Burden of Occupational Health Problems and Cardiovascular Risk Factors in a Selected Industrial Population in South India: Should We be Concerned

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ABSTRACT

Introduction: Indian industrial workers had reported a high prevalence of risk factors and morbidity due to non-communicable diseases (NCD). In the past few decades, the nature of work in many organizations has been radically transformed due to growth in the use of information technology, and this has introduced a range of work related morbidity in their daily life. **Objective:** This study aims at profiling the risk factors of non-communicable diseases and the work related morbidity in an industrial setting in Puducherry, targeting Information Technology sector. **Methods:** Cross- sectional study was done among the employees of an industry under the Information technology sector (n=907). Survey of behavioural risk factors using structured questionnaires, work related morbidity and anthropometric measurements were done for the study population. **Results:** Mean age of the study population was 27.8 + 5.5 years. Stress and back ache was reported by almost half of the respondents. Baseline risk assessment showed that around 40% of the employees were obese and 21% were hypertensive. High levels of risk factors and morbidity as in other studies among industrial population was noted in this study. **Conclusion:** The study indicates high levels of behavioral risk factors and high prevalence of obesity and hypertension in a young working population. Work related morbidity like backache and stress is also high in this industrial sector. The long-term follow-up in such settings will provide an opportunity to design interventions targeting physical and psychosocial environment and health promotion in order to control the outcomes of non communicable diseases.

Key words: Cardiovascular risk factors, Industrial population, Occupational Health, Surveillance, Work related morbidity.

INTRODUCTION

Changes in diet and lifestyle that have occurred with industrialization, urbanization, economic development and market globalization, have accelerated over the past decade. These have had a significant impact on the health and nutritional status of populations, particularly in developing countries, like India.[1] Indian industrial workers had reported a high prevalence of risk factors and morbidity due to non-communicable diseases (NCD).[2]

In the past few decades, the nature of work in many organizations has been radically transformed due to growth in the use of information technology (IT). IT professionals are at increased risk of developing occupational health problems. A new genre of occupational health problems has set in recent years among this class of workers - cardiovascular risk factors and computer related health problems. There has been less attention paid to the health and needs of the employees in various sectors of the Indian industries.[3] Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations. Apart from lowering the quality of workers' life and reducing the productivity, WMSDs are the most expensive form of work disability, attributing to about 40% of all costs toward the treatment of work-related injuries.[4]

The workplace is increasingly being used as a setting for health promotion and preventive health activities; not only to prevent occupational injury, but to assess and improve people's overall health.[3] There is an empirical need to establish the burden

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of NCD risk factors in this group of population through surveillance and to take preventive and control measures to impart health education. Very few studies on NCD risk factors are available in the industrial setting in South India.

But while targeting young population for health promotion, the immediate health issues and stressors they face are work related morbidity. Health promotion measures that target both behavior change towards NCD and immediate problems faced by the study population are expected to yield better results. Hence this study aims at profiling the risk factors of non-communicable diseases and work related morbidity in an industrial setting in Puducherry.

METHODS

Study setting

Puducherry has made rapid industrial progress in the past few decades with 7553 industries representing a cross section of industries in seven well established industrial estates with comprehensive infrastructure facilities. A number of hardware and software companies function in this region. The oldest and largest of these firms was approached for purposes of this study and official permissions were obtained.

Study design

A cross-sectional study was carried out in a company working for information technology sector in Puducherry. A total of 1012 members are employed in this company in four shifts.

Data collection

All employees in the company were included in the study population. They were explained the purpose of the study and informed consent was obtained. Baseline evaluation of employees was done by a self-administered questionnaire to collect socio-demographic variables and details related to the type and nature of the job. Risk factor profile was done using NCD work LITE proforma (developed by PGIMER, Chandigarh).[3] This was followed by anthropometric measurements like height, weight, body mass index (BMI) and blood pressure recording.

BMI more than 23 and 25 kg/ m^2 was categorized as overweight and Obesity respectively (Asian Indians).[5] Psychosocial stress in this study was defined as presence of a state of mental or emotional strain or tension resulting from adverse or demanding circumstances both at workplace and home.

The study was approved by the Institute Scientific and Ethics Review board. Study subjects were included after obtaining informed consent. Measures were taken to ensure confidentiality of the data collected.

