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A Study on Health Status of Women Workers in Match Industry

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ABSTRACT:

Background: *According to Indian Factories Act-1948 Section:62, insist registry of adult workers but no record was available regarding women in match industry. Moreover, very few studies were done regarding the health status of women worker. Some studies were done on women workers in leather tanning, chemical industries & textile industries. Even though we are the leading match manufacturers and match industry is one of the most foreign exchange earning sector. No studies were conducted regarding the status of women workers in match industries till date.*

Objective: Primary: *To investigate the occupational health status of women workers in match industry and thedistribution of health problems among them.*

Secondary: *To describe the nature of match industry and comparing with standards of Indian Factories Act (1948 amended on 1987). To describe the chemicalhandling among the women workers and personal hygiene. To focus on the prevalence of certain diseases in women workers. To find out the work environment and disease relation (Occupational Hazard)*

Materials and Methods: *A comprehensive medical questionnaire was prepared for the patients visiting hospitals in and around Kovilpatti for a period of 15 days from 19.12.17 to 03.01.18.*

It was a pilot survey with a questionnaire as the exposure assessment tool. Results: Out of the 100 persons interviewed most of the health problems were Low back ache, Acid peptic disease, muscle cramps which are prevailing in all age groups. My interest was in Anaemia, Poly cystic ovarian disease & infertility because the incidence of this is somewhat rare diagnosis and is alarming the whole industrial women workers.

Conclusion: *It was concluded that the standard health and safety measures for women workers in match*

industries are substandard and many were not to the mark according to Indian factories act.

Keywords: *Women workers status, Match industry, Indian factories act.*

INTRODUCTION:

It has been a century if we trace the safety match industries origin.

Past five decades of small scale, non- mechanized sector rapid development testifies most of the contribution was from match industries which may be due to governments policies which places protective tariffs on imported products. This favored the expansion of the handmade, small-scale sector using differential excise taxes. Among 12,000 units in the small-scale, non-mechanized sector, 75% to 90% are situated in Southern India[1].

WOODEN MATCH PRODUCTION:

Category 1- Mechanized large-scale vector -18% Category 2 – Handmade small-scale vector – 67%Category 3 – Cottage Sector – 15%

India's 67% match production is from Category 2 industries which are situated in Ramanathapuram and Tuticorin districts. Only one unit represents Category 1 i.e., M/s.Wimco Ltd., contributes 18% of current match production.Category 3 contributes 15% of total match production this is also from Tuticorin district[2]. In Kovilpatti there aremany small-scale industries which are launched in early 1930s.Mainly

1. Match industries
2. Textile mills
3. Firework industries

Kovilpatti "**A MATCHLESS CITY FOR MATCHES**"

WHY KOVILPATTI?

- Dry land sloped from south west to northwest of Tuticorin.
- Low socio-economic status
- Cheap Labor (Women & Child) Availability of raw materials from neighbor state Kerala.

This made a ground to start match industries in this locality.

WHY SO MANY …?

1. Government promoting small scale vector.

i. Protective Tariffs

ii. Differential excise duties

iii. Sales tax exemption

2. All raw materials such as wood, potassium chlorate, blue match paper, potassium bichromate, red phosphorus, manganese dioxide, iron oxide , glass powder are availableIndia.

WHY HANDMADE…?

i. Good quality (Importer's view)

ii. Losses are negligible (Owner's View)

WHY WOMEN WORKERS…?

i. Low wages

ii. Long duration of work

iii. Illiteracy of adolescent girls

iv. Khadi & Village Industries Commission focused mainly on womenlaborer's promoting the cottage sectors.

