 30,000 people are disabled by respiratory disease due to their previous employment in the cotton textile industry. According to Department of Labor statistics, 85,000 active cotton mill workers suffer varying degrees of partial disability from byssinosis. Any current partial disability might well progress to more serious illness for workers previously exposed to high dust levels for a long period, even with the current reduction in exposure limits. Workers with serious respiratory ailments face both loss of income, and the high, escalating costs of health care. The public health community has been critical of the provisions this society makes for health care delivery. The inadequacies of the medical system are compounded by the provision of insufficient income maintenance for the ill. Presumably, worker's compensation programs are designed to provide no-fault insurance for employees exposed to hazardous industrial environments and to expedite financial assistance to those disabled in the course of their work. Worker's compensation therefore becomes the focus of attention for the disabled employee confronted by scant support from the Social Security System (SSS). The Social Security Disability Insurance Program (SSDI) provides income support only for workers with long-term total disability.

Many workers with byssinosis may have permanent partial disability and therefore are ineligible for SSDI payments. Furthermore, in 1978, SSDI provided an average annual benefit of only $3900 (or $325 per month) for the individual worker who was eligible, and $90 per month for one dependent (These benefits are periodically adjusted for cost-of living increases). Yet few of the large number of byssinotics potentially eligible for workers' compensation benefits have been able to gain assistance from this benefit system. Even companies that have recognized byssinosis as an industrial disease, and that have been relatively willing to institute cotton dust controls, have regularly challenged the compensation claims of disabled former employees. In many cases, the notion of contributory negligence has been resuscitated, undermining the no-fault compensation system with the successful argument that the worker's smoking habits may be the real or primary contributing cause of chronic lung disease. Since there is presently no way to determine absolutely the relationship between a specific worker's illness and cotton dust exposure, regardless of smoking habits, many of them are subjected to the devastating financial consequences of industrial disability in addition to the disastrous health effects. The burden of insufficient scientific knowledge, then, is borne by those least able to suffer these additional consequences. Proposals to remedy this situation have been offered and should be adopted. Using a combination of criteria, including occupational history and objective tests of lung function, **Bouhuys, *et al* (1977),** described a presumptive standard for the compensation of byssinotics which would relieve the financial distress of disabled workers while the medical and scientific community continued its search for a more fundamental understanding of the disease.

In the case of coal workers pneumoconiosis, the US Congress has acted to provide substantial, federally subsidized benefits for disabled workers. Several bills for similar sorts of relief have been introduced for those suffering disability from cotton dust exposure but these bills have yet to be acted upon. Our review of the scientific debate over byssinosis indicates that while "interesting" questions remain for investigation, their lack of resolution does not constitute a rationale for failure to act against the hazards of cotton dust exposure. An appropriate public health orientation dictates primary reliance on engineering controls, with administrative controls, personal protective equipment, and medical surveillance used only in a secondary capacity. The use of a presumptive standard for workers compensation is essential for the financial relief of the disabled. The legitimate concern of the public health community for the ill effects of smoking should be used neither to obscure the scientific discussion of occupational respiratory disease, nor to shift the responsibility for hazardous exposures to their victims. The arguments presented here are not unique to byssinosis. They apply equally to other occupational lung diseases, both with respect to the prevention of disease and to the financial compensation of individuals for work-related disability.

In summary, the evaluation of the current state of knowledge about the effects of cotton dust and the means to their control takes note of the dilemma all scientists face; the better we characterize the scientific problems and answer the questions that we pose, the more we open up to study and explore further. Those whose commitment is to the public's health must simultaneously follow promising lines of inquiry while taking maximum advantage of what is presently known to control or eliminate occupational disease.

STATEMENT OF THE PROBLEM

A study to assess the effect of using face mask and deep breathing exercise on peak expiratory flow rate and self reported respiratory problems among cotton mill workers in a selected community.

AIM OF THE STUDY

To assess the effect of using face mask and deep breathing exercise among cotton mill workers to check whether there is any improvement in respiratory functions.

SPECIFIC OBJECTIVES

- To assess and compare the level of peak expiratory flow rate among cotton mill workers before and after intervention.
- To assess and compare the presence of self reported respiratory problems among cotton mill workers before and after intervention.
- To associate the peak expiratory flow rate of cotton mill workers with demographic variables (smoking status, experience, *etc.*)
- To assess and correlate the level of wearing face mask with respiratory problem.

RESEARCH HYPOTHESIS

- There is a significant difference in mean peak expiratory flow rate among cotton mill workers before and after intervention.
- There is a significant difference in presence of self reported respiratory problem among cotton mill workers before and after intervention.
- There is a significant difference in correlation of use of face mask and the respiratory problems.

OPERATIONAL DEFINITIONS

FACE MASK

- The protective equipment usually made of cloth or plastic, which covers the nose and mouth, as that worn by workers in a cotton mill to prevent the cotton fibers entering the respiratory tract.

DEEP BREATHING EXERCISES

- Deep breathing exercise is the process of inhalation and exhalation by systematic training by multiple repetitions. Deep breathing exercise involves the act of breathing deep into one's lungs by flexing the diaphragm rather than breathing shallowly by flexing the rib cage.

- Deep breathing is marked by expansion of the stomach (abdomen) rather than the chest when breathing.

PEAK EXPIRATORY FLOW RATE

- A peak flow test is a lung function test using a peak flow meter. A peak flow meter is a small, simple machine that is held in the hand. The peak flow meter allows you to measure how fast the air can be blown out of your lungs. This is called the peak expiratory flow rate and is measured in liters per minute (L/min.). A high peak flow rate means the airways are open, a low peak flow rate means the airways are closed, and the air cannot get out quickly. Peak flow tests are difficult or impossible to do in children below the age of four.
- Self reported respiratory problems means the person who is reporting their respiratory problems by him or herself.

ASSUMPTIONS

- Occupational area plays a major role in determining the health status of the employee.
- Using protective devices can be minimized health problems.

- Deep breathing exercise increase peak expiratory flow rate.

DELIMITATION

- The study is limited to company who is working in cotton mill industry.
- The workers with respiratory problems.
- The workers who are not wearing facemask during working hours.
- The workers who have minimum 6 month of experience in the same company

LIMITATION

The study is limited to

- 50 samples from cotton mills.
- Study is based on verbal report of the workers

Scope of the study

This study is to assess the effectiveness of using face mask and deep breathing exercise in which helps to improve peak expiratory flow rate and to reduce respiratory problems from moderate to mild. It is very important to practice the deep breathing exercise by the cotton mill workers. If the exercise has positive effect it can be practiced by all workers.

CONCEPTUAL FRAMEWORK

A.C. Model can be defined as a set of concepts and those assumptions that integrated them into a meaningful configuration **(Fewett, 1980)**.

The development of a concept model is a fundamental process required before conducting actual research. The framework influences each state of research process. The C. framework in nursing research can help to provide a clear concise idea of knowledge in the area.

The conceptual framework used in this study is based on **Titler *et al.*, (2004)** effectiveness model. Effectiveness indicated the effect of deep breathing exercise and face mask on PEFR and problems. Effectiveness indicates the benefits of deep breathing exercise on patient with respiratory problems.

Independent variables are workers characteristics such as age, experience, smoking status, educational status, *etc.*

Intervening variables: Deep breathing exercise is demonstrated by investigator and assessed the effectiveness among cotton mill workers. Based on modified **Titler *et al.*, (2004)** effectiveness model the investigator assessed the effectiveness of deep breathing exercise on hot flushes and respiratory problems before and after intervention.

CHAPTER – II

REVIEW OF LITERATURE

A review of literature is an eventual aspect of scientific study. It involves the systematic identification, location, scrutiny and summary of the written materials that contain information on a research problem. It broadens the view of the investigator regarding the problem under investigation, helps in focusing on the issues especially concerning the study.

This chapter deals with the information collected in relation to the present study.

The literatures have been organized as follows:

1. Literature related to deep breathing exercise.
2. Literature related to face mask.
3. Literature related to hazards among cotton mill workers.

1. LITERATURE RELATED TO DEEP BREATHING EXERCISE

Deborah Morse (2007) has reviewed the relevant research on the possible benefits of deep breathing exercise for individuals with asthma. Research suggests that Yoga, especially when practiced with inclusion of the whole of its traditional techniques (including asana, pranayama, meditation, and relaxation) provides benefit for asthma patients. The recommended practices will help students with asthma develop a new awareness of how physical posture and breathing techniques can minimize the frequency and severity of asthma episodes.

Katiyar and Shailesh Bihari (2006) have studied that the effect of deep breathing exercise on COPD (Chronic Obstructive Pulmonary Disease) patients considering PFT (Peak Expiratory Flow Time), blood gases, 6 MWT (Minute Walk Test) and SGRQ (St. George's Respiratory Questionnaire) scores and compared with control. Forty eight patients with severe COPD were randomly divided (24 each) into two groups.

Group 1 patients were trained to do deep breathing exercise for 3 months for at least half an hour duration. Both the groups were allowed to continue with their usual physical activity and medications. Spirometry, ABG, 6MWT was done and SGRQ scores were measured before and after study. Training-induced changes were greater in group 1 than 2 for following variables: increase of FVC (Forced Vital Capacity) from 68 ± 4.2 to 72 ± 3.9 (p=0.11), FEV1 (Forced Expiratory Volume) from 48 ± 2.4 to 52 ±2.1, (p=0.15), PEF (% predicted) from 24.2 ± 0.9 to 30.1± 0.8 (p<0.05), 6 MWT from 262 ± 38 to 312 ± 47 m (p<0.05). There was decrease in scores of symptoms (72 ± 2.5 to 66 ± 2.9, p<0.03), activity (66 ± 2.1 to 50 ± 1.7, p<0.005), impact (53 ± 2.9 to 39 ± 1.8, p<0.008) and total score (55 ± 2.9 to 48 ±2.3 p<0.02) in group 1 but not in group 2 patients.

