Effect Of Exposure To Spice Dust On Peak Expiratory Flow Rate, Chest Expansion And It's Correlation With Years Of Exposure In Spice Factory Workers.

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ABSTRACT:

Background: As a multiracial country, India enjoys a variety of dishes; many are hot and spicy. Indian Spices are well known, all over the world for their taste and strong aromatic flavour.1 There are around 80 types of spices grown through the world, but India alone produces about 50 types of them. Occupational diseases reflect health hazards brought on by exposures within the work environment due to lack of education, unaware of the hazards of their occupations, general poor nutrition and climatic proneness of this geographic region to epidemics aggravate their health hazards from work environtment3. Occupational diseases caused by irritant dust are well documented and include occupational asthma, occupationally induced upper respiratory track illness and occupational skin diseases4. Exposure to thousands of allergic agent present in vegetable dust is a growing cause of work related illness of respiratory system3. . Due to continuous exposure to spices like Pepper, Paprika, Chilli can cause obstructive lung diseases and frequent irritation of large quantity of these particles may cause bronchial carcinoma and destruction of alveoli.. Chest expansion gives us a measurement chest wall mobility and peak expiratory flow rate will give us the idea about the air flow limitation due to spice dust. J Shaheed Suhrawardy et.al conducted in his study that use of peak expiratory flow rate as majority of ventilatory function test is an ancient. This simple test measure by Mini Wright peak flow meter, is very useful in diagnosis, management, follow up of bronchial asthma and predict the status of ventilatory lung function

Materials and methodology: in this study 40 subjects from spice factories included by random sampling.

Then inclusion exclusion criteria checked and PEFR and chest expansion measurement done. And data collected and statistical analysis done.

Results: PEFR And Chest expansion is decreased as the years of exposure is more.

Conclusion: The study concluded that there is significant correlation between years exposure and PEFR. i.e. as the year of exposure increases. There is decrease in PEFR. Hence, there is negative correlation between years of exposure and cheast expansion. It means that if years of exposure increases. There is decrease in chest expansion.

Key words: PEFR, Chest expansion, spice factory workers, lung function, occupational disease

INTRODUCTION

As a multiracial country, India enjoys a variety of dishes; many are hot and spicy. Indian Spices are well known, all over the world for their taste and strong aromatic flavour.[1] In India, spices are important for medical crops from the point of view of both domestic consumption and export. Besides huge quantity of spices is also being consumed within the country for flavouring foods and are also used in medicines, pharmaceuticals, cosmetics and several industries. There are around 80 types of spices grown through the world, but India alone produces about 50 types of them. The history of spices is as old as human civilization. The spices offer in abundance are pepper, turmeric, chilli, fenugreek, clove, nutmeg, cumin, ginger, garlic etc[2].

Recent industrialisation and globalization are changing Indian occupation drastically[3]. As India is a developing country there is a lack of modern technology and machineries hence more preference is given to manual work. Because of this, millions of people work daily in dusty environment in the spice industry. Because of high demand, spice processing factories become one of the major food processing industries, involving many workers. Since the process of spice preparation involves grinding, the workers are constantly exposed to spice dust. The health of workers exposed to a highly dusty environment is a serious concern because it has been chronic pulmonary problems[1].

Occupational diseases reflect health hazards brought on by exposures within the work environment due to lack of education, unaware of the hazards of their occupations, general poor nutrition and climatic proneness of this geographic region to epidemics aggravate their health hazards from work environtment[3]. Occupational diseases caused by irritant dust are well documented and include occupational asthma, occupationally induced upper respiratory track illness and occupational skin diseases[4]. Exposure to thousands of allergic agent present invegetable dust is a growing cause of work related illness of respiratory system[3].

An allergic response to the spices may be implicated particularly with exposure to paprika, pepper and is normally associated with pollen allergy.4In terms of other respiratory symptoms, observed very high incidence of sneezing, running nose and cough among workers exposed to chilli peppers. Paul Blanc. et.al conducted a cross sectional study of responses to a structured questionnaire lung function assisted spirometer and cough threshold to inhalation of capsicum workers they concluded that chronic occupations exposure to chilli, peppers is associated with complaints of cough. Due to continuous exposure to spices like Pepper, Paprika, Chilli can cause obstructive lung diseases and frequent irritation of large quantity of these particles may cause bronchial carcinoma and destruction of alveoli. Anita Van et.al conducted a study to find out whether the spice mill workers developed work related allergic asthma after prolong exposure to higher level of inhalable spice dust. They concluded that spice mill workers are at high risk to become sensitized to multiple spice allergies when expose to inhalable spice dust levels of more than 1mg/m3. There are many ways to assist respiratory problems, but very few techniques give an immediate result such as chest expansion and peak expiratory flow rate. Chest expansion gives us a measurement chest wall mobility and peak expiratory flow rate will give us the idea about the air flow limitation due to spice dust.
J Shaheed Suhrawardy et.al conducted in his study that use of peak expiratory flow rate as majority of ventilatory function test is an ancient. This simple test measure by Mini Wright peak flow meter, is very useful in diagnosis, management, follow up of bronchial asthma and predict the status of ventilatory lung function.