RAW MATERIALS AND THEIR HAZARDS

- Match wood

– Splints – 0.11m^3(Soft woods), Match boxes - 0.09 $m^3$29 species for match wood

- ✓ Bombax ceiba (Indian cotton wood)
- ✓ Evodia roxburghiana (Indian aspen)
- ✓ Ailanthus malabarica (White mutty)
- ✓ Hevea Brazilenzis (Rubber Tree) – Good box wood(Also called Semul – commercial name)

- Potassium Chlorate

Potassium, chlorine & oxygen-Harmful oxidant

- Potassium bichromate (Red crystals)
- ✓ strong oxidizing agent (Supports combustion)
- ✓ Highly corrosive to skin and mucous membrane
- ✓ Cause violent GE, Peripheral vascular collapse, vertigo,

Muscle cramps, Coma, toxic nephritis (Glycosuria)

- Red phosphorus (Phosphorous oxides)
- ✓ Early white phosphorous (1851) cause phossy jaw so ALBRIGHT & WILSON use phosphorous sesquisulfide.
- ✓ Property between white and violet phosphorous
- ✓ Does not catch fire less than 260^o C
- Iron Oxide (Red pigment)
- ✓ Fumes give irritation to URT (Not dangerous)
- Glass powder
- Silica, soda & calcium oxide
- Risk of inhaling dust (Not Hazardous)
- PPE - Kevlar gloves above rubber gloves while mixing
- MSDS : Eyes - rubbing corneal ulceration
- OSHA : 0.1mg/m^3·Crystalline silica cause silicosis , Bronchitis
- Manganese dioxide (Black)
- ✓ Easy to oxidize
- ✓ Hazards
- Impaired motor skills
- Cognitive disorder
- ✓ Absorption

- Skin
- Intestine (Affect kidney and liver)
- Zinc (Metal fume fever, Common Influenza)
- Blue Match Paper, Antimony sulphide , rosin, sulphur are now not in use.

HAZARDS:
Allergic skin diseases, Allergic lung disorder, Menstrual problems, Nutritional deficiency, Recurrent infections, Long working hours, Improper posture, Overcrowded working place, Continuous sitting, Low illumination, Exposure to excessive heat, Exposure to chemicals, Work induced psychological problems, Suicidal attempts, Improper ventilation[3].

ECONOMIC IMPORTANCE:
According to 1981 census survey women who are working was 14%. Now it is 30% but the TIME USE SURVEY conducted by CENTRAL STATISTICAL ORGANIZATION (official organ of government of India) in 1999-2000 through a pilot survey on different seven states of India involving 18,000 household ofadult categorizes workers into

i.e., who are involved in

Implies that

1. System of national accounts (SNA)
2. Extended system of national account
3. Non-System of national account

1. Productive work
2. Non- Productive work (Eg: Gardening.,)
3. No work (Eg: Students, disabled, sick, simply leisured)

- Work of women is more than man (Includes working hours)
- Women are involved in SNA and extended SNA i.e., Productive & Non-productive work.Till now no more surveys was conducted regarding the status of women workers in certain industries.

Growth of economy is 6-7% annually but it is not translated into formal and decent employment. This is due to poor infrastructure, poor investment which shows its implications on women'shealth status[4].

Analytical distinguishing of society into social sector who are earning and informal sector(which covers >90%) according to their employment. Research from the informal sector revealed that more women are employed in industries **"NOT AS A WORKER BUT HELPER"[5].**

According to 1991 census, the distribution of female main workers is as follows.

- In Tamilnadu the female workers are distributed maximally to the south region who aremostly involved in small scale sectors[6].

According to 2001 census, the literacy rate of female in Tamilnadu, was between 60 to 70 % which was contributed mainly by the urban sector[7].

Even though literacy rate was 60 to 70 % the village sector was not undergoing any improvementin quality of life as most of the females belong to low socio-economic status and must work compulsory for their daily wages[8].

According to Indian Factories Act-1948 Section:62, insist registry of adult workers but no record was

available regarding women in match industry[9]. Moreover, very few studies were done regarding the health status of women worker. Some studies were done on women workers in leather tanning, chemical industries & textile industries[10].

Even though we are the **leading match** manufacturers and match industry is one of the most **Foreign exchange earning sector**. No studies were conducted regarding the status of women workers in match industries till date.

OBJECTIVES:

Primary: To investigate the occupational health status of women workers in match industry and the distribution of health problems among them. **Secondary:** To describe the nature of match industry and comparing with standards of Indian Factories Act (1948 amended on 1987). To describe the chemical handling among the women workers and personal hygiene. To focus on the prevalence of certain diseases in women workers. To find out the work environment and disease relation (Occupational Hazard)**.**

PRODUCTION PROCESS:

1. Processing timber logs into outer& inner box – Veneers & splints
2. Box Making (Manual & Machine)
3. Dipping & filling
4. Labeling and packing

- **KARBORISATION:**

A match is a tiny stick of wood of cardboard with a hardened mix of flammable chemicals at oneend, when the end is rubbed then it creates friction and produce desirable heat to induct a small flame.

