



## Opinion on Occupational Health Problems among Salt Workers at Saltpan in Tamilnadu

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### ABSTRACT

Exposure to salt industrial chemicals and sea environmental conditions results in serious Occupational Health Problems (OHPs) among the salt workers. The World Health Organization is studying OHPs of salt workers engaged in various salt industries in Tamilnadu. In India the Tamilnadu is the second largest producer of salt next to Gujarat. The salt in the state is produced from saltpans along the seacoast. Tuticorin, Ramanathapuram and Nagapattinam are the three major salt producing districts, accounting for about 85 percent of the state's salt production. An estimated 30,000 acres of land is used for salt production in the three districts, it has providing economic for large numbers of people along the coast. It is only sources of revenue to them; Salt workers working in different clusters along the seacoast are one of the most disadvantaged groups in the state (Durairaj&Murugan, 2016). This paper highlighted occupational health problems (OHPs) of salt workers, the salt work related general symptoms of OHPs to the workers are skin and eye symptoms were significantly higher among the salt workers. The production of salt workers had higher prevalence of these symptoms morbidities rather than the non-production of salt workers. The mean systolic and diastolic blood pressure among different categories was comparable.

**Keywords:** Occupational Health Problems (OHPs), Skin Disease, Eye symptoms.

### INTRODUCTION

More than two million people are involving the production of salt in Tamilnadu alone, which is an important organized and unorganized sector. This sector provides more employability rather than other works of coastal areas. The salt workers are exposed to adversities of environmental conditions as well as occupational health issues. There is a lack of awareness about their occupational health problems (OHPs). Government of India as well as Tamilnadu government has been making continuous efforts to educate about health issues of salt manufacturers, salt workers in general and small salt producers in for particularly improving the quality of salt to meet the stringent standards of industrial and edible salt, to compete in the domestic and international market and also to make it sure health safety of workers.

The salt workers have a definite mindset about the way salt is to be produced and are not willing to change it. Hence it would have to been affected their occupational health problems, they are still following primitive methods and layout of the Salt works is out dated. It is necessary to demonstrate before them to produce good quality salt with high yield per acre under different climatic conditions. SCO (Salt Commissioner's Organization) has set up Model Salt Farms (MSF) in Rajasthan, Odisha and Tamilnadu in collaboration with Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar and the concerned State Governments (Socio-Economic Status – Dec 07). These MSFs have successfully demonstrated the technicalities of

production of good quality salt with protection of human health. Therefore, it is felt that if proper training is imparted to salt workers and expose them to the modern technologies, they will be able to produce good quality salt in a cost effective manner with good occupational health conditions.

### Statement of the Problem

The OHPs to human in nature, and also we can avoided OHPs if maintaining good working environment through the technological development and proper machines handling. Comparatively the large number of salt workers exposed and facing occupational health problems like prevalence of ophthalmic symptoms, dermatological symptoms like headache, giddiness, breathlessness, muscular and joint pains.

The ophthalmic problems were most common, probably due to irritation by direct sunlight and its glare caused by salt crystals to brine as well as irritation, traumatic ulcers, dermatitis, muscular and joint pains, headache and giddiness were other more common symptoms to salt workers. There is a need for developing a mechanism for prevention of these problems to them. Hence this paper is made an attempt to access the opinion an occupational health problems among salt workers at saltpan in Tamilnadu.

### Objectives of the Study

1. To analyze the Occupational Health Problems (OHPs) of the salt workers.



2. To access the protection and safety measures of salt workers at saltpan.

### Sampling Design

The present study is based on the primary data, collected from the Tuticorin, Ramanathapuram and Nagapattinam, the study area sample method is used simple random sampling for this study. The researcher would be selected all three districts under census method. Out of the three strata, the total population is 198621. Hence researcher would be selected as a sample respondent is 598 by using Rao calculator (The Survey system) to identify the sample size at 99 percent confident level at margin of one percent, the respondents selected in order to assess their opinion towards health hazard.