Demeke Mekonnen *et al.*, (2010) have reported that asthma is one of the commonest respiratory diseases in Jimma area as well as a significant disease burden worldwide costing billions of dollars. Anti-asthmatic drugs that are available in the market are expensive and have adverse effects. Thus, it is wise to look for an adjunct therapy to alleviate these problems. Therefore, the main aim of this study was to see the effect of yoga on patterns of clinical features, peak expiratory flow rates and use of drugs in asthmatic patients. A preliminary controlled clinical trial study was conducted on 24 volunteer asthmatic patients who were getting support at the missionary of charity. They were grouped in yoga and control groups. An Indian yoga expert through a translator conducted the training on yogic practice, yogic posture, slow breathing technique and discussion at the end. Then, the yoga groups were supervised for four weeks taking yoga exercise daily for 50 minutes. Peak expiratory flow rate was taken using the mini Wright peak flow meter and vital signs were measured in both groups. Data were analyzed using web based graph pad quick calcs statistical software. The male to female ratio was 1:1 in both cases and control groups, 8 (66.7%) were Christian and 9 (75.0%) were farmers. The yoga group showed 66.7% reduction in the use of salbutamole puff and 58.3% salbutamole tablets. There was a 10% increment in the PEFR (Peak Expiratory Flow Rate) in the yoga group while only 2% in the control group. There was statistically significant reduction in day and night asthma attacks in the yoga group. Yoga exercise among asthmatic patients resulted in a decreased number of day and night attacks and use of drugs. It also shows significant improvement in the peak expiratory flow rate. Further large scale study is recommended.

Madanmohan (2002) has studied that after six months of training in deep breathing exercise there was improvement in cardio-respiratory functions as well as muscle strength and endurance. Significant improvement of body mass index by training in deep breathing exercise was an interesting finding of the present study. Since the subjects (school children) were from less privileged section of the society and had lower body weight, the effect of yoga training on body weight and body mass index was more pronounced. Hence, the researchers recommend that yoga as a compulsory discipline in the schools of Pondicherry. Introduction of yoga alone with nutritional supplements will have a far-reaching role to play in improving physiological functions, overall health and performance of students.

Subbalakshmi *et al.*, (2005) have studied that the practice of deep breathing exercise has been known to modulate cardiac autonomic status with an improvement in cardio-respiratory functions. Keeping this in view, this study was designed to determine whether deep breathing exercise practice for 20 minutes had any immediate effect on heart rate, systolic and diastolic blood pressure, peak expiratory flow rate, and simple problem solving ability. Ten normal healthy subjects of first year physiotherapy course volunteered for this study. They were aged between 17-20 years. Among them, five were females and five were males. They did not have any previous training in Pranayama. They were highly motivated to participate in this study program. Study procedures were done separately for each subject at the same time of the day between 4-5 pm. All the selected physiological parameters were measured before and after performing deep breathing exercise. Two sets of controls were done in the matched subjects by allowing them to relax in a couch (A) or close their eyes with quiet breathing for 20 minutes. Following deep breathing exercise of 20 minutes, a significant decline in basal heart rate ($P<0.0001$) and systolic blood pressure ($P<0.001$) was observed. Peak expiratory flow rate was significantly improved ($P<0.01$) and the time taken for simple problem solving was significantly less following deep breathing exercise practice (P<0.0001). In contrast, both control subjects did not show any significant change in respiratory and cardiovascular parameters with 20 minutes. The present study suggests that the 'deep breathing exercise' rapidly alters cardiopulmonary responses and improves simple problem solving. Further studies on a larger sample size need to illustrate the underlying mechanisms involved in this alteration.

Ankad Roopa *et al.*, (2011) reported that the deep breathing exercise is a technique of controlling and modulating breath and meditation, a process through which one attains a state of deep rest yet active state of mind. Recent studies on long-term yogic practices have shown improvements in respiratory functions. This study was done to evaluate the effects of deep breathing exercise on respiratory parameters. The present study was a comparative prospective study consisting of 50 (24 male and 26 female) healthy subjects of 20-60 years age. Participants fulfilling the inclusion and exclusion criteria underwent two hours daily yoga program for 15 days taught by yoga teacher. Pre and post yoga respiratory functions were assessed by measuring chest expansion, breath holding time and peak expiratory flow rate. The parameters were analyzed by Student's t-test. There was significant increase in chest expansion, breath holding time and peak expiratory flow rate compared to pre yoga practice. The response was similar in both genders, both age groups <40 yrs and >40yrs and both groups of BMI <25 kg/m2 and >25 kg/m2. This study showed beneficial effects of short term (15 days) regular pranayama and meditation practice on respiratory functions irrespective of age, gender and BMI in normal healthy individuals.

LITERATURE RELATED TO FACE MASK

Ford and Peterson (1960) have measured the efficiency of surgical face masks for some patients related to occupational hazardous. Surgical masks must also be carefully selected and carefully worn if they are to reduce microbial aerosol penetration in the operating room.

Greene and Vesley (1962) have studied that the method for evaluating effectiveness of surgical mask for protection of patient in the operating suite. The surgical face mask is a medical device intended to be worn by operating room personnel during surgical procedures to protect both the surgical patients and the operating room personnel from the transfer of microorganisms, body fluids and particulate material. Therefore the primary functions of surgical face masks are to protect individuals from blood splash or spatter and from microorganism transfer. **Mikulicz (1896)**, was the first surgeon to use a mask to protect wounds from mouth bacteria. Since the end of the nineteenth century wearing a surgical face mask by those caring for patients has been recognized as a necessity. The early masks consisted of several layers of gauze or linen and were reused after sterilization. Masks were later improved by the insertion of paper or cellophane between the linen layers to provide an impervious barrier. In the early 1960's, synthetic fibers such as polyester and polypropylene were first used to produce nonwoven surgical face masks. Now surgical face masks are commonly produced from disposable nonwoven fabrics. Surgical face masks have a variety of styles such as flat-fold, tie-on, cone shaped, duckbill, flat-fold with shields and duckbill with shields.

There have been a number of reports citing experimental evidence about the effectiveness of the surgical face mask. **Greene (1962)** developed a sampling chamber to evaluate the effectiveness of the surgical face mask. In his experiment, the subject inserted his head into the chamber and distinctly pronounced the words "sing and chew" at ten-second intervals for one minute. Samples were collected on blood agar with an Anderson sampler and then incubated at 37 °C for 24 hours. The results showed that the airborne microorganisms expelled by the masked subject were significantly less than those expelled by the unmasked subject during talking.

Ajeet Jaiswal, (2011) has stated that reduction of respiratory function among textile workers in the textile industry has been observed since the 1970s. A contaminant of raw cotton fiber and cotton dust has been proposed as an affecting agent that may deteriorate the respiratory function. This study aimed to find the factors associated with the deterioration of respiratory function among female textile workers. The sample consisted of 243 men above the age of 20 years who had worked for at least 3 months in a textile factory and 235 female non textile workers of same area were studied. All the respondents were interviewed by a pretested questionnaire to gather information regarding the chest symptoms, certain personal characteristics and occupational history. Statistical analyses like Chi-square and odds ratio was done to determine the significant difference between female textile workers and female non textile workers. Uni-variate analysis of the factors for symptomatic byssinosis showed that dusty worksites, heavy smoking and duration of service years were significant. Logistic regression analysis showed that working in the scouring (odds ratio 11.0), spinning (odds ratio 4.7) and weaving sections (odds ratio 2.6), heavy smoking (odds ratio 12.4) and more than 10 years of service (odds ratio 2.8) were independent significant risk factors. Efforts to reduce dust levels in the working environment and to discourage smoking among textile workers need to be strengthened to minimize the risk of developing respiratory functions.

Ismail Memon *et al.*, (2008) measured prevalence of byssinosis in spinning and textile workers of Karachi, Pakistan, and examined association of the disease with demographic and environmental factors. This was a cross-sectional study conducted in 3 spinning and textile mills and 3 colonies inhabited by spinning and textile workers. A precoded questionnaire was administered to the workers and followed by physical and clinical examination. Among 362 textile workers, the authors found the prevalence of byssinosis to be 35.6%. Educational status of the workers and section of the mill were significantly associated with prevalence of the disease. The authors conclude that there was a high prevalence of byssinosis in spinning and textile workers of Karachi. Furthermore, low education level and work in the spinning section of the mill appear to contribute significantly to the high prevalence of the disease in Pakistan.

They also found educational status of spinning and textile workers to be significantly associated with byssinosis. Uneducated workers and those with only primary education were found to have more likelihood of developing the disease. Perhaps the reason for high prevalence among these uneducated and less educated workers was lack of information about hazards of occupation related diseases in general and about cotton dust in particular. They also observed that uneducated and less educated workers do not follow basic safety and preventive measures, such as **wearing a face mask**.

Madsen (1967) found that many thousands of bacteria can be expelled in a single cough or sneeze. In this study, four commonly used masks, a Filtron mask, an Aseptex mask, a Bardic Deseret Filtermask and a paper mask, were selected for evaluation. Then these masks were placed over the nose and mouth of a manikin that was placed in a special counting chamber. A known number of bacteria were blown from manikin through the mask simulating a human sneeze or cough. Bacteria in the chamber were collected by an Anderson sampler and counted. The bacterial retaining efficiencies were 98.8%, 98.4%, 97.3% and 92.7% for the Filtron mask, the Aseptex mask, the Bardic Deseret Filtermask and the paper mask respectively. **Quesnel (1975)** used similar chamber to evaluate five different types of surgical masks including Aseptex Cestra, Surgine, Filtermask and Filtron. The contaminated particles escaping through or around the mask during speech by the wearer were collected. The results showed that all the masks had a high degree of efficiency of about 99% in particle filtration. **Ford and Rogers (1980)** used a different testing device to evaluate the efficiency of surgical face masks. The experimental testing device was composed of four components: (1) Anderson sampler, (2) a glass cylindrical chamber, (3) a nebulizing flask, and (4) a compressed air source. This device was used to collect the bacterial particles filtering through masks. Nine types of masks, Aseptex, 3M 1818, Surgine, White Knight, Luxan Medex, Macarthys Macro, Macarthys, Robinson and SNS, were evaluated. The results demonstrated that all tests through masks produced lower bacterial particle counts than the unmasked controls did. Today, there are a variety of test methods specifically relating to face masks and their evaluation. ASTM: Standard Test Method for Resistance of Surgical Mask to Penetration by Synthetic Blood can be used to evaluate fluid resistance.

Fluid resistance was the ability of the mask's material to inhibit the penetration of blood and body fluids.