Materials and Methodology

- Study design – Cross- sectional observational study
- Place of study- Bhusawal City.
- Duration of Study- Six Months
- Sample Size- 40 (All workers working in 6 Factories)
- Sampling method : Simple Random sampling.

Selection Criteria

Inclusion:

- Age- 21years-51years
- Gender- Male & Female
- Work Experience- >3 Years
- Subjects with negative RTPCR or Rapid Antigen Test Report

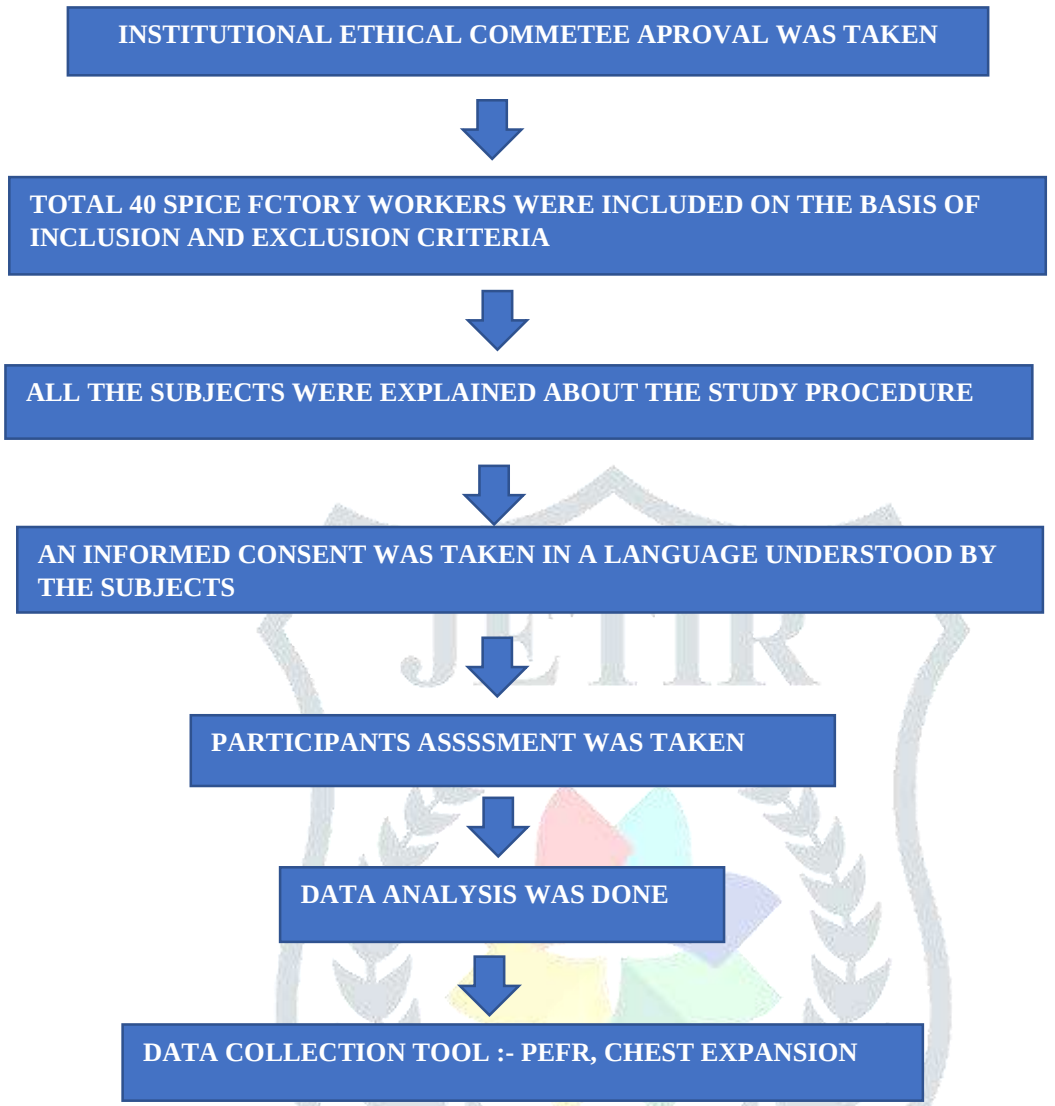
Exclusion:

- Subjects with any respiratory conditions.
- Uncooperative Participants.
- Post Covid-19 Participant.
- Subjects with history of smoking

Materials:

- Pen.
- Paper.
- Peak Flow Meter.
- Inch Tape.
- Chair

PROCEDURE



- **Out come measures**

➢ Peak expiratory flow meter

Peak flow meter is a portable device used to monitor a person's ability to breath out air for measuring peak expiratory flow rate.

➢ Chest expansion

Chest expansion is measured with inch taps.
It gives us a measurement of chest wall mobility.

PROCEDURE

1. To measure the PEFR, Wright's peak flow meter is used. The correct instruction for PEFR technique is given according to guidelines of National institute of Health, they were as follows[10]
   - Move the indicator to the bottom of the numbered scale.
   - Sit on a chair.
   - Place mouthpiece into your mouth and close your lips around it. Don't put your tongue inside the hole.
     Place nose clip on the nose.

Blow out as hard and as fast as you can in a single blow.

Classification of PEFR:

➢ Green Zone - Reading between 80-100% of the patient's personal best
➢ Yellow Zone - Reading between 50-70% of the patient's personal best

- Red Zone - Reading between 50% of the patient's personal best

The steps are repeated 3 times and the best of 3 attempts were used for analysis.

2.To measure chest expansion, inch tape used[9]

- Subject is in sitting position
- Hands are placed behind head
- Chest expansion is measured at 3 levels that is as follows
- 2nd intercostal space (Axillary)
- 4th intercostal space (Nipple)
- At xiphoid process.

Subjects is asked to exhale the air as much as possible and then take a maximal deep inspiration. The difference between the full expansion and full inspiration is noted. Three trials were given at each level and average of three reading is noted[9].

Normal Value :-

Gender	2nd ICS	3rd ICS	Xiphoid process
Male	2.76 inch	2.71inch	2.99 inch
Female	2.22 inch	2.71inch	2.99 inch

Result and Data Analysis

- The present study included 40 spice workers subjects and my study aimed to assess the effect of exposure to spice dust on long function of spice factory worker.
- All data analysis was performed using SPSS software
- P value was performed considering ….
- Pai chart and Graphs were used for visual representation of the analysed data.