### Review of Literature

D.Durairaj & S.Murugan, (2016) in this research paper they reveal that the large number of salt workers exposed to salt and facing occupational health problems like prevalence of ophthalmic symptoms, dermatological symptoms like headache, giddiness, breathlessness, muscular and joint pains. The ophthalmic problems were most common, probably due to irritation by direct sunlight and its glare caused by salt crystals to brine as well as irritation, traumatic ulcers, dermatitis, muscular and joint pains, headache and giddiness were other more common symptoms to salt workers. There is a need for developing a mechanism for prevention of these problems to them

### LIMITATIONS OF THE STUDY

During the data collection, responses on accident data, safety infrastructure from some manufacturers were not ready to offer details, at times incomplete and regular follow up also were not very effective in getting accurate details as information was closely watched over being a sensitive matter.

### Analysis and Discussion

#### *Salt Workers Opinion about OHPs- Factor Analysis*

India is one of the major producers of salt accounting for eight percent of the world's salt production. Salt is produced by solar evaporation of sea/subsoil/ inland brines. The salt industry provides employment to more than two million workers. In Tamilnadu, it is a source of livelihoods of Tuticorin, Ramanathapuram and Nagapattinam area, other than fishers.

Based on the opinion of the salt workers, the researcher has applied factor analysis. This is a non – parametric test. This test can be used to for grouping data, thereby which one is in the top health related problems affected under the fourteen occupational health problems for affecting workers. The groups were assigned and on the total scores are found out by using SPSS packages.

### Kaiser – Meyer – Olkin (KMO) and Bartlett's Test - Factor Analysis

The factor analysis is used to group the factors based on their relevant similarities. In order to access the salt workers opinion towards the OHPs, the researcher has applied principal component analysis method to group the OHPs. Principal component method of data reduction, in this method, the proportion of variance of a particular item that is due to common factor is communality.

**Table 1:** Opinion of OHPs among Salt Workers

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.898
Bartlett's Test of Sphericity	Approx. Chi-Square	2.630
	Df	72
	Sig.	.001

Table 1 show that the KMO is 0.898 which indicates that the degree of common variance among the variables is quite high, therefore factor analysis can be conducted.

Table 2 elucidates that the matrix of common factor analysis, the number of health problems extracted from the respondents is three. Factors of the ratios are grouped and closely related groups are identified. The last column in the table shows cumulative percentage. The following are the related variables identified and given common name to each group.

#### Factor I

The occupational health problems like Eye problems, (.993), Fungal infection in the feet (.974), Allergic contact dermatitis (.967), Photo-dermatitis (.944), Toxin metanosis (.928) and soon have the highest significant positive loading and the factor one is characterized as "Skin disease".

#### Factor II

The second factor includes the variables namely Poor night vision (.811), Headache (.804), Joint pains (.663) Toxin Breathlessness (.619), have the highest significant positive loading and the factor two characterized as "Head and Breathing issues".

#### Factor III

The third factor consists of the variables like illness (.805), chronic diseases (.631) fatal accidents (.843) and Low vision (.936) have the highest significant positive loading. Factor three is characterized as "Health Illness".

It is concluded that there are fourteen health related issues were identified by the researcher for collecting opinion an occupational health problems of salt workers at saltpan. Each factor is correlated with common factors.



Through the factor analysis all these factors of salt workers health issues brought under three head namely skin disease, head and breathe issue and health illness.

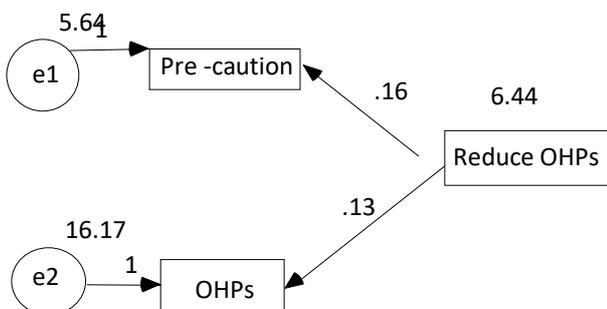
**Table 2:** Opinion of OHPs among Salt Workers

Factors	Components		Total	Per cent of Variance	Cumulative Per cent
I	Eye problems	.993	8.877	61.728	61.129
	Fungal infection in the feet	.974			
	Allergic contact dermatitis	.967			
	Photo-dermatitis	.944			
	Toxin metanosis	.928			
	Fungal infection due to moist air.	.707			
II	Poor night vision	.811	2.228	16.307	79.546
	Headache	.804			
	Joint pains	.663			
	Toxin Breathlessness	.619			
III	illness	.821	1.022	8.886	90.442
	chronic diseases	.611			
	fatal accidents	.800			
	Low vision	.621			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					

Source: Primary Data.

