

PONDICHERRY UNIVERSITY

PUDUCHERRY

EXECUTIVE SUMMARY OF FINAL REPORT OF THE WORK DONE ON THE PROJECT

Title of the Project: A Socio economic, Nutritional and Health Evaluation among Worker of Different Sector of Textile Industries.

1.	Title of the Project A Socio economic, Nutritional and Health Evaluation among Worker of Different Sector of Textile Industries	
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3.	Name and Address of the Institution	Department of Anthropology, Pondicherry University
4.	UGC Reference No. & Date	F.No.-43-31/2014 (SR) Dated: July, 2015
5.	Date of Implementation	01/07/2015
6.	Tenure of the Project	3 years from 01/07/2015 to 30/06/2018_
7.	Title of the Project: A Socio economic, Nutritional and Health Evaluation among Worker of Different Sector of Textile Industries	

The textile sector is the fastest developing sector in our country. The contribution of this industry to the gross export earnings of the country is over 28 per cent while it adds only 4 per cent to the country's gross import bill. It is the only industry which is self-reliant from raw material to the highest value added products like garments, carpet, and thread. The textile industry's predominance in the Indian economy is manifested in its significant contributions to industrial production, employment generation, and foreign exchange earnings during the last five years. As the textile industry employs the largest number of workers after agricultural sector in our economy therefore acts as a pillar of Indian economy and provide significance to the economy of the country.

Occupational Health

Occupational health aims at the promotion and maintenance of the highest degree of physical, mental and social well being of worker in all occupations and not mere absence of disease or infirmity (WHO, 1948).

In India the traditional public health concerns like communicable diseases, malnutrition, poor environmental sanitation and reproductive health care get emphasis and priorities in the health policy. Recent industrialization and globalizations are changing the occupational morbidity drastically, new pathologies like cancers, stress, AIDS, geriatrics, psychological disorders and heart diseases are on the rise. This transition poses new challenges to health care system with new concepts of environmental legislation, ethical issues, new safety regulations, insurance and high costs of healthcare (Beckett et.al, 1994).

Occupational health programmes basically aim to protect the health of employees. Unfortunately, in India these programmes are not given due importance.

Humans are exposed either environmentally or occupationally to countless chemical agents/particles, which may cause a variety of health hazards including cancer and genetic diseases. Among the major threat, workplace dust of textile industry (cotton, silk, thread, carpet) is the key contributing factor causing more adverse effect with higher magnitude of exposure level. In spite of great economic and commercial significance of textile, systematic evaluation of toxicological and occupational health risk studies have not been made proportionately. Dust prevalent in the air during processing of raw textile material may have hazardous effect on the exposed workers (Pallasaho et.al, 2004). The dust concentration, composition and size are directly proportional to its toxicity. It is estimated that maximum number of people in the Textile manufacturing industries are exposed to dust generated in their units. Textile dusts are a complex mixture of many organic and inorganic compounds, which interacts with other carcinogenic factors to express their effects (Prasad et.al, 2002).

Apart from deaths due to explosions and fire, coughing, sore throat, dizziness and anemia are common effects of ingestion or inhalation of textile dust, it also causes respiratory infections, asthma, eye infections and other chronic lung diseases (Sekhar, 1992).

Sareen et.al, (1997) found the following emerging as the salient health problems that confront working women. They are: (a) stress arising out of multiple roles, job characteristics, sexual harassment and threat of violence, (b) ergonomic problems due to use of tools, work situations and personal protective equipment that are designed to fit the average male, (c) reproductive hazards (pregnancy, abortion), (d) physical exertion, (e) effect of noise on birth weight, menstrual disturbances and infertility, and (f) effect of chemicals such as exposure to pesticides (in agriculture) causing spontaneous abortions.

Occupational Hazard

For years, the phrase “occupational hazards” conjured up vision of people working in damp, unhealthy mines and in factories where workers and machines were constantly at war. Only recently has the concept been broadened to embrace less visible but not less dangerous threats like cancer striking even 20 years after exposure to chemicals, dust and fibres in the workplace, noise and even psychological wear and tear.

Workers are often exposed to stresses of more than one kind. Human tolerance to both physical and psychological factors also varies. Workers may be easily affected by minor degrees of stress

because of the lowered "vital" status of the exposed individuals (Willie,1959). The environmental stress in this case does not cause the illness, it rather brings about, in vulnerable groups, a rapid shift from the previously tolerated levels of existing illness or of subclinical impairment, to a state of disability. Such acute events have often occurred as a consequence of different environmental stress factors acting on individuals with quite different kinds of physiological handicap. In developing countries, the employment of children, women, the elderly and the partially disabled is common. The degree of tolerance and susceptibility to psychological and physical stresses at work varies in these groups and may result in health impairment and decreased labour turnover.

