

Original Research Article

Health profile of workers in an industrial area of Thrissur district: a cross-sectional study

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ABSTRACT

Background: Rapid unplanned industrialization is creating serious problems for the human environment. Worse and directly affected in this process are the industrial workers. The purpose of the study is to assess the health profile of workers in an Industrial area of Thrissur district and to compare the morbidity profile of industrial workers from native Kerala and migrants.

Methods: A cross-sectional study was conducted in the industrial area of Thrissur district for a period of six months. Cluster sampling was done. Among the total industries in the industrial area of Thrissur, one industry was selected using the lottery method. All the workers in that industry were included in the study. After establishing a rapport, data was collected using a semi-structured interview schedule from the participant using questionnaires.

Results: Among 246 workers interviewed, 79.3% were males. 43.9% of participants were from Kerala, 37.4% Orissa, 10.4% Bihar and the rest from other states of India. 30.9% of participants were obese, 17.9% overweight and 8.5% underweight. Other morbidities were refractory error (46.7%) and hypertension (30.5%). Overweight and obesity were significantly more among workers from native Kerala compared to migrants ($p=0.001$). History of injuries was reported by 10.6% of workers.

Conclusions: The high proportion of obesity and hypertension detected among workers was alarming. Interventions at various levels (host, vector, and environment) are likely to produce a lasting impact on industrial worker's health.

Keywords: Industrial worker, Migrant, Health profile

INTRODUCTION

Industrialization is considered as the important tires of economic development in any part of the world. However, rapid unplanned industrialization and urbanization without environment and social impact assessment is creating very serious problems for the human environment.¹ Worst and directly affected during this process are the industrial workers, who are exposed directly to the physical, physiological and social environment of the industry.²

A healthy worker is a key factor for the maintainable economic growth of an industry. They contribute truly to the wealth of the industries. The speedy introduction of

new industries, poor and insecure working conditions, and the creation of new tools for increasing mass production and other processes brought about serious threat to the health of workers which were not expected.³⁻⁶ Such problems can seriously affect the productivity and life span of workers. Environmental and social health problems include increases in migration of both unskilled and skilled workers from rural to urban centres leading to overcrowding and environmental pollution.^{7,8} Besides the migration results in delinquent behaviour such as abuse of alcohol and drugs, robbery, prostitution, and psychological problems among industrial workers.⁹ These outcomes lead to anxiety, depression stress, and their implications.¹⁰

Kerala, a state of southern India is witnessing a huge inflow of migrant workers from different parts of India especially the recent years.¹¹ Kerala has now become a lucrative job market for semiskilled and unskilled workers hailing from various parts of India.¹²⁻¹⁴ Though the exact figure is unavailable, the rough estimates assess it between 23 lakhs in 2014.¹⁵ These workers face various health problems and occupational hazards which may be different from native industrial workers.^{16,17}

So it is necessary to assess the health profile of workers in industry and to compare the morbidity profile of industrial workers from native Kerala and migrants.

METHODS

A cross-sectional study was conducted in the industrial area of Thrissur district. The study period was six months from August 2019 to January 2019. Cluster sampling was done. Each industry in the area was considered as one cluster. Among the total industries in the industrial area of Thrissur, one industry was selected using the lottery method. All the workers in that industry were included in the study.

The sample size was calculated using the formula:

$$n = Z\alpha^2pq/d^2$$

Where prevalence was 59% (prevalence of respiratory morbidity among industrial workers) and allowable error, taken as 15%.³ Sample size obtained was 246. After establishing a rapport with the participants, data were collected using a semi-structured interview schedule from the participant using questionnaires. Anthropometric measurements height and weight were measured using the standard methods prescribed in the World Health Organization (WHO)- STEPwise approach to surveillance (STEPS) field manual.¹⁸ Height was measured using a stadiometer (portable height-length measuring board). Weight was measured using a portable bathroom scale weighing machine. Body mass index (BMI) was calculated and then classified as per WHO guidelines. For measurement of blood pressure, Korotkoff phase I and V sounds were taken as systolic and diastolic blood pressure respectively for mercury sphygmomanometer. Hypertension was defined as systolic blood pressure is equal to or above 140 mmHg and/or a diastolic blood pressure equal to or more than 90mmHg. Screening for communicable diseases like malaria, filariasis, and human immunodeficiency virus (HIV) was done in the participants using peripheral smear, diethylcarbamazine (DEC) provocation test, and rapid kit test respectively.