ASTM: Standard Test Method for Evaluating the Bacterial Filtration Efficiency (BFE) of Medical Face Mask Materials, Using a Biological Aerosol of Staphylococcus aureus can be used to measure bacterial filtration efficiency. BFE was a measure of the ability of the mask's material to prevent the passage of aerosolized bacteria. BFE was expressed in the percentage of a known quantity that does not pass the mask material at a given aerosol flow rate. Differential pressure (Delta-P) was the measured pressure drop across a surgical face mask material and was used to determine breathing resistance. Differential pressure is expressed as a pressure per unit area. The differential pressure of surgical face masks can be measured according to the Military Specification: Surgical masks, disposable. Differential pressure relates to the breathability and comfort of the surgical face mask. The lower the differential pressure, the better the breathability and comfort of the surgical face mask. The requirement of differential pressure for surgical face masks was determined in the ASTM F 2100 Standard Specification for Performance of Materials Used in Medical Face Masks. The face mask can offer acceptable breathability as long as its differential pressure was lower than 4.0 mm H_2O/cm^2.

LITERATURE RELATED TO HAZARDS AMONG COTTON MILL WORKERS

David Wegman *et al.*, (1983) reported that Byssinosis, a lung disease caused by cotton dust, has been the subject of recent controversy. Debates over the nature of the disease, possible interactions with cigarette smoking, and the proposed reevaluation of the cotton dust standard by the Occupational Safety and Health Administration (OSHA) have tended to overlook the plight of affected workers and to obscure the most effective means for preventing the disease. The lack of definitive information was no reason for inaction, nor for depriving disabled workers of adequate financial compensation. In this respect, lung diseases were no different from other public health hazards for which action must often be taken on the basis of incomplete evidence.

Joseph Mberikunashe *et al.*, (2010) conducted a cross sectional analytic study to determine the prevalence of respiratory obstructive conditions among workers in various sections in a textile manufacturing company. Workers were randomly sampled and data was collected using interviewer-administered questionnaires. Respiratory function was assessed using spirometry and chest auscultation. A walk through survey was conducted and a checklist was used to capture hazards and control measures in the work place. A total of 194 workers participated. The prevalence of severe respiratory obstruction was 27.8%. It was 50.0% among the blowers, 35.3% in waste recovery, 32.5% in carders, 15.0% in spinners and 7.5% among weavers. The mean years of exposure between the affected and the non-affected were significantly different ($T = 2.20$; $p < 0.05$). Working in the blowing department was significantly associated with developing respiratory obstruction (OR=3.53; 95% CI= 1.61- 7.79) but working in the weaving department was significantly protective (OR 0.16; CI 0.04-0.59). Working in a department for less than 10 years was protective (OR =0.94; 95% CI= 0.48- 1.85), but not significant. Obstructive respiratory conditions are common among textile workers, with those in blowing and waste recovery sections being the most affected. Hence the researchers recommended worker rotation every six months, and regular spirometric screening employment.

David Christiani *et al.*, (1986) pulmonary function tests were performed pre and post work shift on 887 textile workers with at least two years of employment in two cotton mills and one silk mill in Shanghai, the people's republic of China. Environmental sampling was performed with vertical elutriators, and pulmonary function was performed with standardized techniques. Cotton textile workers were found to have greater across-shift decrements in forced expiratory volume in FEVl than silk workers. Increasing duration of exposure resulted in increasing acute decrements in FEVl, although significant acute decrements were found in workers with less than five years of exposure. The acute changes in FEVl were noted in both symptomatic and asymptomatic cotton workers, though the difference between the across-shift change in FEVl of the byssinotics and nonbyssinotics increased as work duration increased. There was no difference in preshift FEV1 between the cotton and silk workers, but several selection factors likely influenced the observations.

Wang *et al.*, (2003) conducted a study to determine chronic effects of long term exposure to cotton dust and endo-toxin on incidence of respiratory symptoms and the effect of cessation of exposure. Respiratory health in 429 Chinese cotton textile workers (study group) and 449 silk textile workers (control group) was followed prospectively from 1981 to 1996. Byssinosis, chest tightness, and non-specific respiratory symptoms were assessed by means of identical standardised questionnaires at four time points. Exposures to cotton dust and endotoxin were estimated using area samples collected at each survey. Incidence and persistence of symptoms were examined in relation to cumulative exposure and exposure cessation using Generalised Estimating Equations (GEE). Among cotton workers, the cumulative incidence of byssinosis and chest tightness was 24% and 23%, respectively, and was significantly more common in smokers than in non-smokers. A high proportion of symptoms was found to be intermittent, rather than persistent. Among silk workers, no typical byssinosis was identified; the incidence of chest tightness was 10%. Chronic bronchitis, cough, and dyspnoea were more common and persistent in the cotton group than in the silk group. Significantly lower odds ratios for symptoms were observed in cotton workers who left the cotton mills; risk was also related to years since last worked. Multivariate analysis indicated a trend for higher cumulative exposure to endotoxin in relation to a higher risk for byssinosis. Chronic exposure to cotton dust was related to both work specific and non-specific respiratory symptoms. Byssinosis was more strongly associated with exposure to endotoxin than to dust. Cessation of exposure may improve the respiratory health of cotton textile workers in which the improvement appears to increase with time since last exposure.

Saadat Ali Khan and Aiza Saadia (2006) have explored the relationship between the pulmonary functions and exposure to cotton dust. Pulmonary function tests *i.e.* forced vital capacity (FVC), forced expiratory volume 1 (FEV1), and peak expiratory flow rate (PEFR) were recorded in 64 non smoker cotton ginners. The data on pulmonary function test for healthy Pakistani population from previous studies was used as control. The follow-up study for lung function testing on the same cotton ginners was conducted from 1999 and repeated yearly up to 2005. Because of cotton dust exposure, cotton ginners showed a significant decline in their pulmonary function ($P<0.05$). The continuous exposure to cotton dust in ginners was associated with an increased progressive impairment of pulmonary functions.

CONCLUSION

The above mentioned studies have explored to reveal some effect of deep breathing exercise and face mask on peak expiratory flow rate and respiratory problems. Through these findings the researcher concludes that deep breathing exercise which helps to improve the peak expiratory flow rate.

CHAPTER – III

METHODOLOGY

This chapter provides a brief description of the method adopted for the study. Methodology of research indicates the general pattern of organizing the procedure of gathering a valid and reliable data for the problem under investigation. The methodology of the study, research design and settings of the study, population, sampling technique and criteria for samples, development of tools, pilot study and data collection procedure.

RESEARCH APPROACH

In view of the nature of the problem and to accomplish the objectives of the study an evaluative approach was considered to be most appropriate.

RESEARCH DESIGN

The research design selected for this study was one group pre and post test design.

$$O_1xxxxxxxxxxxxxxxO_2xxxxxxxxxxxxxxxxO_3$$

x – Using face mask and deep breathing exercises.

O_1 – 1st day observation of workers (persons with respiratory problems and measuring peak expiratory flow rate with peak expiratory flow meter).

O_2 – 15th day observation of peak expiratory flow rate, presence of respiratory problems.

O_3 – 30th day observation of peak expiratory flow rate, presence of respiratory problems.

On 1st week – observation of samples was done for respiratory problem and peak expiratory flow rate.

On 3rd and 4th week – using data record for assessing the duration of using face mask and practicing deep breathing exercise.

Day 1 to Day 30 – Total duration of the study.

VARIABLES IN THE STUDY

<u>Independent variables</u>: Using face mask and deep breathing exercises

<u>Dependent Variable:</u> Peak expiratory flow rate and self reported respiratory problems.

SETTING OF THE STUDY

The setting of the study refers to the area, where the study is conducted. The setting for the study was a popular cotton mill at Rajapalayam, Virudhunagar District, Tamil Nadu, India. Mostly, rural people are engaged in cotton mill and most of them belong to category of economically poor and illiterate. This area has all the basic facilities like school, temple, youth club and hospital.

POPULATION

The population consisted of all male and female aged 20-40 years (50 samples), having respiratory problems in this cotton mill.

SAMPLE SIZE

The sample consisted of 50 workers from three areas of cotton mill (spinning, reeling and weaving). 30 samples female and 20 samples male were selected for this study.

SAMPLING TECHNIQUE

Purposive sampling technique was adopted for the selection of sample.

SAMPLING CRITERIA

Inclusion Criteria

- Male and Female workers.
- Those who were willing to participate.
- Those who were having respiratory problems.

Exclusion criteria

- Workers working in the cotton mill industry for less than 6 months.

RESEARCH TOOL

The tool used for the collection of the data were

- ❖ Structured interview schedule.
- ❖ Observation schedule for recording peak expiratory flow rate device used.
- ❖ Checklist for self reported respiratory problems.
- ❖ Data record on duration of using face mask.

STRUCTURED INTERVIEW SCHEDULE

It consisted of demographic variables such as age, sex, educational status, marital status, smoking status, monthly income, area of working, experience, using face mask and on treatment.

OBSERVATION SCHEDULE FOR RECORDING PEAK EXPIRATORY FLOW RATE

The observation schedule was designed to measure the peak expiratory flow rate on 1st day, 15th day and 30th day.

Scoring and interpretation of scoring

The details of scoring about assessment of peak expiratory flow rate are given below:

Below Normal	-	< 400 l/min
Normal	-	400 – 600 l/min
Above Normal	-	> 600 l/min.

CHECKLIST FOR SELF REPORTED RESPIRATORY PROBLEMS

Checklist was designed to categories the respiratory problems before and after intervention as given below:

- ❖ Category of respiratory problem
- ❖ Scoring and interpretation of scoring.

Category of respiratory problems

The category consists of mild, moderate and severe problems. The details of problems rate given below:

Mild	- 1 to 4 problems
Moderate	- 5 to 8 problems
Severe	- 9 to 12 problems

DATA RECORD ON DURATION OF WEARING FACE MASK

Data record was designed to analyze the duration of wearing face mask.

Scoring and interpretation of scoring

The details of scoring about face mask assessment are given below:

Poor	– 1 to 33 %
Average	– 34 to 63 %
Good	– 64 to 100 %

DEEP BREATHING EXERCISE

Steps of deep breathing exercise

- ❖ Open the right hand and bend index and middle fingers against the palm. The thumb was used for closing the right nostril while the fourth and fifth fingers were used for the left nostril.
- ❖ Place the right thumb against the ala at the end of the nostril to close it and similarly press the fourth and fifth fingertips against the left nostril.
- ❖ Start the exercise in the 'Sitting posture', with relaxed attitude and concentration as below:
  - a. Exhale slowly and deeply without closing the nostrils but being ready to do so.
  - b. Inhale slowly and quietly through the left nostril while closing the right.
  - c. At the end of the inhalation, close both nostrils and hold the breath for a while (not more than 1-2 seconds).
  - d. Keep the left nostril closed and exhale through the right as quietly as possible.

e. After exhaling completely, inhale slowly and quietly through the right nostril.
f. Close both nostril and wait for a while, then open the left nostril and exhale slowly and silently.
g. Inhale through the same nostril and continue.