- **TISSUE PAPER THREADED INTO STICK**
- **THREADED PAPER COATED WITH WAX**
- **THREADED PAPER COATED WITH WAX**
- **FILLING FRAMES WITH STICKS (MACHINE, MANUAL)**
- **CHEMICALS MIXING FOR MATCH HEAD**
- **DIPPED IN WAX AND CHEMICALS**
- **MATCH BOX FILLING**
- **LABELLING AND PACKING**
- **DRYING**
- **STORAGE**

MATERIALS AND METHODS:

After obtaining Institutional ethical committee approval, a comprehensive medical questionnaire was prepared for the patients visiting hospitals in and around Kovilpatti for a period of 15 days from 19.12.17 to 03.01.18. It was a pilot survey with a questionnaire as the exposure assessment tool.

The questionnaire concentrated on the age, present complaints, nature of work, working hours, workplace environment and their hazards, past frequent illness, any treatment history, history of TB, purposely asked questions about muscle cramps.

The data obtained from the questionnaire were analyzed using Microsoft Excel 2007.

RESULTS:

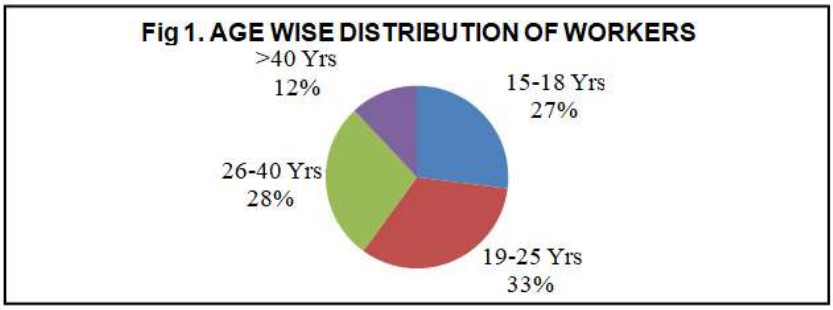
This pilot survey was done with women workers in a small-scale match industry in Kovilpatti. 100 women workers are surveyed and taken as sample.

Distribution of diseases in different age groups:

The age wise distribution of diseases shows the most vulnerable population was adolescents and of reproductive age females. This clear-cut demarcation of age shows the need to address the deterioratinghealth burden of women in match industry. (Refer Fig 1)

FIG 1 DISTRIBUTION OF DISEASES IN DIFFERENT AGE GROUPS:

The age wise distribution of workers is as follows

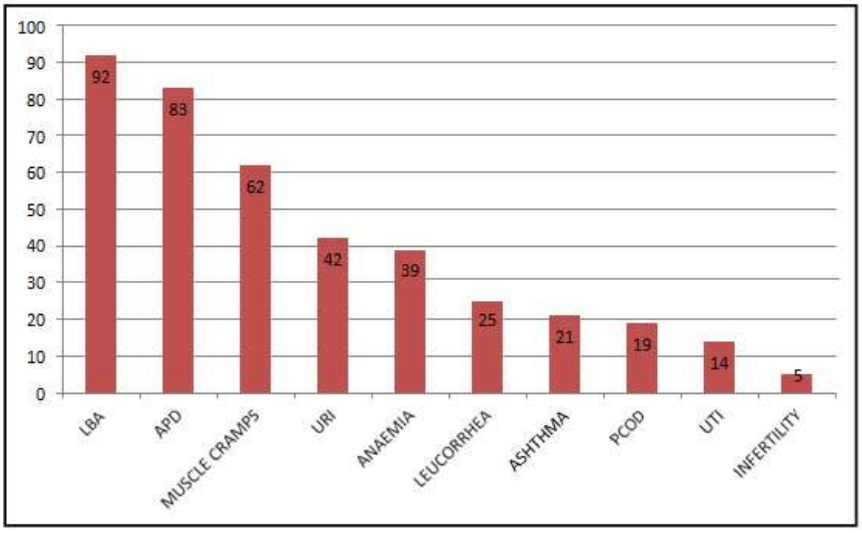


Distribution of Various Diseases In Different Age Groups:

With this pilot survey we conclude that more than 50% of the sample population is affected with LBA, ABD & muscular cramps. Infertility & PCOD prevalence is increasing among the workers[11]. (Refer Fig 2) Out of total 92 persons affected by LBA the percentage distribution of LBA in different age group are as follows. Low back ache is more prevalent among 19 to 25 years age group. These are the women whose working hours are 10 to 12 hrs/day, (10 to 72 hrs/week) which far exceeds the working hours as per Indian factories Act (IFA)-1948 standards i.e.,48 hrs. /week. As LBA is a global problem and also a work related disease, here its prevalence shows more contribution due to their work nature that is sitting without back support for more than recommended hours there by making LBA more favoring to relate it as an OCCUPATIONAL DISEASE[12].

The distributions of different diseases in various age groups are illustrated below using table and bar chart.

Fig 2: Distribution of Various Diseases in Different Age Groups:



Acid peptic disease (APD) and upper respiratory infection (URI) in this study sample is more among19 to 25

years. All the women who are surveyed belong to low socio-economic status. Their fasting state andimmune compromised state, handling of chemicals, continuous exposure to the factory environment (Smoky,dusty) for 8 to 9 hours aggravates these diseases. Among the factors contributing these diseases, handling of chemicals 8 to 9 hours, improper hand washing before taking food (due to scarcity of water & ignorance about chemicals) and having food on factory premises favors more ingestion & inhalation of chemicals. Thisrelates APD & URI as an OCCUPATIONAL DISEASES

In the total affected population of 62 persons, percentage distribution of muscle cramps accordingto age group from the above bar chart obviously relates the disease to consider it as an occupational disease because of the continuous static posture with less dynamic movement, more working hours with very less rest in between, poor nutritional status, handling of chemicals like potassium dichromate in match head and poor personal hygiene. This makes the disease more prevalent among the workers of this age group of 19 to 25 years.

Percentage distribution of 39 anemic persons in different age group from the bar chart analysis reveals that Chronic exposure of chemicals, poor nutritional status, childbearing age of the individuals contributes this disease more prevalent among the age group of 19 to 25 years.

In the total population 25 persons are affected by leucorrhea and 14 persons by UTI.

Inadequate water intake during working hours, in availability of drinking water and basic facilities in the factory premises, extended time of work, chronic exposure of chemicals (more than 20 yrs), poor personal hygiene and age of the individuals make Urinary tract infection (UTI) & Leucorrhea more prevalent among the age group of 26 to 40 years and above 40 years.

These diseases Poly cystic ovarian disease (PCOD) & Infertility always go hand in hand. The women having these diseases are exposed to this environment since 20 to 25 years. Some had a history of spontaneous abortion and tuberculosis also. Women above 40 years have been investigated and treated fortheir infertility still they are barren. Need further investigation and studies to relate these diseases to be anoccupational origin.

Out of 21 people affected by asthma, these are the women who had frequent acute attack of asthma for 15 to 20 years. Few had family history of asthma. They are working in match industry from their childhood age more than 20 years. Chemical exposure and disease effect relationship to be studiedfurther. (Refer Table 1)

Table 1: Distribution of Various Diseases in Different Age Groups:

DISEASES	AGE GROUPS (IN YEARS)			
	15-18	19-25	26-40	>40
LBA	20	32	28	12
APD	21	29	25	8
MUSCLE CRAMPS	5	26	20	11
URI	14	17	9	2
ANAEMIA	9	12	11	7
LEUCORRHEA	2	8	5	10
ASTHMA	1	4	12	4
PCOD	0	7	12	0
UTI	2	3	8	1
INFERTILITY	0	2	1	2

Distribution of Workers Based on Production Process:

Women indulge in most of the process of match making but many females participate in filling frames and match box which contributes to the various diseases mentioned. Handling chemicals, its constant exposure, improper work break, inadequate hydration and ventilation was the base for most ofthe diseases. (Refer Table 2)