Statistical analysis

Data was collected and analysed using SPSS version 20. Data are presented in means, SD and proportions. Chi square test was used to compare proportions between the groups.

Table 1: Socio-demographic characteristics of the study population (n=907)

Characteristics		N	%
Gender	Male	460	50.7
	Female	447	49.3
Marital status	Married	372	41.0
	Unmarried	535	59.0
No of children	Nil	644	71.0
	1	182	20.1
	2	76	8.4
	>2	5	0.5
Education	Matric	2	0.2
	Higher Secondary	5	0.6
	Graduate	605	66.7
	Postgraduate or above	295	32.5
Type of occupation	Professional	695	76.6
	Skilled	182	20.1
	Semi-skilled	21	2.3
	Unskilled	9	1.0
Religion	Christian	90	9.9
	Hindu	783	86.3
	Muslim	26	2.9
	Others	8	0.9

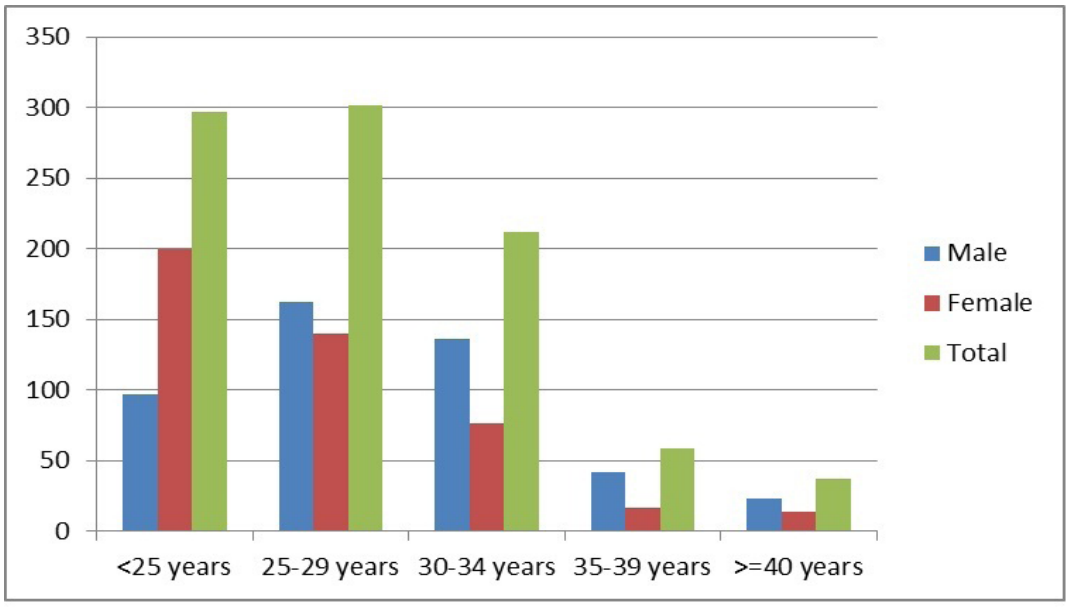

Figure 1: Age and gender distribution of the study population (n=907)

RESULTS

A total of 907 employees participated in the baseline assessment with a response rate of 92%. Basic socio-demographic profile of the participants is given in table 1. Mean age of the participants was 27.8 ± 5.5 years with 51% being males. One third of the respondents belonged to 25-29 years of age followed by another third belonging to less than 25 years (Figure 1). Around 40% were married and almost all of them were educated upto graduation (>99%).

Smoking was common among 6.8% compared to smokeless tobacco (1.3%) in this population. Alcohol consumption was more prevalent among men, with around 20% reported to be current users of alcohol.

Figure 2 shows the prevalence of major risk factors of diet, physical activity, stress, body weight and blood pressure in the study population. The proportion of subjects who never consumed fruits (in the last week) was around 16%. Frequency of consumption of fruits on 1-2 days a week was noted to be the highest in 60% individuals, while consumption of fast food intake on more than 3 days a week was observed in 20.8%. Around 17% were overweight, 40% were obese (BMI>25 kg/m^2), while one third of them were in the normal weight category. Stress, both at workplace and home, was perceived as a major factor in 48% of the subjects.