Respiratory problem is one of the major health threats to Textile Workers (Jaiswal et.al,2004; Brhel. 2003). Not only in cotton sector (Shamssain et.al,1996; Jaiswal, 2013,2014,2016) but also in synthetic and silk sector (Bouhuys et.al,1969). It leads to some symptoms in exposed workers (Wang et.al, 2003), along with a number of other physical problem like, hearing loss or noise problem, (Shake, 1996), low back pain (Industrial Health, 1997), respiratory symptoms and pulmonary functions. (Ming et.al,2003), byssinosis diseases (Bhasker et.al,2003; Chattopadhyay et.al,2003), with significant disease related decrease in FEV_{1.0}, FVC (Chattopadhyay et.al,2003; Shamssain et.al,1996).

Along with respiratory problem there is colour vision dysfunction in long term solvent (dye) exposure (Ihrig et.al,2002). The duration of exposure and dust concentration in the textile industry play a significant role in the occupation related respiratory impairment (Industrial Health, 2003; Jaiswal, 2013, 2014, 2016). It has been confirmed from the number of studies that an aqueous extract of bracts consistently eases histamine from human lungs only (Industrial Health, 2003, Antweiler, 2003) not from animal lungs. Smoking of cigarettes and tobacco too shows a significantly higher frequency of the health impairment of the Textile Workers (Reddy et.al,2004). Apart from Textile Workers, similar response has also been found in number of other dust, chemical exposing industries like stone, cement, petrol and leather (Chattopadhyay, 2007; Chattopadhyay, 2006; Whig et.al,2006; Jannet et.al,2006; Kesavachandkan et.al,2006; Fulambarker et.al,2004, Jaiswal, 2013, 2014, 2016).

The Mechanisms of Dust Inhibition, Inhalation, Deposition and Elimination

Air borne dust passing into lung is subjected to a process of size separation. The largest particle fall out by infection in respiratory tract .As air penetrates deep into lungs, sedimentation becomes the principal method of disposition and finally very fine dust of submicroscopic size is removed from the inspired air by a Brownian motion. The first two processes are dependent upon the density and the square of diameter of the particles. It is often locally stated that particle greater than 5µm do not reach the alveoli in appropriate quantities. This is an incorrect simplification because in general this is the effect of density and particle shape. Thus in heavy dust such as Tin oxide, few particles over 2µm reach the alveoli, conversely dust composed of long fiber such as asbestos which on account of their shape have a low settling velocity to penetrate deep into lungs. Fibres as long as 30µm are being frequently found (Knox et.al,1954).

Objectives:

- To Study the Socio-economic and Nutritional status of Textile Workers and Control Group.

- To Study the Safety Measure followed, Working Environmental and Health Conditions of Textile Workers.
- To Study and Compare the Pulmonary functions of Textile Workers and Control Group.
- To Study and Compare various Body Measurements of the Textile Workers and Control Group.
- To study the Occupation related Health problems of the Textile Workers

Area and People

The present study was carried out in the industrial area of district Varanasi Bhadohi belt of Uttar Pradesh (North) and Coimbatore of Tamil Nadu (South). This area was chosen because in the district Varanasi Bhadohi belt of Uttar Pradesh and Coimbatore of Tamil Nadu are one of the main centers of small scale industry, especially of sarees, carpet and synthetic power loom based textile. These districts were considered because of four main reasons. Firstly, there is abundance of textile industries in these districts, secondly, western and southern district claims maximum number of textile working family, thirdly as a member of industrial family of Varanasi and Coimbatore, I found that the worker of textile industries are facing some sort of health problem especially related to chest, and fourthly, a renowned Government Carpet Weaving Training Center, situated in these district, is active in this area for past several years in providing free training and information to people of Varanasi and Coimbatore textile belt.

Materials and Methods

A total of 600 people formed the sample size of the study which included a total of 300 Textile Workers (150 from Varanasi Textile belt and 150 from Coimbatore Textile belt) from different textile industries and household were studied. From this household and industries, a total of 300 Textile Workers (TW) were interviewed and measured, this group has been treated as test group and 300 people residing in the same area but not working in the textile Industries were taken as Non Textile Workers (NTW) and have been referred to as control group.