Data was entered into excel sheets and analyzed using statistical package for the social sciences (SPSS) software version 20. The qualitative data were expressed in proportions and the quantitative data was expressed in means and standard deviation.

Data was obtained after taking informed consent from participants. Institutional ethical committee approval was obtained. Information obtained was used for the study and strict confidentiality was maintained throughout.

RESULTS

Among 246 workers interviewed, 79.3% were males. 43.9% of participants were from Kerala, 37.4% Orissa, 10.4% Bihar and the rest from other states of India. Details of age distribution and duration of employment are given in Table 1.

Table 1: Socio-demographic distribution of industrial workers.

Socio-demographic factors	Frequency (%)
Age distribution (years)	
≤20	21 (8.5)
21-30	95 (38.6)
31-40	77 (31.3)
41-50	43 (17.5)
51-60	10 (4.1)
Gender distribution	
Male	195 (79.3)
Female	51 (20.7)
Native state	
Kerala	108 (43.9)
Orissa	92 (37.4)
Bihar	25 (10.2)
Uttar Pradesh	18 (7.3)
Others	3 (1.2)
Duration of employment (years)	
<1	34 (13.8)
1-5	93 (37.8)
6-10	62 (25.2)
11-15	31 (12.6)
>15	26 (10.6)

Health profile is described as general findings, nutritional status, acute and chronic morbidity. Profile of risk behaviours was also assessed.

The general physical examination of the workers revealed that 6.10% of workers were pale and 15.7% had discoloration of the skin. Dental caries and tobacco staining were present in 14.6% and 12.6% of the industrial workers respectively. Among the workers, 46.7% had a refractory error of eyes (Figure 1).

Among the workers only 35.8% were having normal nutritional status. 32.1% of workers were obese (95% CI - 26.3, 38.3), 24% overweight and 8.1% underweight (Figure 2).

Non-communicable diseases reported in the study population were hypertension and diabetes mellitus. Of the

participants, 30.5% had hypertension (95% CI-24.8, 36.7) and only 4 (1.6% 95% CI 0.45-4.1) had reported diabetes.

Screening for communicable diseases like hepatitis E, malaria, filariasis, and HIV was done in the participants. Among the participants, 15 (6.1%) had communicable diseases. None had malaria and HIV infection. Hepatitis E was found in 12 (4.9%, 95% CI-2.5, 8.4) participants. One migrant worker from Bihar had filariasis infection. Five persons (2%) reported taking anti-tuberculosis medication.

History of injuries during their working time was reported by 26 (10.6%). None of the workers had received a pre-placement examination. 75.2% of workers had received a periodic yearly medical examination. But 19.9% of workers had not undergone even a single medical examination. Among the workers, 84.1% were using masks, 57.7% gloves, 10.6% boots, and 48.8% caps as personal protective equipment regularly. The vaccination status of the workers is given in Table 2. None had been immunized against hepatitis B or diphtheria.

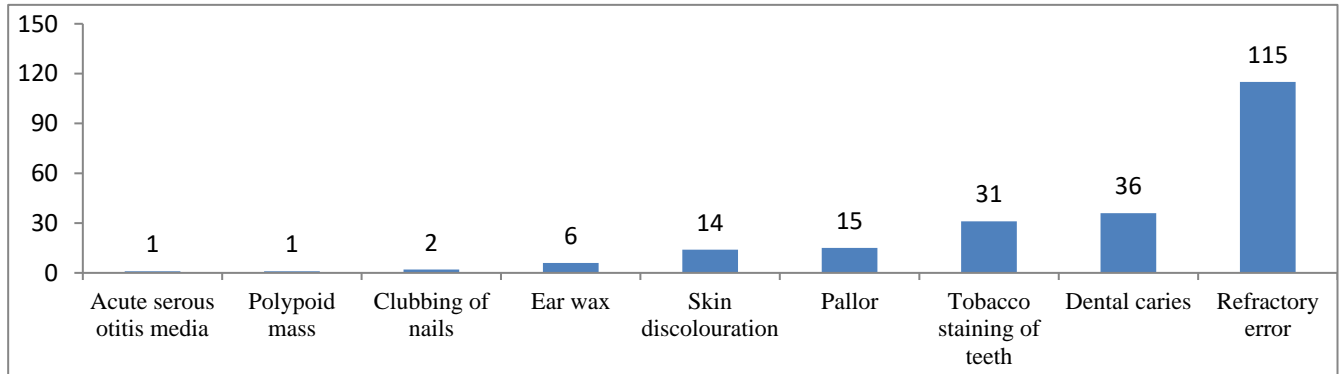


Figure 1: General physical examination of industrial workers.