TEACHING PLAN

The following steps were adopted to develop the teaching plan:

- ❖ Development of specific objectives
- ❖ Selection of teaching/learning content
- ❖ Selection of teaching/learning activity
- ❖ Organization of content

The contents included were

- ❖ Basic concepts of deep breathing exercise
- ❖ Purposes of deep breathing exercise
- ❖ Demonstration of deep breathing exercise
- ❖ Re-demonstration
- ❖ Importance of face mask
- ❖ Follow up

The teaching plan was developed by keeping in mind the objectives, literacy level of the sample and simplicity of language.

CONTENT VALIDITY

The prepared tool, observation schedule (50 samples) to check the peak expiratory flow rate and respiratory assessment were submitted to four experts, three nurses and one doctor. The three research experts are working in different college of nursing with more than five years of experience. The medical expert was a pulmonary medicine in RVS hospital at Sulur, Coimbatore district with more than 10 years of experience.

Based on the suggestions given by the experts the researcher modified the tool and added some questions in the demographic data.

RELIABILITY OF THE RESEARCH TOOL

Reliability of the observational schedule to check peak expiratory flow rate was done by inter rater method and checklist for self reported respiratory problems was done by split half method. The reliability was calculated by **Karl Pearson's** coefficient of correlation. After intervention the correlation of the samples based on the use of face mask and respiratory problems (r=0.82).

There was a significant difference in the mean score of using face mask (2.88) and the mean score respiratory problems (2.020) with the obtained value (t = 4.94, p≤0.05, df = 49) was greater than the table value (t = 2.01, p≤0.05, df = 49).

PILOT STUDY REPORT

A pilot study involves a small sample of subjects drawn from the same setting or population from which the study sample will be drawn. During the pilot study the instrument goes through pretest.

A formal permission was sought to conduct the pilot study. The pilot study was done in the selected cotton mill, Rajapalayam. A purposive sample was 5 men and 5 women who were selected to the experiment group, 5 samples in each you have only one group. Reliability of the observational schedule to check peak expiratory flow rate was done by interrater method and checklist for self reported respiratory problems was done by split half method.

Pre intervention study was done by the Peak Expiratory Flow meter (PEF). The peak expiratory flow rate measured by peak expiratory flow meter and the self reported respiratory problems were recorded on the check list. Deep breathing exercise and face mask instruction were given on 1st day and measured the peak expiratory flow rate and identify the respiratory problems on 15th day. Between 1st and 15th day breathing exercise was given.

The period of pilot study was up to 15 days positive and encouraging information were gathered from the pilot study, which gave the investigator the basis to design and modify the tool. The pilot study confirmed the adequacy of the tool and technique.

DATA COLLECTION PROCEDURE

Before the commencement of the study permission have taken from the concerned authority of the cotton mill.

First the investigator will develop rapport with the workers explain about type of intervention and obtained their willingness. Initially the demographic data and respiratory efficiency information will be collected by observation schedule and recorded and signs and symptoms of self reported respiratory problems will be observed by checklist and recorded.

50 samples will be selected according to the sampling criteria (person with respiratory problem and peak expiratory flow rate) teach about deep breathing exercise and use of face mask on 1^{st} week. Investigator have encouraged for importance of deep breathing exercise and wearing face mask on 2^{nd} week. The observation of samples for assessing the duration of using face mask and practicing deep breathing exercise on 15^{th} day and 30^{th} day observation of peak expiratory flow rate (on 3^{rd} and 4^{th} week) and presence of respiratory problems will be collected and recorded. The total duration of data will be one month.

PLAN FOR DATA ANALYSIS

The data obtained were analyzed in terms of the objectives of the study using descriptive and inferential statistics.

Descriptive statistics

Frequency and percentage were used to analyze demographic variables and to assess the peak expiratory flow rate (using peak expiratory flow meter) and level of respiratory problems.

Mean and standard deviation was used to determine the peak expiratory flow rate and respiratory problems.

Inferential statistics

- The student's t-test was used to determine the significance of the difference in peak expiratory flow rate and respiratory problems.
- 'Spearman Correlation' test was used to assess the relationship of using the face mask and respiratory problems after intervention.
- The 'chi - square' test was used to check the association of demographic variables with the level of peak expiratory rate.

CHAPTER - IV

DATA ANALYSIS AND INTERPRETATION

"Kerlinzer (1976) has described analysis as the categorizing, ordering, manipulating and summarizing of data to obtain answers to be used in research hypothesis questions"

This chapter deals with the analysis and interpretation of the data gathered from 50 workers from the cotton mill with regard to their demographic characteristics, peak expiratory flow rates and respiratory problems.

The data has been presented under the following sections:

Section – I Demographic characteristics of the sample

Demographic characteristics of the sample have been presented in relation to personal characteristics, and working information in frequency and percentage.

Section – II Assessment of peak expiratory flow rate of the sample

The peak expiratory flow rate has been analyzed before and after intervention in frequency and percentage, mean and standard deviation of the sample based on the peak expiratory flow rate before and after intervention and also its level of the significance has been examined.

Section – III Assessment of respiratory problem of the sample and use of mask

This analysis has been done according to the level of respiratory problem before and after intervention in frequency and percentage, mean and standard deviation of the sample based on the respiratory problem and also assess the usage of face mask in frequency and percentage.

Respiratory problems of the sample has been analyzed in three levels (mild, module and severe) before and after intervention on 15^{th} and 30^{th} day in frequency and percentage. Also in mean score and its level of significance. The presence and absence of the individual respiratory problem is presented in frequency and percentage.

The use of face mask is analyzed in three levels (good, average and poor) in frequency and percentage.

Section – IV – Relationship between variables under correlation and association

The correlation of the samples based on the using of the face mask and respiratory problems after intervention. After intervention the correlation of the samples based on the use of face mask and respiratory problems (r=0.82).

The frequency and percentage of the samples association of the demographic variables with the level of peak expiratory flow rate before intervention. There was a significant association between the demographic variables of smoking status with their level of peak expiratory flow rate.

SECTION – 1 DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

TABLE-I

FREQUENCY AND PERCENTAGE OF SAMPLE ACCORDING TO PERSONAL CHARACTERISTICS

N= 50

S. No.	Personal Characteristics	F	%
1.	Age		
	• 20-25 years	15	30.00
	• 26-30 years	13	26.00
	• 31-35 years	14	28.00
	• 36-40 years	8	16.00
2.	Sex		
	• Male	20	40.00
	• Female	30	60.00
3.	Educational Status		
	• Illiterate	10	20.00
	• Primary education	30	60.00
	• Secondary education	8	16.00
	• Higher secondary education	2	4.00
4.	Marital status		
	• Married	37	74.00
	• Unmarried	13	26.00
5.	Income		
	• Rs. 2001-3000	31	62.00
	• Rs. 3001-4000	19	38.00
6.	Smoking status		
	• Yes	10	20.00
	• No	40	80.00

F = Frequency

Table – I presents the personal characteristics of the sample

Age: Age of the samples ranged from 20- 40 years. Fifteen (30%) of samples were in the age group of 20 -25 years, 13 (26%) samples were in the age of 26 - 30, 14 (28%) samples were in the age group of 31- 35 years and 8 (16%) samples were in the age group 36 – 40 years.

Sex: Most of the samples (60 %) were females and remaining (40%) were males.

Education: Majority of the samples 30 (60%) had primary education, 8 (16%) had secondary education, 4 (8%) had higher secondary education and rest of the samples 10 (20%) were illiterate.

Marital status: Majority of the samples 37 (74 %) were married and rest of the samples 13 (26%) were unmarried.

Monthly Income: Majority of the samples 31 (62%) had an income of Rs. 2001-3000 and remaining samples 19 (38%) had an income of Rs. 3001-4000.

Smoking status: Majority of the samples 40 (80 %) were non-smokers and rest of the samples 10 (20 %) were smokers.

TABLE-II

FREQUENCY AND PERCENTAGE OF SAMPLES ACCORDING TO WORKING INFORMATION

N=50

S. No	Working Information of Samples	F	%
1.	Area of working		
	• Winding	20	40.00
	• Spinning	15	30.00
	• Reeling	15	30.00
2.	Experience		
	• 1-3 years	16	32.00
	• 4-6 years	24	48.00
	• 7-9 years	10	20.00
3.	Wear face mask		
	• Yes	-	-
	• No	50	100.00
4.	Any treatment		
	• Yes	-	-
	• No	50	100.00

Table – II presents the frequency and percentage of samples according to working information.

Area of working: Twenty (40 %) samples were working in winding area, 15 (30 %) samples were working in spinning area and 15 (30 %) samples were working in reeling area.

Experience: Nearly half 24 (48 %) samples had 4-6 years of experience and the rest 10-16 (20-32%) had either 7-9 or 1-3 years of experience.

Wearing face mask: All the samples were not wearing face mask at work.

Any Treatment: All the samples were not taking any regular treatment

SECTION – II ASSESSMENT OF PEAK EXPIRATORY FLOW RATE

TABLE-III

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE BASED ON LEVEL OF PEAK EXPIRATORY FLOW RATE BEFORE AND AFTER INTERVENTION ON 15th AND 30th DAY

N=50

S.No	Level of Peak expiratory flow rate	Intervention					
		Before Intervention		After Intervention			
				15th day		30th day	
		F	%	F	%	F	%
1	Below normal	34	68.00	11	22.00	5	10.00
2	Normal	16	32.00	39	78.00	45	90.00
3	Above normal	-	-	-	-	-	-

Table – III shows the frequency and percentage of samples based on level of peak expiratory flow rate before and after intervention on 15th and 30th day.

Majority of the samples 34 (68%) had below normal peak expiratory flow rate and 16 (34%) samples with normal level of peak expiratory flow rate. After the intervention on 15th day, 39 (78%) of samples had normal level of peak expiratory flow rate and only if samples with below normal peak expiratory flow rate. On the 30th day after intervention, majority 45 (90%) of samples had normal level of peak expiratory flow rate and only 5 samples with below normal peak expiratory flow rate.

The table concludes that the change of peak expiratory flow rate from below normal could be due to the effectiveness of intervention.