The distribution of Textile Workers was quite remarkable as certain section of the work is dominated by Muslims and some other sector by Hindus. Majority of Textile workers belonged to Hindu and Muslim religious categories almost in equal proportion in Varanasi but in Coimbatore district majority of Textile workers belonged to Hindu religious categories. Both the group were taken together to avoid administrative problems for the industry owners which would have happened, if one religious group were to be studied in that closed knit group. Among Hindus and Muslims, both male and female were studied.

A sample of 600 will be evaluated by using stratified, purposive random sampling technique. Various methods of data collection were used, which is beneficial in eliciting different kinds of information. Several methods were used such as survey, interviews, observations, group discussions, industry visit and the home visits. Secondary sources of data collection were also brought to use at different points of data collection. This help in substantial data collection both qualitatively and quantitatively. Prior to data collection, each subject is to be explain in details about the purpose of the study, techniques to be used and measurements to be taken. Written

formal consent will be obtained from all the subjects in the beginning. Those who do not agree to be subject, is not be measured or interviewed.

The subjects in both Textile Workers (TW) and Non Textile Workers (NTW) categories consisted of Varanasi TW and Coimbatore TW. Among Varanasi TW 48.54% were Textile Workers (25.05% male and 23.54% female), among Coimbatore TW 51.41% were Textile Workers (27.43% male and 23.98% female). In the categories of Non Textile Workers 49.45% were Varanasi TW (25.16% male and 24.29% female) and 50.54% were Coimbatore TW (26.25% male and 24.29% female).

Mean age of the Varanasi TW male Textile Workers was 32.95 ± 11.00 years and of the Varanasi TW female Textile Workers was 29.60 ± 7.90 years where as mean age of the Coimbatore TW male Textile Workers was 31.50 ± 12.46 years and of the Coimbatore TW female Textile Workers was 29.00 ± 10.48 years.

Mean age of the Varanasi TW male Non Textile Workers was 33.62 ± 10.79 years and that of Varanasi TW female Non Textile Workers was 30.54 ± 6.89 years. Whereas Mean age of the Coimbatore TW male Non Textile Workers and Coimbatore TW female Non Textile Workers was 31.95 ± 11.84 years and 29.85 ± 8.55 years respectively.

The subjects were screened on the basis of age, sex, sector of textile industry, sector of work, duration of exposure and symptoms suggestive of workers health. In all subjects were interviewed and measured

A total of 19 anthropometric and 8 physiological measurements were taken on each subject, using standardized technique. Analysis will be conducted using SPSS package. The statistical analyses in present study include measures of frequency, percentage, mean and standard deviation, chi-square, t-tests and odds ratio.

Performa contain questions related to

1. Socio-cultural – exhaustive personal information on Occupational status, Socio-economic status, Health status with case studies etc.
2. Biological: Morphological and Physiological Variables. The following physiological and body measurements were taken on each subject: stature; body weight; different circumferences of the body; different skinfold of the body; BMI; WHR; forced expiratory volume in first second (FEV1); forced vital capacity (FVC); forced expiratory ratio(FER); peak expiratory flow rate (PEFR) and some other measurement related to health and nutrition using standardized technique of Weiner and Laurie, (1981)..

Result and Discussion:

Occupational health is undoubtedly an issue that calls for more research by experts and activists. Respiratory problem is one of the major health threats to Textile Workers. It leads to some systemic symptoms in exposed Workers, along with a number of other physical problem like, hearing loss or noise problem. (Shake, 1996; Chavalitsakulchai, 1989), low back pain (Industrial Health, 1997, Jaiswal and Kapoor, 2012; Jaiswal, 2014), Respiratory symptoms and

pulmonary functions. (Ralf. 1998; Ming et al, 2003, Jaiswal et.al, 2011; Jaiswal and Kapoor, 2012; Jaiswal, 2014; Jaiswal, 2016), Byssinosis diseases (Shamssain and Shamssian, 1996; Bhasker et al, 2003). Colour vision dysfunction in long term solvent (dye) exposure, (Ihrig,2002).