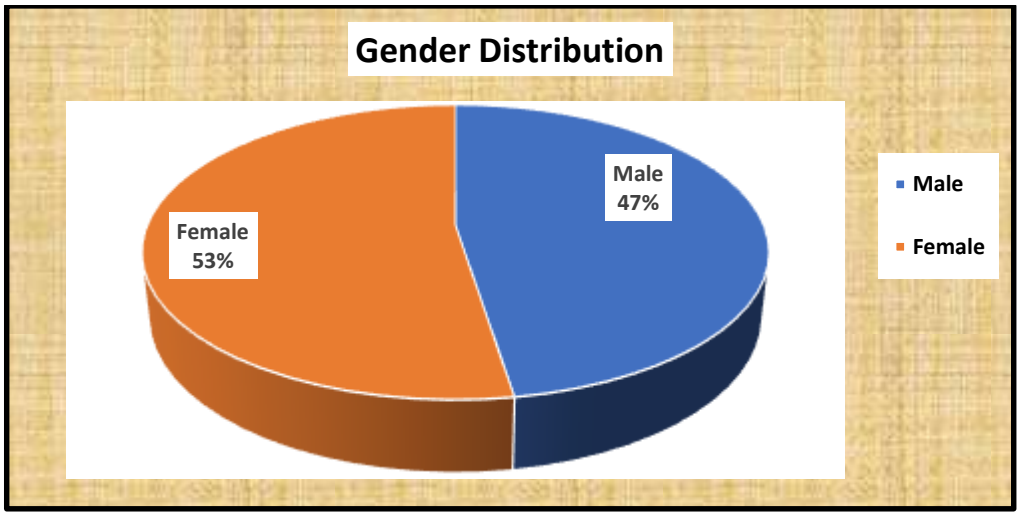
DATA ANALYSIS

Table no – 1. Gender distribution

Table 1

Variable	Groups	Frequency	Percentage
Gender	Male	19	47.50
	Female	21	52.50

Graph 1- Gender distribution



Inference

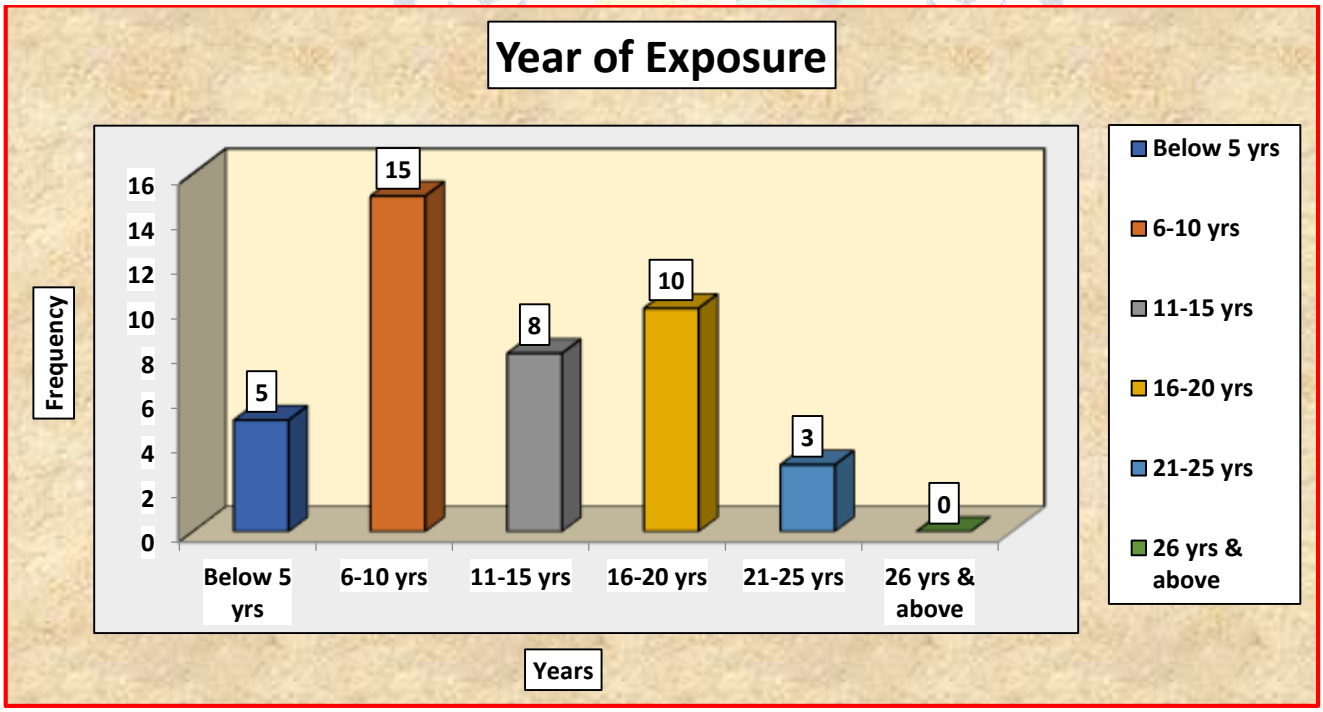
According to this graph there are 47%male and 52% female.

TABLE NO. 2: age and years of exposure

Table 2.

Variable	Groups	Frequency	Percentage
Year of Exposure	Below 5 years	5	12.50
	6-10 years	15	37.50
	11-15 years	8	20.00
	16-20 years	10	25.00
	21-25 years	3	7.50
	26 years & above	0	0.00

Graph 2- Bar graph presenting the age and years of exposure



Inference

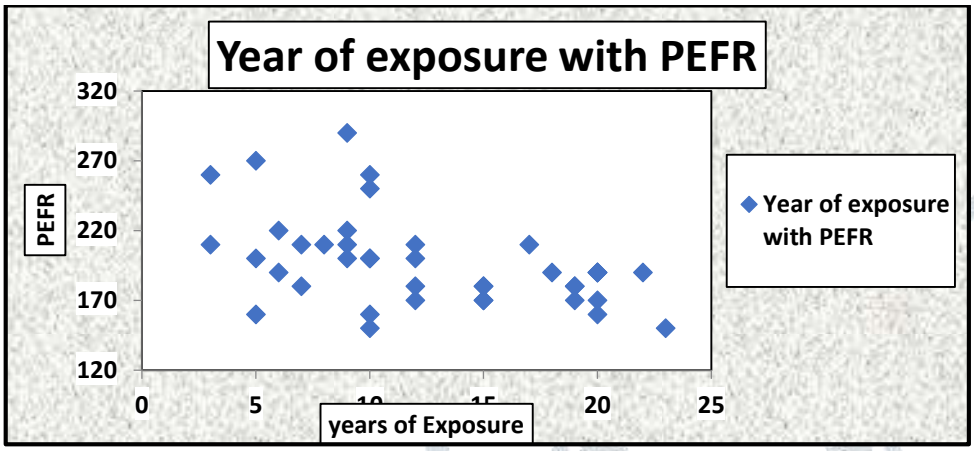
This graph shows that people with 5 or below 5 years of exposure are 12.50%, exposure of 6-10 years are 37.50%, 11-15 years are 20%, 16-20 years are 25%, 21- 25 years are 7.50% and above 26 years are 0%