Figure - 2 Levels of peak expiratory flow rate of samples before and after intervention on 15th and 30th day in percentage.

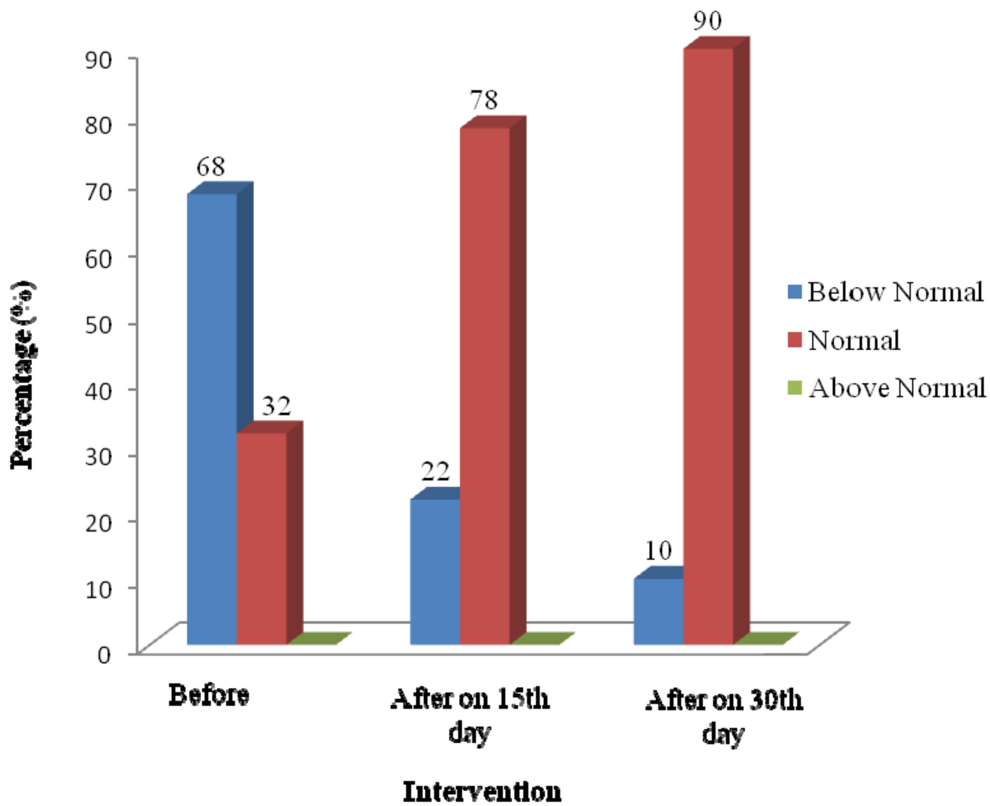

Figure - 2 Levels of peak expiratory flow rate of samples before and after intervention on 15th and 30th day in percentage.

TABLE-IV

MEAN AND STANDARD DEVIATION OF PEAK EXPIRATORY FLOW RATE OF THE SAMPLE BEFORE AND AFTER INTERVENTION ON 15th DAY AND LEVEL OF SIGNIFICANCE

N=50

Sl. No.	Intervention	Experimental group (N=50)		Mean difference	Paired t test (p<0.0 5), df=49
		Mean	SD		
1.	Before intervention	4.28	57.85	0.16	11.71*
2.	After intervention 15th day	4.44	58.85		

***-Significant** **Table value = 2.01**

Table – IV shows the mean and standard deviation of peak expiratory flow rate of the sample before and after intervention on 15th day and level of significance.

The mean peak expiratory flow score before intervention was found to be lesser than the mean peak expiratory flow score after intervention (15th day). Statistically there was a significant difference in the mean score of the peak expiratory flow rate before and after intervention (t value = 11.71, df = 49, $p \leq 0.05$).

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TABLE-V

MEAN AND STANDARD DEVIATION OF PEAK EXPIRATORY FLOW RATE OF THE SAMPLE BEFORE AND AFTER INTERVENTION ON 30th DAY AND LEVEL OF SIGNIFICANCE

N=50

Sl. No.	Intervention	Experimental group (N=50)		Mean difference	Paired t test (p<0.0 5), df=49
		Mean	SD		
1.	Before intervention 1st day	4.28	57.85	0.30	15.66*
2.	After intervention 30th day	4.58	56.12		

***-Significant** **Table value = 2.01**

Table – V shows the mean and standard deviation of peak expiratory flow rate of the sample before and after intervention on 30th day and level of significance.

The mean peak expiratory flow score before intervention was found to be lesser than the mean peak expiratory flow score after intervention (30th day). Statistically there was a significant difference in the mean score of peak expiratory flow rate before and after intervention (t value = 15.66, df = 49, $p \leq 0.05$).

Figure - 3 Mean score of the samples based on the peak expiratory flow rate before and after intervention on 15th and 30th day.

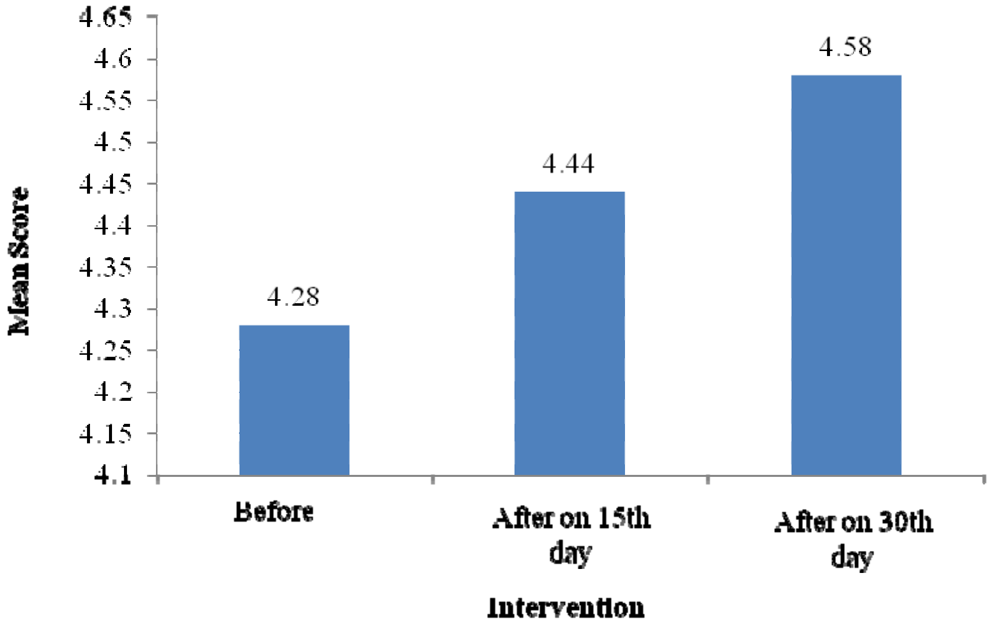

Figure - 3 Mean score of the peak expiratory flow rate of the sample before and after intervention on 15th and 30th day.

SECTION III ASSESSMENT OF RESPIRATORY PROBLEMS OF THE SAMPLE

TABLE –VI

FREQUENCY AND PERCENTAGE OF SAMPLE ACCORDING TO LEVEL OF RESPIRATORY PROBLEMS BEFORE AND AFTER INTERVENTION ON 15th AND 30th DAY

N=50

Sl. No.	Level of respiratory problems	Intervention					
		Before		After			
		1st day		15th day		30th day	
		F	%	F	%	F	%
1.	Mild	1	2	31	62	45	90
2.	Moderate	49	98	19	38	5	10
3.	Severe	-	-	-	-	-	-

***-Significant** **Table value = 2.01**

Table – VI shows frequency and percentage of sample according to level of respiratory problems before and after intervention.

There was a decline observed in the level of the respiratory problems, before and after intervention. Before intervention, majority 49 (98%) of the samples had moderate level of respiratory problems whereas after intervention, on the 15th day and the 30th day, majority of the samples had mild respiratory symptoms. Therefore there was a drastic difference in the level of respiratory problems, before and after the intervention.

The table concludes that the reduction of respiratory problems may be due to the effectiveness of intervention.

TABLE-VII

FREQUENCY AND PERCENTAGE DISTRIBUTION OF THE SAMPLE BASED ON THE SELF REPORTED RESPIRATORY PROBLEMS BEFORE AND AFTER INTERVENTION

N=50

S.No	Problems	Before intervention				After Intervention							
		1st Day				15th Day				30th day			
		Present		Absent		Present		Absent		Present		Absent	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Pharyngeal itching	35	70	15	30	4	8	46	92	-	-	50	100
2	Sneezing	31	62	19	38	17	34	33	66	2	4	48	96
3	Running nose	33	66	17	34	33	66	17	34	17	34	33	66
4	Nasal Itching	48	96	2	4	24	48	26	52	3	6	47	94
5	Obstruction of nasal passages	42	84	8	16	30	60	20	40	8	16	42	84
6	Sore throat	42	84	8	16	36	72	14	28	17	34	33	66
7	Dry cough	28	56	22	44	28	56	22	44	19	38	31	62
8	Cough with sputum	18	36	32	64	18	36	32	64	17	34	33	66
9	Chest tightness	-	-	50	100	-	-	50	100	-	-	50	100
10	Wheezing	-	-	50	100	-	-	50	100	-	-	50	100
11	Dyspnoea	20	40	30	60	20	40	30	60	20	40	30	60
12	Purulent discharge	-	-	50	100	-	-	50	100	-	-	50	100

Table – VII shows frequency and percentage distribution of the sample based on the self reported respiratory problems before and after intervention.

Before intervention, majority of samples 48 (96 %) had nasal itching, 42 samples (84 %) reported obstruction of nasal passages and sore throat. After intervention on 15th and 30th day there was a great reduction in the number of sample having problems (Nasal itching, obstruction of nasal passages and sore throat).

TABLE-VIII

MEAN AND STANDARD DEVIATION OF RESPIRATORY PROBLEM OF THE SAMPLE BEFORE AND AFTER INTERVENTION ON 15th DAY AND LEVEL OF SIGNIFICANCE

N=50

Sl. No.	**Respiratory problems**	**Experimental group (N=50)**		**Mean difference**	**Paired t test (p<0.0 5), df=49**
		Mean	**SD**		
1.	Before intervention 1st day	1.98	.1414	0.60	8.57*
2.	After intervention 15th day	1.38	.4903		

***-Significant** **Table value = 2.01**

Table – VIII shows the mean and standard deviation of respiratory problems of the sample before and after intervention on 15th day and its level of significance

The mean respiratory problems before intervention were found to be more than the mean respiratory problems after intervention (15th day). Statistically there was a significant difference in the mean score of respiratory problems before and after intervention (t value = 8.57, df = 49, p≤0.05).