The odd ratio (OR) at 95% CI showed that the likelihood of cardio-respiratory functions being affected among Textile Workers was maximum: ---

- in wool/synthetic sector of the textile industries as compared to Cotton or Silk sectors.
- in scouring, spinning, teasing sector of the textile industry as compared to weaving and cutting, carding, reeling, dyeing and washing sectors.
- in non ventilated textile industry as compared to properly ventilated textile industry.
- in working most frequently in a half sitting position or work requiring deep forward bending and driving vehicle as compared to working most frequently while sitting on chair, sitting on the floor or in standing position.
- in handling heavy object as compared to handling object of below 50 kg or mainly doing care giving work.
- in working most frequently as a dyer as compared to running the machine or work involving lowering things or weaving works or cargo unloading, loading work, carrying work or moving work, pushing pulling work.
- in working in a dye area of the textile industry as compared to working in a outdoor environment or in a narrow/slippy area or working in shaking, vibration environment and working in cold place.
- in not receiving the safety measures as compared to those receiving the safety measures.
- in living in rented kuccha houses as compared to living in semi kuccha or semi pucca or pucca houses.
- in living in houses with dry and dusty floor as compare to houses with moist and tidy floor.
- in living in houses with open drainage system as compared to houses with closed drainage system.
- in houses with less than two rooms as compared to houses with two or more than two rooms.
- in living in houses with dirty surrounding as compared to houses with clean surrounding.
- in living in houses without separate kitchen as compared to houses with separate kitchen.
- in using smoke emitting chullahs as fuel in the kitchen as compared to using smokeless chullahs/stoves.
- in using cowdung/firewood as a fuel in the kitchen as compared to using LPG, Kerosene or Coal as a fuel in the kitchen.
- in houses without their own latrine as compared to houses with their own latrine or community latrine.
- in facing the problem of frequent power failure as compared to regular power supply.
- among current smoker as compared to non smoker or former smoker Textile Workers.
- among those suffering from breathing problems followed by cardiac problems or feeling of heaviness in the chest, frequent cough and fever as compared to other symptoms among Textile Workers.
- in suffering from cardio-respiratory diseases for the last three years followed by gastric

diseases, and skin diseases as compared to other chronic diseases.

In present study, the multivariate analysis showed an association of cardio-respiratory problems with overcrowding, poorer housing, lesser education and lower number of available commodities. This is in agreement with results observed in literature. Low income had increased odds only in the lowest income category, which was statistically not significant. This could be attributed to the fallacies in reporting income, which could otherwise be assessed from other parameters such as the number of available commodities, etc.

The result of present study reflected a need for textile mills to reduce the dust levels in the spinning and weaving sections. Workers should be encouraged to use protective measures such as face-masks. Since heavy smoking is a risk factor for cardiac diseases, measures should be taken to reduce smoking among Textile Workers. Rotating Textile Workers from dusty to non-dusty sections on a regular basis would reduce the length of exposure to higher dust levels, thereby reducing the risk.

Nutritional survey of the subjects revealed that majority of the Textile Workers purchased staple food articles like cereals and pulses for the entire month but their families mostly missed regular pattern of three meals a day where as most of the Non Textile Workers followed the regular pattern of three meals a day.

Majority of Workers in Textile Industry and Non Textile Workers engaged in agricultural activities had heavy breakfast cum lunch and dinner as a meal pattern. Almost all the Textile Workers and Non Textile Workers engaged in agricultural activities began their day's activity by 6 a.m., breakfast cum lunch was consumed outside their homes prepared early in the morning. Dinner was mainly consumed in their homes and was usually prepared by other members of the family.

Most of Textile Workers and Non Textile Workers were non vegetarian with few exceptions, their staple cereal was rice and used higher amount of mustard oil in their diet. Consumption of vegetables and fruits were low which could be due to their poor socio-economic status.

Among Textile Workers and Non Textile Workers of both the groups, more than 60% males and 55% females had normal BMI as per the classification of W.H.O. (2000).

Chronic Energy Deficiency (CED) was found to be more prevalent in Textile Workers than Non Textile Workers but the prevalence of obesity was seen more in Non Textile Workers.

A higher percentage of female Textile Workers as compared to their counterpart males, consumed inadequate amount of cereals and millets, milk, milk product and fruits, meat, fish and eggs in comparison to the Recommended Dietary Allowances (RDA). Similar observation was made for pulse consumption also.

On the other hand male Textile Workers consumed inadequate amount of vegetables, sugar and jaggery as against the RDA.

Conclusion

The present study highlights that exposure to Textile dust has noticeable effect on cardio-respiratory function rather than on body structure. Most detrimental factors are:

- Period of exposure to textile dust.
- Smoking habits among Textile Workers.
- Wool/synthetic and dye sector of textile industry.
- Scouring and spinning sector of textile industry.

- Absence of ventilation facility in textile industry.
- Living in kuccha houses, with dry floor, with less than two rooms, dirty surrounding.
- House with open drainage system, without separate kitchen using smoke emitting chullah with cowdung/firewood as fuel.
- Not receiving the safety measure in textile industry.
- Consuming inadequate amount of food in comparison to the RDA.