Table no-3 Correlation of years of exposure with PEFR.

Years of exposure with PEFR	
Correlation	0.48
p value	0.002

* p value less than 0.05, shows the significant correlation.

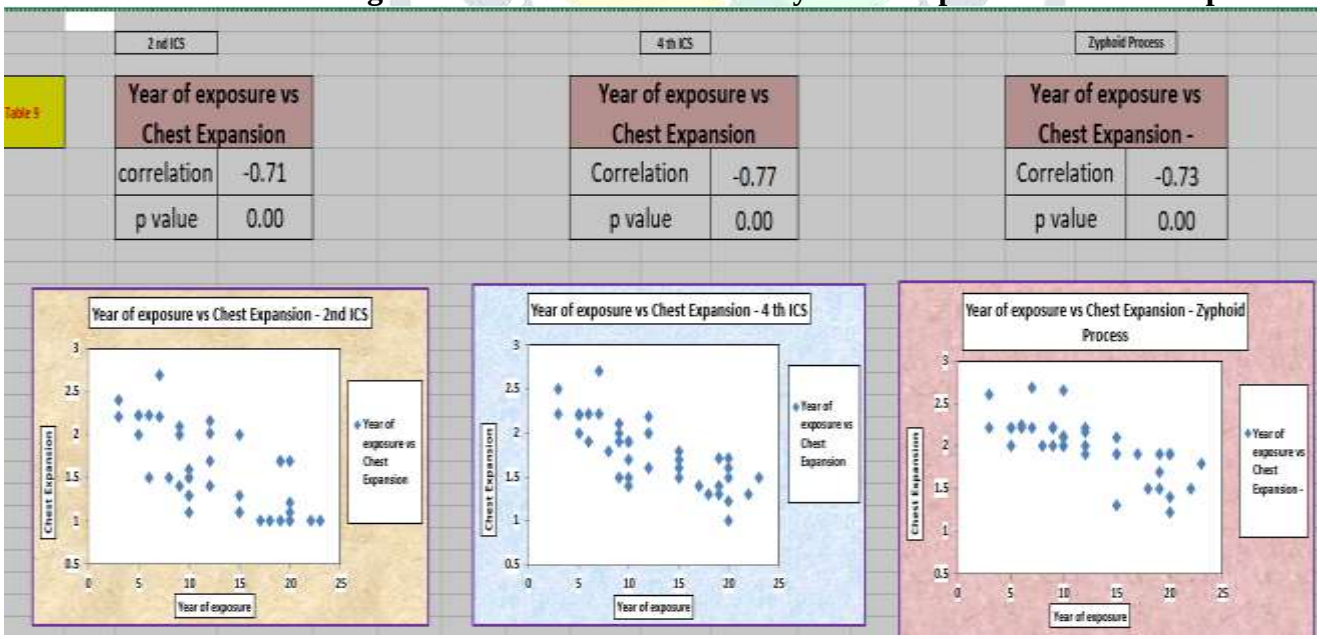
The scatter diagram represents Correlation of years of exposure with PEFR.



Inference

According to table no 3 and scatter diagram shows significant correlation between years of exposure and PEFR i.e.as the years of exposure increases, there is a decrease in PEFR.

Table no. 4 and scatter diagram no.4 correlation between years of exposure and chest expansion



Inference : These table and graph shows that there is negative correlation between years of exposure and chest expansion. i.e. there is Increase in years of exposure, then chest expansion decreases.

CONCLUSION

The study concluded that there is significant correlation between years exposure and PEFR. i.e. as the year of exposure increases There is decrease in PEFR.

Hence, there is negative correlation between years of exposure and cheast expansion. It means that if years of exposure increases There is decrease in chest expansion.

Limitations

The study was restricted to bhusawal city

Suggestions

Spirometer can also be used as a outcome measure in future study

Clinical implication

Assessment of PEFR and chest expansion routinely in spice factory workers to prevent CVRS complication.

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