TABLE-IX

MEAN AND STANDARD DEVIATION OF RESPIRATORY PROBLEM OF THE SAMPLE BEFORE AND AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE ON 30th DAY

N=50

Sl. No.	Respiratory problems	Experimental group (N=50)		Mean difference	Paired t test (p<0.0 5), df=49
		Mean	SD		
1.	Before intervention	1.98	0.1414	0.94	32.17*
2.	After intervention 30th day	1.04	0.2040		

***-Significant** **Table value = 2.01**

Table – IX shows the mean and standard deviation of respiratory problems of the sample before and after intervention on 30th day and level of significance.

The mean respiratory problems before intervention were found to be more than the mean respiratory problems after intervention (30th day). Statistically there was a significant difference in the mean score of respiratory problems before and after intervention (t value = 32.17, df = 49, p≤0.05).

Hence the research hypothesis, **H2:** There is a significant difference between the mean score of self reported respiratory problems of the sample before intervention on 30th day was accepted.

Figure – 4 Mean score of respiratory problems of sample before and after intervention on 15th and 30th day.

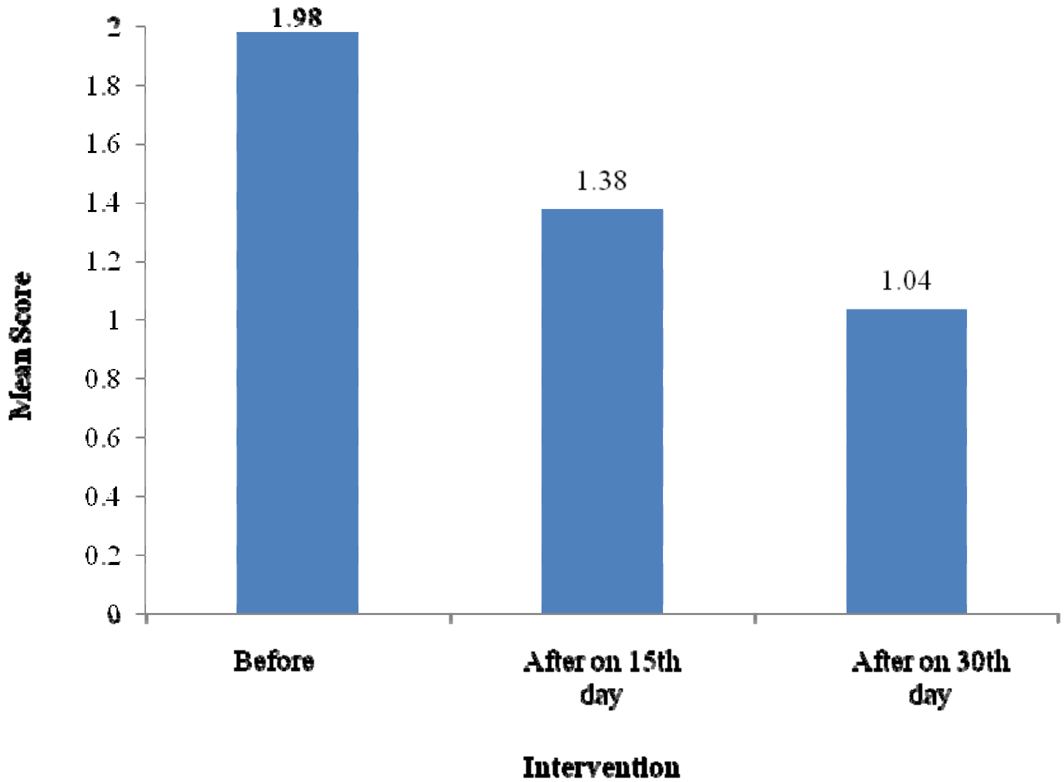

Figure – 4 Mean score of respiratory problems of sample before and after intervention on 15th and 30th day.

TABLE – X

FREQUENCY AND PERCENTAGE DISTRIBUTION OF THE SAMPLES BASED ON LEVEL OF USING FACE MASK AFTER INTERVENTION

N = 50

Level of using face mask	3rd week		4th week	
	F	%	F	%
Good	41	82	44	88
Average	3	6	6	12
Poor	6	12	-	-

Table – X shows frequency and percentage distribution of the sample based on the using of face mask after intervention.

Third and fourth week, the majority of the samples 41 (82%) were using face mask after intervention. On comparison, there was found in the use of face mask in the 4th week than the 3rd week in which shows that the intervention was increasing the use of face mask among the workers will decrease respiratory problems.

In the 3rd week, three levels of using mask were seen (good, average and poor). Majority of the sample 41 (82%) showed and usage. 3 samples will average use and 6 samples will poor usage.

In the 4th week, there were more samples in the category of good use 44 (88%) and 6 samples showed average use and none in poor category.

TABLE – XI

CORRELATION OF USE OF FACE MASK AND RESPIRATORY PROBLEMS AFTER INTERVENTION

N = 50

S. No.	Week	Using of face mask		Respiratory problems		R	Paired 't' test ($p \leq 0.05$), df = 49
		Mean	SD	Mean	SD		
1.	4^{th}	2.88	0.328	2.060	1.132	0.820	4.94*

*** Significant** **Table value = 2.01**

Table XI shows that the correlation based on the using of face mask and respiratory problems after intervention.

After intervention the correlation based on the use of face mask and respiratory problems (r=0.82).

The mean score of using face mask (2.88) and the mean score of respiratory problems (2.020) with the obtained value (t = 4.94, p≤0.05, df = 49) were greater than the table value (t = 2.01, p≤0.05, df = 49).

ASSOCIATION OF THE DEMOGRAPHIC VARIABLES WITH THE LEVELOF PEAK RESPIRATORY FLOW RATE BEFORE INTERVENTION

TABLE – XII

ASSOCIATION OF THE DEMOGRAPHIC VARIABLES WITH THE LEVELOF PEAK RESPIRATORY FLOW RATE BEFORE INTERVENTION

N = 50

S. No	Demographic variables	Level of peak expiratory flow rate				χ^2 value, $p \leq 0.05$	Table value, Degrees of Freedom
		Below Normal		Normal			
		F	%	F	%		
1.	Age						
	• 20-25 years	8	16.00	7	14.00	5.08 **NS**	5.99, df=2
	• 26-30 years	5	10.00	8	16.00		
	• 31-35 years	6	12.00	8	16.00		
	• 36-40 years	6	12.00	2	4.00		
2.	Smoking status						
	• Yes	-	-	10	20.00	10.12*	3.84, df=1
	• No	25	50.00	15	30.00		
3.	Experience						
	• 1-3 years	7	14.00	9	18.00	0.24**NS**	5.99, df=2
	• 4-6 years	12	24.00	12	24.00		
	• 7-9 years	6	12.00	4	8.00		

* Significant NS – Non-significant

Table XII shows the frequency and percentage of the samples association of the demographic variables with the level of peak expiratory flow rate before intervention.

There was a significant association between smoking status and level of peak expiratory flow rate. Age of the samples ranged from 20- 40 years. Fifteen (30%) of samples were in the age group of 20 -25 years, 13 (26%) samples were in the age of 26 - 30, 14 (28%) samples were in the age group of 31- 35 years and 8 (16%) samples were in the age group 36 – 40 years.

Majority of the samples 40 (80 %) were non-smokers and rest of the samples 10 (20 %) were smokers. Nearly half 24 (48 %) samples had 4-6 years of experience and the rest 10-16 (20-32%) had either 7-9 or 1-3 years of experience.

CHAPTER – V

DISCUSSION

This chapter presents a discussion of the main findings.

Table – I and II presents the frequency distribution of the demographic characteristic of the sample.

Table – I Age of the samples ranged from 20- 40 years. Fifteen (30%) of samples were in the age group of 20 -25 years, 13 (26%) samples were in the age of 26 - 30, 14 (28%) samples were in the age group of 31- 35 years and 8 (16%) samples were in the age group 36 – 40 years. Most of the samples (60 %) were females and remaining (40%) were males. Majority of the samples 30 (60%) had primary education, 8 (16%) had secondary education, 4 (8%) had higher secondary education and rest of the samples 10 (20%) had illiterate. Majority of the samples 37 (74 %) were married and rest of the samples 13 (26%) were unmarried. Majority of the samples 31 (62%) had income of Rs. 2001-3000 and remaining samples 19 (38%) had income of Rs. 3001-4000. Majority of the samples 40 (80 %) were non-smokers and rest of the samples 10 (20 %) were smokers.

Table – II Twenty (40 %) samples were working in winding area, 15 (30 %) samples were working in spinning area and 15 (30 %) samples were working in reeling area. Nearly half 24 (48 %) samples had 4-6 years of experience and rest 10-16 (20-32%) had 7-9 and 1-3 years of experience. All the samples were not wearing face mask at the time of working. All the samples were not taking any regular treatment.

Table – III presents the frequency and percentage of samples based on level of peak expiratory flow rate before and after intervention on 15th and 30th day.

Table – III Majority of the samples 34 (68%) were in below normal peak expiratory flow rate. After the intervention on 15th day, 39 (78%) of samples were in the normal level of peak expiratory flow rate which had improved from below normal to normal. On the 30th day after intervention, majority 45 (90%) of samples had normal level of peak expiratory flow rate which had improved. The table concludes that the change of peak expiratory flow rate from below normal to normal at the samples were of the effectiveness of intervention.

Table – IV and V presents the mean and standard deviation of the sample based on the peak expiratory flow rate before and after intervention and level of significance on 15th day and 30th day.

Table – IV The mean peak expiratory flow score before intervention was found to be lesser than the mean peak expiratory flow score after intervention (15th day). Statistically there was a significant difference in the mean score of the peak expiratory flow rate before and after intervention (t value = 11.71, df = 49, $p \leq 0.05$).

Table – V The mean peak expiratory flow score before intervention was found to be lesser than the mean peak expiratory flow score after intervention (30th day). Statistically there was a significant difference in the mean score of peak expiratory flow rate before and after intervention (t value = 15.66, df = 49, $p \leq 0.05$).