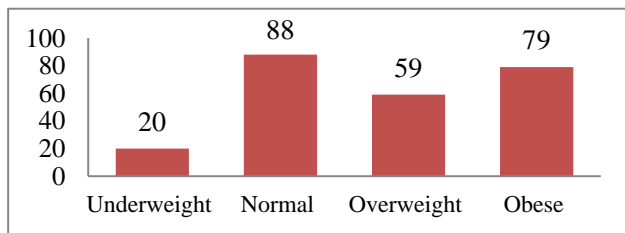


Figure 2: Nutritional status among industrial workers.

Table 2: Immunization status of industrial workers.

Immunization status	Number (n=246)	Percentage (%)
Tetanus	90	36.6
Typhoid	2	0.8
Hepatitis A	2	0.8
Not immunized	156	63.4

The risk behaviours like tobacco use and alcohol consumption are prevalent in the group. Alcohol or tobacco product usage was seen among 32.9% of the workers. Alcohol consumption (22.4%) was most common among them. The mean duration of alcohol consumption was 7.66±1.01 years. The pattern of tobacco usage showed that 49 (19.92%) of workers were chewing tobacco products while smoking was seen only in 19 (7.70%) of the workers.

The major findings in comparing the health profile of native and migrant workers are given in Table 3. The majority of migrant workers were males and were younger in an age when compared to native workers (p<0.001). Overweight and obesity were significantly more among workers from native Kerala compared to migrants (p=0.001). Tetanus immunization coverage was low among migrants (p=0.001). Workplace injury was more for migrants but was not statistically significant.

Table 3: Comparison between native and migrant industrial workers.

Factors	Industrial workers		Chi square and p value
	Kerala, n=108	Migrants, n=138	
Gender			
Male	58 (29.7)	137 (70.3)	$\chi^2=76.6$ p<0.001
Female	50 (98)	1 (2)	
Age group (years)			
18-35	50 (32.1)	106 (67.8)	$\chi^2=24.3$ p<0.001
36-60	58 (64.4)	32 (35.6)	
Duration of employment (years)			
<1	10 (29.4)	24 (70.6)	

Continued.

Factors	Industrial workers		Chi square and p value
	Kerala, n=108	Migrants, n=138	
1-5	41 (44.1)	52 (55.9)	$\chi^2=18$ p=0.001
6-10	40 (64.5)	22 (35.5)	
11-15	10 (32.3)	21 (67.7)	
>15	7 (26.9)	19 (73.1)	
Periodic medical examination			
Yes	85 (45.9)	100 (54.1)	$\chi^2= 1.26$ p=0.26
No	23 (37.7)	38 (62.3)	
Immunization			
Tetanus	59 (65.6)	31 (34.4)	$\chi^2=27, p=0.001$
Typhoid	1 (50)	1 (50)	
Hepatitis A	2 (100)	0	p=0.19
Not immunized	49 (31.4)	107 (68.6)	$\chi^2=27, p=0.001$
BMI classification			
Underweight	9 (45.0)	11 (55.0)	$\chi^2=16.11$ p=0.001
Normal	24 (27.3)	64 (72.7)	
Overweight	33 (55.9)	26 (44.1)	
Obese	42 (53.2)	37 (46.8)	
Hypertension			
Yes	30 (28)	43 (31)	$\chi^2=0.3,$ p=0.5
No	78 (45)	95 (55)	
Refractory error			
Yes	61 (53)	54 (47)	$\chi^2=7.3$ p=0.007
No	47 (36)	84 (64)	
Work place injury			
Yes	7 (27)	19 (73)	$\chi^2=3.4,$ p=0.06
No	101 (46)	119 (54)	

DISCUSSION

Workers represent around half the world's population and are the major contributors to social and economic development. Occupational hazards make an important contribution to the global burden of disease. Industrial worker's health is determined not only by workplace accidents but also by social and environmental factors and access to healthcare services.