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Details of Publications/ Paper presentation in Seminar or Conference resulting from the project work.

Paper presentation in Seminar or Conference

- National Seminar on “Innovative Management Practices for sustainable Development and Global Competitiveness IMPETUS, 15, organized by Department of Management Studies, Pondicherry University, Puducherry, Presented paper “Occupational Health and Safety in the Construction Industry in Development Countries”, October, 8th -9th, 2015.
- National Conference on “Caring the Elderly: Psycho-Social Perspectives”, organized by Department of Applied Psychology, Pondicherry University, Puducherry, Presented paper “Anthropo-Physiology of Ageing”, March, 23th -24th, 2016.
- 104th Indian Science Congress organized by S.V University, Tirupati, Andhra Pradesh, Indian Science Congress Association. 3-7 January, 2017 and Presented Paper “Job Stress and Occupational Accident among Blue- Collar Workers of India: An Anthropological Insight”
- National Seminar on “Genomics and Culture Variation of Indian Population: An Appraisal of Health and Disease Susceptibility”, under UGC-SAP-CAS-I organized by Department of Anthropology, Sri Venkateswara University, Tirupati, Andhra Pradesh, Presented paper “An Anthropological Insight on Healthiness and Ageing, among Elderly people of Pondicherry, India”, 23rd and 24th February, 2017.
- National Seminar on “Genomics and Culture Variation of Indian Population: An Appraisal of Health and Disease Susceptibility”, under UGC-SAP-CAS-I organized by Department of Anthropology, Sri Venkateswara University, Tirupati, Andhra Pradesh, Presented paper “A Study on Nutritional Profile of Textile Workers of District Coimbatore, Tamil Nadu”, 23rd and 24th February, 2017.
- International Conference On Changing Paradigm and Emerging Challenges in Statistical Sciences in Conjunction with Bi-Decennial Convention of Society of Statistics, Computer and Applications Organized by Department of Statistics, Pondicherry University, Puducherry. Presented paper “An anthropological Study on Ageing and Nutritional Status” 29-31 Jan, 2018.
- 53rd National and 22nd International Conference of Indian Academy of Applied Psychology (IAAP-2018) Organized by Department of Applied Psychology, Pondicherry University, Puducherry. Presented paper “Ageing and Nutritional status among Populations inhabiting varied Geographical Regions in India” 16-18th March, 2018.
- National Conference On Gender and Development Organized by Department of Gender Studies, Rajiv Gandhi National Institute of Youth and Development, Sriperumbudur, Tamil Nadu. Presented paper 1. “An Anthropological study on the Industrial Health

Function among Female Textile Workers” and 2. “Health of women of Domestic Cooking Fuel: an Anthropological Insight” 8th-9th March, 2018.

- 105th Indian Science Congress organized by Manipur University, Imphal, Manipur, Indian Science Congress Association. 16-20 March, 2018 and Paper “An Anthropological Investigation on Effect of Domestic Cooking Fuel on the Health of Non- smoking Women of Uttar Pradesh, India”

Deliver Lecture related to the Topic of Major Research Project:

- Deliver Sarita Bhowmick Memorial Endowment Lecture on 4th March, 2016, at the Department of Anthropology, Madras University, Chennai.
- Deliver L.K Ananthakrishna Iyer Endowment Lecture on 5th March, 2016, at the Department of Anthropology, Madras University, Chennai.

Publications

- “An Anthropological and Medical Analysis on Respiratory Problem and Worker’s Working Condition” International Journal of Research in Sociology and Anthropology (IJRSA) Volume 1, Issue 1, 2015, 18-28. www.arcjournals.org (ISSN 2454-8677).
- “Industrial Health and Management and Safety in Textile Industry”, International Journal of Business Intelligence and Innovations, Special Volume 2, 2015, 181-186. (ISSN 2348-4705). Co author: Sapna Jaiswal
- “Job Stress and Occupational Accident among Blue- Collar Workers of India: An Anthropological Insight” International Journal of Multidisciplinary Research in Social Science. Volume 2, Issue 01, Dec, 2016, 1-11. (ISSN 2455-7943).
- “An Occupational Hazard and Public Health Investigation among the Fabric Workers of India” Asian Man, An International Journal, 2016, 10, 2: 241-246 (Print ISSN : 0974-6366. Online ISSN : 0975-6884).
- A Cross-Sectional Study on Industrial Health Hazards among Garment Factories Workers of Tamil Nadu; Asian Man, An International Journal, **Accepted for Publication** 2018, (Print ISSN : 0974-6366. Online ISSN : 0975-6884).



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