NUMBER OF PERSONS=1OO

Table 2 Distribution of Workers Based on Production Process

AGE IN YEARS	FRAMES	FILLING OF MATCH BOX	LABELLING & PACKING	FILLING FRAMES & MATCH BOX
15-18	7	16	4	10
19-25	11	19	3	16
26-40	5	21	2	14
>40	1	6	5	5

Distribution of Workers Based on Working Area and Hours:

Women working in match industries do not demarcate their work and family. Hence the working hours was beyond measure. Low socio-economic status presses them to pursue such extended working hours. (Refer Table 3)

Table 3 Distribution of Workers Based on Working Area and Hours

AGE IN YEARS	WORKING INFACTORY	WORKING IN HOME & FACTORY
15-18	27	10
19-25	33	16
26-40	28	14
>40	12	5

WORKPLACE	WORK HOURSPER DAY	WORK HOURS PERWEEK
FACTORY	8 TO 9	48 TO 54
HOME	2 TO 3	12 TO 18
BOTH IN HOME &FACTORY	10 TO 12	60 TO 72

DISCUSSION

Out of the 100 persons interviewed most of the health problems were Low back ache, Acid peptic disease, muscle cramps which are prevailing in all age groups. My interest was in Anemia, Poly cystic ovarian disease & infertility because the incidence of this is somewhat rare diagnosis and is alarming the whole industrial women workers.

I have not done further investigation to detect the cause for infertility. The PCOD diagnosis was based on ultrasound findings. A direct relationship of following factors was already discussed.

1. Continuous working hours more than 10 to 12 hours per day (60 to 72 hours/ week)
2. Short interval of rest
3. Handling of chemicals more than 8 to 9 hours
4. Inhalation and ingestion of chemicals
5. Ignorance and poor personal hygiene
6. Poor basic facilities of the working environment
7. Scarcity of water and humid dry condition
8. Immuno compromised, poor nutritional status, low socio-economic status.
9. Poor environmental and engineering control measures
10. No usage of personal protective equipment

These pave the way for certain diseases more prevalent among the women workers working in match industry[14,15].

LIMITATIONS:

1. Pilot survey which includes only 100 samples is a very short time. Non-probability(purposive sampling) was taken.
2. Questionnaire: Answers to the questions depends on the individual pursuing knowledge & memory. Also depends on the interviewer skill.
3. The person's interviewed are those who came to a particular hospital alone and they represent only the diseased (at the time of survey)
4. There may be exaggeration or hiding of symptoms.
5. Certain disease like infertility was never investigated. (For eg., TB which is main cause in India need further evaluation
6. Same person is having one or more disease which may be a co-morbid state or may be due to occupational exposure of chemicals which need further clarification.
7. Acid peptic disease may be due to chemicals or fasting state of the individual because of the prevailing low socio-economic status.
8. Follow up of cases, impossibility of tracking which hinders diagnosing several other diseases.
9. LBA: A global work-related disease which has multifactorial origin cannot be considered as occupational disease. It is only a contributing factor.

RECOMMENDATIONS:

1. Small scale industries should comply with various provisions stipulated under the Indian Factories Act or atleast the basic work environment structure.by self-regulations in the interest of the work force.
2. Awareness programs and health education programs to be conducted periodically among the workers.
3. To relate work and disease the chemicals and the disease nature should be studied thoroughly, and their exposure effect relationship has to be revealed.
4. Proper drinking water, adequate ventilation should be provided in workplace.
5. Each worker should know about "WHAT THEY ARE DEALING WITH?".
6. PCOD among the workers was more prevalent and may contribute to infertility. This needs further investigation and study.
7. Provision of alternate job by authorities and rehabilitation for workers should be done properly.
8. Proper engineering and environmental control measures should be done at the workplace.
9. To follow this survey further investigations and studies should be conducted in various matchindustries to promote occupational health of women worker population.

This will be an eye opener for the whole city which mainly deals with matches and keep the city as "**A MATCHLESS CITY FOR MATCHES"**

CONFLICT OF INTEREST: NO

FUNDING: NIL

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