Among the study participants, 51.6% of the workers had been working in the food industries for duration of fewer than 5 years and 10.6% were working for more than 15 years. This finding was not in corroboration with the studies conducted by Somarouthu et al which showed 76.3% of the workers had worked in the mines for the duration between 1–5 years and 1.2% were working more than 15 years.¹⁹

The general physical examination of the workers revealed that 64.2% were malnourished, of which 8.1% underweight, 24% overweight, and 32.1% obese. Obesity was significantly higher in native workers then compared to migrant workers. It could be due to reluctance on the part of Kerala workers to do unskilled and hard physical work. Another confounding factor was the age difference between the two groups, native Kerala workers were older than migrant workers and the age difference was

statistically significant. The proportion of obesity in the present study was much higher than the study conducted by Somarouthu et al (5.5% of workers were obese).¹⁹

The refractory error of eyes was found in 46.7% of the workers in the present study. This finding is very high when compared to studies done by Pratik et al which showed ophthalmic problems were present in 8.97% of workers.²⁰ In the study from Uttar Pradesh, 10% of workers had the same.²¹ The higher occurrence of the refractory error in the present study may be attributed to poor working conditions, which requires further investigation. It indicates the need for vision screening during the pre-placement and periodic medical examination.²² Native Kerala workers were older than migrant workers that could be the cause of higher refractory error among them.

Communicable diseases found among the workers in this study were hepatitis E, tuberculosis and filariasis. The burden of tuberculosis was lesser than study conducted in Uttar Pradesh (5%).²¹ Hepatitis E is transmitted principally via contaminated drinking water. Hepatitis E outbreaks can be prevented among industrial workers by maintaining quality standards for drinking water supplies and by establishing proper disposal of human faeces.

This study showed the prevalence of hypertension as 30.5% and there was no significant difference between native and migrant workers. The overall prevalence was found to be higher when compared to other studies conducted.^{19,23} The higher prevalence of hypertension in the present study can be attributed to the higher epidemiological transition ratio of Kerala and the stress associated with the work.

The commonly used as personal protective equipment were boots, helmet, mask, and goggles in food industries.²⁴ In the study population 84.1% were using masks, 57.7% gloves, 10.6% boots, and 48.8% helmets regularly during work hours. These findings were higher when compared to a study conducted by Pandit et al where 25%, 16%, 10%, 2%, and 10% of steel industry workers used eye shields, gloves, boots, helmets, and boots respectively.²⁵

In the study conducted 10.6% of workers reported injuries majority of which weren't notified based on the minor nature of the injury. These observations were lower when compared to the studies conducted by Pratik et al were 53% of workers reported injuries.²⁰ Nearly one-fifth of respondents in Athena et al study had experienced an occupational injury in their lifetime.¹⁰ These observations may be due to increased use of personal protective equipment among study participants. The workplace injuries were more among migrants than native Keralites.

In the current study even though none of the workers had received a pre-placement examination, 75.2% of workers had received a periodic yearly medical examination. This finding is higher when compared to a study conducted by Giri et al in which 36.4% of the workers undergone periodic examination.

The study had limitation in the form that, fasting blood glucose could not be done among the workers, only reported cases were taken in the present study. Detailed ophthalmic examination could not be done.

CONCLUSION

In this study population, the variety of morbidities detected among industrial workers especially the high proportion of overweight, obesity, hypertension, and refractory error is alarming. Overweight and obesity were more among workers from Kerala. Immunization coverage was low, especially among migrants. The importance of detailed pre-placement medical examination is to be reinforced to industrial authorities. Water borne infections and other communicable diseases are to be detected at earlier period among the workers to prevent occurrence of outbreaks. Occupational injuries were more among migrant workers. Environmental interventions include improving healthy options in the cafeteria, implementing occupational health programmes, and applying principles of ergonomics in working environment. Education of the workers about lifestyle diseases and their prevention is needed as higher prevalence of NCD and their risk behaviours were high in

the present study. Workers should use adequate personal protective equipment only as the last line of protection.

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