Hypertension was prevalent in 21% of study participants, as measured during the study; while prevalence of self reported Diabetes and Hypertension was 4.0% and 4.7% respectively. Mean Systolic and diastolic blood pressure among the study population was 125.6±14.3 mm Hg and 79.2 ± 8.7 mm Hg. Mean BMI was 23.8 ± 4.6 kg/m^2 among the study subjects. In addition, frequency of consumption of vegetables on 3-5 days a week was noted to be the highest in 40% individuals and high salt intake was perceived among 2.1% subjects. Physical activity profile of the employees showed around 75% under sedentary nature of work. Around 28% use either cycling/walking to work as mode of transport, while the rest were using some form of motorized transport. Around 30% subjects use the lift upto 3 to 5 times in a day. One fifth of the subjects responded that they use only stairs for climbing upstairs, while around 35% used stairs for climbing downstairs.

Gender wise distribution of risk factors in terms of diet, physical activity, stress, body weight and blood pressure among the study population is shown in Table 2. Prevalence of risk factors like low consumption of fruits, high levels of sedentary activity and high levels of stress were comparable among both the genders in the study population. However there was a significantly higher prevalence of obesity (48% in males vs 31% in females), three times higher prevalence of hypertension (31% in males vs 10% in females) and higher consumption of fast foods (11.7% in males vs 7.2% in females).

On analyzing the self reported morbidity profile, prevalence of known hypertensive's was very low when compared to measurement of blood pressure. Chronic backache was another common complaint in half of the subjects (Figure 3). Backache was significantly higher among women (54% in females compared to 43%, p=0.002).