Table – VI presents frequency and percentage of sample according to level of respiratory problems before and after intervention.

Table – VI There was a decline observed in the level of the respiratory problems, before and after intervention. Before intervention, on the first day, majority 49 (98%) of the samples had moderate level of respiratory problems whereas after intervention, on the 15th day and the 30th day, majority of the samples had mild respiratory symptoms. Therefore there was a drastic difference in the level of respiratory problems, before and after the intervention.

Table – VII presents frequency and percentage distribution of the sample based on the self reported respiratory problems before and after intervention.

Table – VII Before intervention, majority of samples 48 (96 %) had nasal itching, 42 samples (84 %) obstruction of nasal passages, 42 samples (84 %) after intervention on 15th and 30th day majority of the samples had reduction from these problems (Nasal itching, obstruction of nasal passages and sore throat).

Table – VIII and IX presents the mean and standard deviation of the sample based on the respiratory problems before and after intervention and its level of significance on 15th and 30th day.

Table – VIII The mean respiratory problems before intervention were found to be more than the mean respiratory problems after intervention (15th day). Statistically there was a significant difference in the mean score of both the groups (t value = 8.57, df = 49, $p \leq 0.05$).

Table – IX The mean respiratory problems before intervention were found to be more than the mean respiratory problems after intervention (30th day). Statistically there was a significant difference in the mean score of both the groups (t value = 32.17, df = 49, $p \leq 0.05$).

Table – X presents frequency and percentage distribution of the sample based on the use of face mask after intervention.

Table – X Third and fourth week, the majority of the samples 41 (82%) were using face mask after intervention. On comparison, there was found in the use of face mask in the 4th week than the 3rd week in which shows that the intervention was increasing the use of face mask among the workers will decrease respiratory problems.

Table XI presents that the correlation of the samples based on the using of the face mask and respiratory problems after intervention.

Table – XI After intervention the correlation of the samples based on the use of face mask and respiratory problems (r=0.82). There was a significant difference in the mean score of using face mask (2.88) and the mean score respiratory problems (2.020) with the obtained value ($t = 4.94, p \leq 0.05, df = 49$) was greater than the table value ($t = 2.01, p \leq 0.05, df = 49$).

Table XII presents the frequency and percentage of the samples association of the demographic variables with the level of peak expiratory flow rate before intervention.

Table – XII There was a significant association between the demographic variables of smoking status with their level of peak expiratory flow rate.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATION AND RECOMMENDATIONS

This chapter presents the summary of the study, summary of the findings, conclusions and recommendations.

SUMMARY OF THE STUDY

The study was done to assess the effectiveness of deep breathing exercise and face mask on the peak expiratory flow rate and respiratory problems among cotton mill workers. One group pre and post design mask used. The study was conducted in a selected cotton mill worker in Rajapalayam. Using a purposive sampling method 50 samples were included in this study.

The conceptual framework of this study was based on modified **Titler** effectiveness model (2004). Prior to intervention demographic data and respiratory problems were collected. Peak expiratory flow rate was measured using peak expiratory flow meter and self reported respiratory problems were assessed by check list. The deep breathing exercise was taught to the workers and they carried out the deep breathing exercise everyday for 20 minutes in the morning for 30 days in the presence of investigator. Data on peak expiratory flow rate and self reported respiratory problem was released on 15^{th} and 30^{th} day. Data analysis and interpretation was done using descriptive and inferential statistics.

SUMMARY OF THE FINDINGS

Demographic data

Majority of the samples 30 (60%) had primary education, 8 (16%) had secondary education, 4 (8%) had higher secondary education and rest of the samples 10 (20%) had illiterate. Majority of the samples 40 (80 %) were non-smokers and rest of the samples 10 (20 %) were smokers. Nearly half 24 (48 %) samples had 4-6 years of experience and rest 10-16 (20-32%) had 7-9 and 1-3 years of experience. All the samples were not wearing face mask at the time of working.

Assessment of peak expiratory flow rate of the sample

Majority of the samples 34 (68%) had in below normal peak expiratory flow rate before intervention. After the intervention on 15th day, 39 (78%) of the samples were in the normal level of peak expiratory flow rate which had improved from below normal to normal. On the 30th day after intervention, majority 45 (90%) of samples had normal level of peak expiratory flow rate.

Assessment of Respiratory problem of the sample

There was a decline observed in the level of the respiratory problems, before and after intervention. Before intervention, majority 49 (98%) of the samples had moderate level of respiratory problems whereas after intervention, on the 15th day and the 30th day, majority of the samples 49 (98%) had only mild respiratory symptoms. Out of the 12 respiratory problems (24%) the three problem.

Before intervention were nasal etching (N=48, 96%) and obstruction of nasal passages and sore throat (N=42, 84%). After intervention on 15th and 30th day majority of the samples had reduction from these problems (Nasal itching, obstruction of nasal passages and sore throat).

Significant findings

- There was a significant difference in the mean score of the peak expiratory flow rate before and after intervention (t value = 11.71 & 15.66, df = 49, $p \leq 0.05$) on 15th day and 30th day.
- There was a significant difference in the mean score of respiratory problems before and after intervention (t value = 8.57 and 32.17, df = 49, $p \leq 0.05$) on 15th and 30th day.

Conclusion

The findings of the study concluded that there were significant differences found in the mean score of peak expiratory flow rate and respiratory problems before and after intervention on 15th and 30th day. It was quiet clear that deep breathing exercise and wearing face mask were quite beneficial used to improve the peak expiratory flow rate and reduce the respiratory problems.

IMPLICATION

The findings of the study have implications to nursing education, nursing practice and nursing research.

NURSING EDUCATION

The nursing curriculum should emphasis to the students on the preventive measures of major health problem especially chronic illness. The nurse educator can provide in service education to the nursing personal to update their knowledge on the alternative methods of treatment like deep breathing exercise and protective devices and its valuable benefits to the workers. The nurse have to create awareness about the therapeutic benefits of deep breathing exercise by preparing reference guide which provides information about steps in deep breathing exercise and protective device.

NURSING PRACTICE

The nursing personal working in the community should arrange for community awareness program like yoga therapy as a part of the preventive measures to improve the respiratory functions. The study creates awareness among the workers and nurses to use deep breathing exercise therapy for personal benefit and for workers with respiratory problems. Nurses can gain skills in providing holistic care to workers with respiratory problems using deep breathing exercise therapy as it reduces the respiratory problems and improve the peak expiratory flow rate.

NURSING RESEARCH

A study provides scope for future researcher utilization of finding and applications of knowledge in nursing practice.

RECOMMENDATION

- Maximum publicity should be given through mass media for creating awareness among public about the benefits of deep breathing exercise and protective devices.
- This study can be replicated in various setting by taking large sample.
- A similar study can be conducted in other areas of medicine like chemical industry, metal alloy industry, *etc.*

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APPENDIX – I

LETTER REQUESTING PERMISSION TO CONDUCT THE STUDY

To

The Manager,
Cotton Mill Industry,
Rajapalayam.

Through

The Principal, RVS Colloege of Nursing, Sulur.

Respected Sir/Madam,

Sub: Permission to Research Work – Reg.

Ms. R. Uma Maheswari is a Post Graduate Nursing student of our institution. She has selected the below mentioned topic for her research project to be submitted to Dr.MGR Medical University of Health Science as a partial fulfillment of Master Nursing Degree.

The topic of her study is:

"A study to assess the effect of using face mask and deep breathing exercise on peak expiratory flow rate and self reported respiratory problems among cotton mill workers".

Therefore we humbly request you to grant her permission to do the study in your esteemed industry. We assure you that all details collected will be kept strictly confidential.

Thanking you,

Yours faithfully,

PRINCIPAL

Place :   Date :

APPENDIX – II

PERMISSION LETTER FOR CONTENT VALIDITY

From

Ms. Uma Maheswari,
M.Sc. (Nursing) Student,
R.V.S. College of Nursing,
Sulur, Coimbatore – 641 402.

To

Through

The Principal,
R.V.S. College of Nursing, Sulur.

Respected Madam,

Sub: Request for opinions and suggestions of experts for establishing content validity of research tool.

I am a Master of Science in Nursing student in RVS College of Nursing, Sulur in the speciality of Community Health Nursing. As per the requirement for the partial fulfillment of the Master of Science in Nursing under The Tamil Nadu Dr. M.G.R. Medical University. I have selected the following topic for my dissertation "***A study to assess the effect of using face mask and deep breathing exercise on peak expiratory flow rate and self reported respiratory problems among cotton mill workers***" in a selected community at Rajapalayam.

I humbly request you to validate the tool and give your valuable suggestion.

Thanking you,

Yours sincerely,

Enclosure:

1. Statement of the problem
2. Objectives of the study
3. Research tool
4. Criteria for content validity
5. Certificate of content validity

Place :   Date :

APPENDIX – III

CERTIFICATE OF CONTENT VALIDITY

This is to certify that tool developed by **Ms. Uma Maheswari,** M.Sc., Nursing II year student, RVS College of Nursing, Sulur, Coimbatore to collect data on the problem "***A study to assess the effect of using face mask and deep breathing exercise on peak expiratory flow rate and self reported respiratory problems among cotton mill workers***" is validated by the undersigned and she can proceed with this tool to conduct the main study.

Name and Address :

Signature :

Seal :

Date :

LIST OF EXPERTS

MEDICAL EXPERT

Dr. R. Anantha Kumar, M.B.B.S., M.D. ____________________________

Pulmonary Medicine,

Consultant Pulmonologist and Allergic Specialist,

RVS Hospital, Sulur, Coimbatore.

POPULATION RESEARCH EXPERT

Dr. N. Dhanabaghyam, ____________________________

Assistant Chief,

Research Centre,

The Gandhigram Institute of Rural Health & Family Welfare Trust,

Dindigul District.

NURSING EXPERTS

1. **Mrs. Jaeny Kemp, M.Sc. (N),** ____________________________

   Principal,

   Institute of Nursing,

   G.KN.M. Hospital,

   Coimbatore.

2. **Mrs. Saramma Samuel, M.Sc. (N),** ____________________________

   Principal,

   RVS College of Nursing, Sulur,

   Coimbatore.

3. **Mrs. Alageswari, M.Sc., (N), DPHN,** ____________________________

   Regional Health Teacher Training Institute,

   GIRH & FWT, Gandhigram,

   Dindigul District.