The SEM is a general statistical technique. This is used to analyse the relationship between the variables which have been constructed in the questionnaire. The feature of SEM is to assess the relationship among more number of independent and dependent variables.

The objective of the SEM is to test the Goodness of fit based on the Goodness of fit Index (GFI). The GFI measures the relative amount of variance and covariance in the simple covariance matrix that is jointly explained by the population covariance matrix. The GFI values range from 0 – 1, with values close to 1 being indicative of good fit.



**Figure 1:** OHPs, Pre-Caution Measures and Reduce OHP's of Salt Workers– Sem Model

**TABLE 3:** OHPs, Pre-caution Measures and Reduce OHPs of salt workers– Sem Model

Variables	Values	Significance	Result
Chi square	0.019		The model is highly fit to the analysis for this study.
P – Value	0.002	>0.05 is model fit	
GFI	1.000	> 90% model shows the goodness of analysis	
AGFI	0.999		
CFA	1.000		
RMR	0.048	Error may be <0.10 is > 10 %	
RMSEA	0.906		

Source: Primary Data.

Table 3 shows the opinion of occupational health problems of salt workers at saltpan and reduction of OHPs are constructed as variables for the SEM. The Chi-square value 0.019 is significant at 5 per cent level, which shows that the model which is constructed is fit; normally if the model has to be fit the P value should be less than 5 percent. The Goodness of Fit Index (GFI) 1.000 per cent indicates that the model is good for analysis.

The Confirmatory Factor Analysis (CFA) 1.000 indicates that the model is highly fit and shows goodness. The Root Mean Square of Residual (RMR) 0.048 shows that error value is smaller which less than 10 per cent is and

Root Mean Square Error of Approximation (RMSEA) 0.906 indicates that it lie between the confidence interval of less than 0.06 to 0.08.

The salt production in Tuticorin, Ramanathapuram and Nagapattinam is by the traditional method of evaporation of brine (water with high concentration of salt) filled in the salt pans. The working condition of workers is not modern equipments being used for production. In connection that the salt production, meanwhile the salt workers are involving production they are affected various occupational health related issues.

## RECOMMENDATIONS

- Government as well as producers has to create more awareness amongst the workers of the salt industry regarding different hazards of the work place and action required to be taken for safe working.
- The training needs of the workers in connection with safety management should be reviewed at regular intervals and accordingly the training inputs must be given in a planned and phased manner.
- There has been no scientific study on incidence of occupational diseases in the Indian Salt Industry.
- Both central and state governments are ready to give training to salt workers to inculcate modern salt technology amongst salt producers who are hitherto producing salt with the ancient methods sure make use of it for their better meant.
- Adoption of modern technology would lead to improvement in terms of quality and quantity of salt with safest manner.
- WHO (World Health Organization) come forward and recommended to salt producer to offer safety instruments.
- Medical health surveillance must be adopted by the salt manufacturing units some periodic interval. The medical check must be carried out at the time of induction of worker and at regular intervals.

## CONCLUSION

Working environmental conditions of salt industry exposes the workers to direct contact with inhalable salt dust; salt crystals give direct impact on brine, physical stress, direct bright sunlight and glare due to sunlight reflected by salt crystals and brine surface. However, the extreme weather and hard labour conditions in the salt workers cause lot of health issues among the salt workers. There must be need for modernization and well trained mechanization of salt works and use of personal protective equipments to overcome

occupational health problem (OHPs) of salt workers. In this research study concluded that prevalence of hypertension in salt workers was not found to be different from a similar group of workers not occupationally exposed to salt. Hence this study highlights the need for developing provision for prevention of occupational health problems in workers engaged in salt production of these three districts.

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