APPENDIX – IV

CRITERIA RATING SCALE FOR VALIDATING THE BASELINE OBSERVATIONAL SCHEDULE, CHECKLIST AND DATA RECORD TO ASSESS THE EFFECT OF USING FACEMASK & DEEP BREATHING EXERCISE ON PEAK EXPIRATORY FLOW RATE & SELF REPORTED RESPIRATORY PROBLEMS

Kindly go through this tool, please give your views regarding clarity, relevancy, adequacy and remark.

PART – I

DEMOGRAPHIC DATA

S.No.	Items	Clarity	Relevancy	Adequacy	Remarks
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					

PART – II
OBSERVATION SCHEDULE FOR RECORDING PEAK EXPIRATORY FLOW RATE

S.No.	Items	Clarity	Relevancy	Adequacy	Remarks
1.					

PART – III
CHECKLIST FOR SELF REPORTED RESPIRATORY PROBLEMS

S.No.	Items	Clarity	Relevancy	Adequacy	Remarks
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

PART – IV
DATA RECORD ON DURATON OF USING FACE MASK

S.No.	Items	Clarity	Relevancy	Adequacy	Remarks
1.					

APPENDIX – V

REQUISITION LETTER FOR CO-GUIDE

To

Dr. R. Anantha Kumar, M.B.B.S., M.D.
Pulmonary Medicine,
Consultant Pulmonologist and Allergic Specialist,
RVS Hospital, Sulur, Coimbatore.

Through

The Principal, RVS Colloege of Nursing, Sulur.

Respected Sir,

Sub: Request for Co-Guide – Reg.

Ms. R. Uma Maheswari is a Post Graduate Nursing student of our institution. She has selected the below mentioned topic for her research project to be submitted to Dr.MGR Medical University of Health Science as a partial fulfillment of Master Nursing Degree.

The topic of her study is:

"A study to assess the effect of using face mask and deep breathing exercise on peak expiratory flow rate and self reported respiratory problems among cotton mill workers".

Regarding this project, she is in need of your esteemed help and co-operation as she is interested in conducting a study of her project. Please do the needful and oblige.

Thanking you,

Yours faithfully,

PRINCIPAL

Place :   Date :

APPENDIX - VI

STRUCTURED INTERVIEW SCHEDULE

INTRODUCTION

Respiratory problems are very common among cotton mill workers, but it can be prevented with protective devices like face mask and exercises.

PURPOSE

The purpose of this interview is to find out some information from you regarding your respiratory problems.

INSTRUCTIONS

Kindly give the information for the questions. All the information given by you will be confidential.

SECTION – A

DEMOGRAPHIC VARIABLES

Sample Number

1. Age.
   a). 20 – 25 yrs ☐
   b). 26 – 30 yrs ☐
   c). 31 – 35 yrs ☐
   d). 36 – 40 yrs ☐
2. Sex
   a). Male ☐
   b). Female ☐
3. Educational Status
   a). Illiterate ☐
   b). Primary Education ☐
   c). Secondary Education ☐
   d). Higher Secondary Education ☐
   e). Graduates ☐

4. Marital status

a)Married ☐

b)Unmarried ☐

5. Smoking status:

Yes ☐

No ☐

If smokes, no of cigarettes

per day:…………….

6. Monthly In come

a). Rs. 1001 – 2000 ☐

b). Rs. 2001 – 3000 ☐

c). Rs. 3001 – 4000 ☐

d). Rs. 4001 – 5000 ☐

7. Area of working in cotton mil industry

a). winding ☐

b). Spinning ☐

c). reeling ☐

d). others ☐

8. No of years of experience in the cotton industry

a). 1 – 3 yrs ☐

b). 3 – 6 yrs ☐

c). 7 – 9 yrs ☐

d). Above 9 yrs ☐

9. Do you wear facemask while at work? YES ☐ NO ☐

If yes how often

a). Always ☐

b). most of the time ☐

c). sometimes ☐

d). never ☐

10. If you don't wear mask what are the reasons.

……………………………………………..

……………………………………………..

……………………………………………..

……………………………………………..

11. Are you on any treatment?

a). Yes ☐

b). No ☐

SECTION – B

OBSERVATIONAL SCHEDULE FOR RECORDING PEAK EXPIRATORY FLOW RATE

PURPOSE

The purpose of this observation schedule is to check peak expiratory flow rate.

Sample No	Peak expiratory flow rate		
	Before Intervention	After Intervention	
	1^{st} day	15^{th} day	30^{th} day

SECTION – C

CHECKLIST FOR SELF REPORTED RESPIRATORY PROBLEMS

PURPOSE

The purpose of the check list is to mark the presence and absence of signs and symptoms of respiratory problems before and after intervention.

NOTE

Mark √ if a s/s is present and mark × if absent

S. No.	Problems	Before Intervention		After intervention			
		1st day		15th day		30th day	
		Present	Absent	Present	Absent	Present	Absent
1.	Pharyngeal itching						
2.	Sneezing						
3.	Running nose						
4.	Nasal itching						
5.	Obstruction of nasal passages						
6.	Sore throat						
7.	Dry cough						
8.	Cough with sputum						
9.	Chest tightness						
10.	Wheezing						
11.	Dyspnoea						
12.	Purulent discharge						

Scoring; **1-Present; 0-Absent**

SECTION – D

DATA RECORD ON DURATION OF USING FACE MASK

Time	Post Interval Observation									Total Duration
	3rd Week			4th Week						
	1st day	2nd day	3rd day	1st day	2nd day	3rd day	4th day	5th day	6th day	
9-1 pm										
Put on time										
Removal time										
2-5 pm										
Put on time										
Removal time										
Total (8 h)										

LESSON PLAN

Name of the investigator : R. UMA MAHESWARI

Topic : Deep breathing exercise and face mask instruction

Number of Samples : 10 at a time

Duration : 30 minutes

Place : Private room

Method of Teaching : Discussion and demonstration

Central Objectives :

At the end of teaching, workers are able acquire knowledge about deep breathing exercise and importance of wearing face masks and able to carry out the same in the following days.

Specific Objectives : Workers are able to:

1. List down the respiratory problems
2. Explain about deep breathing exercise
3. Explain the advantages of deep breathing exercise
4. Understand the guidelines
5. Perform deep breathing exercise technique
6. Explain the importance of using face mask
7. List down the instruction to wear face mask

Table – Lesson plan details

S. No.	Time (min.)	Specific objectives	Content	Teaching and learning activity	Avoids
1.	3	Introduction	**Introduction:** Good morning to all. Occupational hazards are plays a major role in influencing the health of an individual. An industry increases in number the health problems also increase. There are various organizations that take active part in the field of occupational health. Specially, when they get exposed to excessive inhalation of dust. It has more affects on respiratory problems. So today, we are going to learn about health hazards of cotton mills data inhalation of dust and how can we prevent that by using protective devices and practicing regular deep breathing exercise	Introducing the topic by asking questions	
2.	3	List down the respiratory problems due to cotton industry (Improper	**Cotton dust can damage the respiratory systems by improper usage of protective devices:** Examples: Chest tightness, wheezing, dysphoea, purulent discharge from the nose cough, sore throat, nasal itching.	Lecture and discussion method	Show pictures related to the diseases

		usage of protective devices)			
3.	5	Cotton mill workers can able to explain about deep breathing exercise	**Deep breathing exercise:** Deep breathing is a most useful technique for respiratory efficiency. When you bring air down into the lower portion of the lungs, where the oxygen exchange is most efficient such as heart rate slow, blood pressure decreases, muscles relax and anxiety reduces.	Explanation about deep breathing exercise	Showing picture on respiratory system
4.	2	Workers are able to explain the advantages of deep breathing exercise	**Advantages of deep breathing:** ❖ It promote health ❖ Lung capacity expand by strengthen our respiratory muscles ❖ It promotes the functions of the systems ❖ It helps to reduce the stress ❖ It helps to relieve aches and discomforts ❖ It promotes sleep	Explanation of advantages of deep breathing exercise	
5.	2	Understand the guidelines to be followed before performing exercise	**Guidelines to be followed before exercise:** ❖ Practice 10-15 min. per day ❖ Practice in empty stomach avoid eating, drinking or smoking	Description about the guidelines have to be followed	

			❖ Practice it in a quiet location ❖ At regular time ❖ Tight clothing should be loosened ❖ Assume a comfortable position.	before performing exercise	
6.	10	Perform deep breathing exercise technique	**Steps of the deep breathing exercise** The details of steps of the deep breathing exercise are given below: ❖ Open the right hand and bend index and middle fingers against the palm. The thumb was used for closing the right nostril while the fourth and fifth fingers were used for the left nostril. ❖ Place the right thumb against the ala at the end of the nostril to close it and similarly press the fourth and fifth fingertips against the left nostril. ❖ Start the exercise in the 'Sitting posture', with relaxed attitude and concentration as below: a. Exhale slowly and deeply without closing the nostrils but being ready to do so. b. Inhale slowly and quietly through the left nostril	Demonstrate the technique explain each steps, re-demonstrates group practice	

			while closing the right. c. At the end of the inhalation, close both nostrils and hold the breath for a while (not more than 1-2 seconds). d. Keep the left nostril closed and exhale through the right as quietly as possible. e. After exhaling completely, inhale slowly and quietly through the right nostril. f. Close both nostril and wait for a while, then open the left nostril and exhale slowly and silently. g. Inhale through the same nostril and continue.		
7.	4	Explain the importance of using face mask	**Importance of using face mask:** ❖ Wearing a face mask properly offers satisfactory protection against inhalation of dust through respiratory tracts among cotton mill workers ❖ If you have a respiratory tract infection it also helps prevent the spread of illness ❖ People with respiratory illness symptoms and those who should wear a facemask		

			❖ Members of the public may wear a face mask for self protection		
8.	4	List down the instruction to wear face mask	**Instruction to wear face mask:** ❖ The face mask fits snugly over the face ❖ The outside of the face mask faces the outside ❖ The strings or rubber band are used properly to keep the face mask firmly in place ❖ The face mask covers the nose, mouth and chin.	Discussion	
9.	-	-	**Conclusion:** So far we have learned what is deep breathing exercise and advantages and how to do these techniques and importance of face mask and how to wear face mask.	Discussion	-
10.	-	-	**Follow up:** Carry out these exercises for 30 days, 10-15 min. per day in a separate hall from 9 am to 9:15 pm.	Instruction and discussion	-