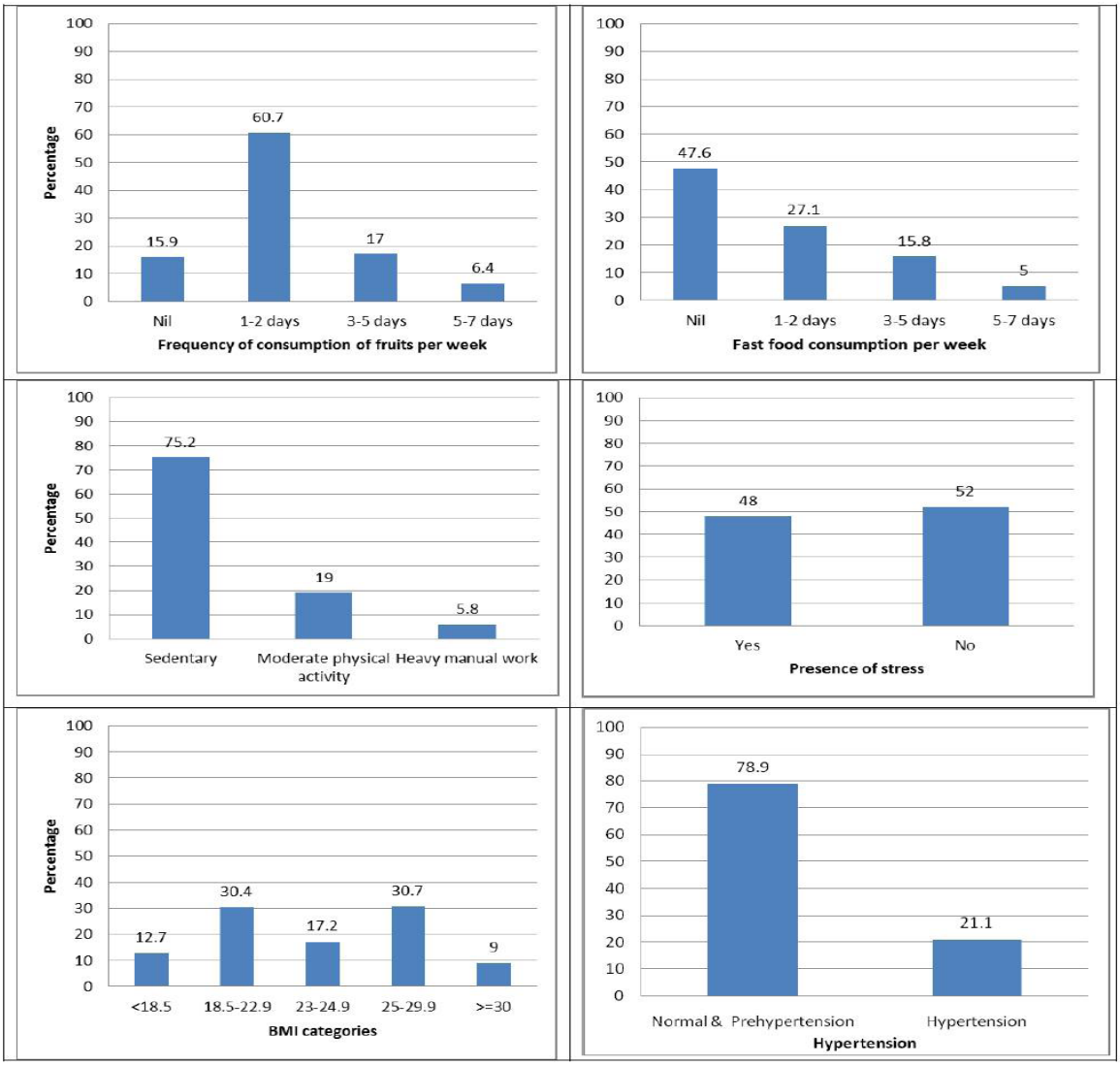

Figure 2: Cardiovascular risk factors in the study population a) Consumptions of fruits, b) Fast food consumption c) Physical activity profile d) Stress e) Body weight and f) Blood pressure (n=907)

DISCUSSION

High levels of risk factors and morbidity among young industrial population in IT sector was noted in this study. Three fourths consume fruits in less than 3 days a week, one fifth consume fast food on more than 3 days a week, around 40% were obese, half of them reported Stress, both at workplace and home, while Hypertension was prevalent in 21% of study participants.

Baseline risk assessment showed that around 57% of the employees were overweight or obese during the baseline survey. In comparison, prevalence of Obesity (BMI ≥ 25) in urban Tamilnadu is 32% according to the surveys done in the state by the Integrated Diseases Surveillance Project (IDSP).[6] Prevalence of hypertension is comparable with urban Tamil Nadu (21% in the community).[4] This is of serious concern as the mean age of the population is less than 30 years. Sedentary nature of the work was observed in 75%, as evident from the type of computer related job functions. The level of physical inactivity is higher in comparison with other study done in North India[3] and also in comparison with general population (IDSP risk factor survey).[5] However levels of tobacco consumption are lower when compared to surveys in general population.

Though prevalence of risk factors like low consumption of fruits, high levels of sedentary activity and high levels of stress were comparable among both the genders in the study population, there was a significantly higher prevalence of obesity, hypertension and consumption of fast foods in males compared to females. This needs to be addressed during workplace based health promotion programs.

Table 2: Gender wise distribution of cardiovascular risk factors among the study population (n=907)

Risk factor	Overall (n=907)	Male (n=460)	Female (n=447)	p value*
Frequency of consumption of fruits per week				
< 3 days a week	695 (76.6)	350 (76.1)	345 (77.2)	0.697
>=3 days a week	212 (23.4)	110 (23.9)	102 (22.8)	
Frequency of consumption of fast food per week				
< 3 days a week	821 (90.5)	406 (88.3)	415 (92.8)	0.019
>=3 days a week	86 (9.5)	54 (11.7)	32 (7.2)	
Nature of Work				
Sedentary (Sitting)	682 (75.2)	357 (77.6)	325 (72.7)	0.200
Moderate physical activity	172 (19)	77 (16.7)	95 (21.3)	
Heavy manual work	53 (5.8)	26 (5.7)	27 (6)	
BMI Categories				
<25 kg/m^2	547 (60.3)	240 (52.2)	307 (68.7)	<0.001
>=25 kg/m^2 (Obese)	360 (39.7)	220 (47.8)	140 (31.3)	
Presence of Hypertension				
Yes	716 (78.9)	315 (68.5)	401 (89.7)	<0.001
No	191 (21.1)	145 (31.5)	46 (10.3)	
Psychosocial stress				
Yes	435 (48)	218 (47.4)	217 (48.5)	0.728
No	472 (52)	242 (52.6)	230 (51.5)	

*p value as compared between male and female.

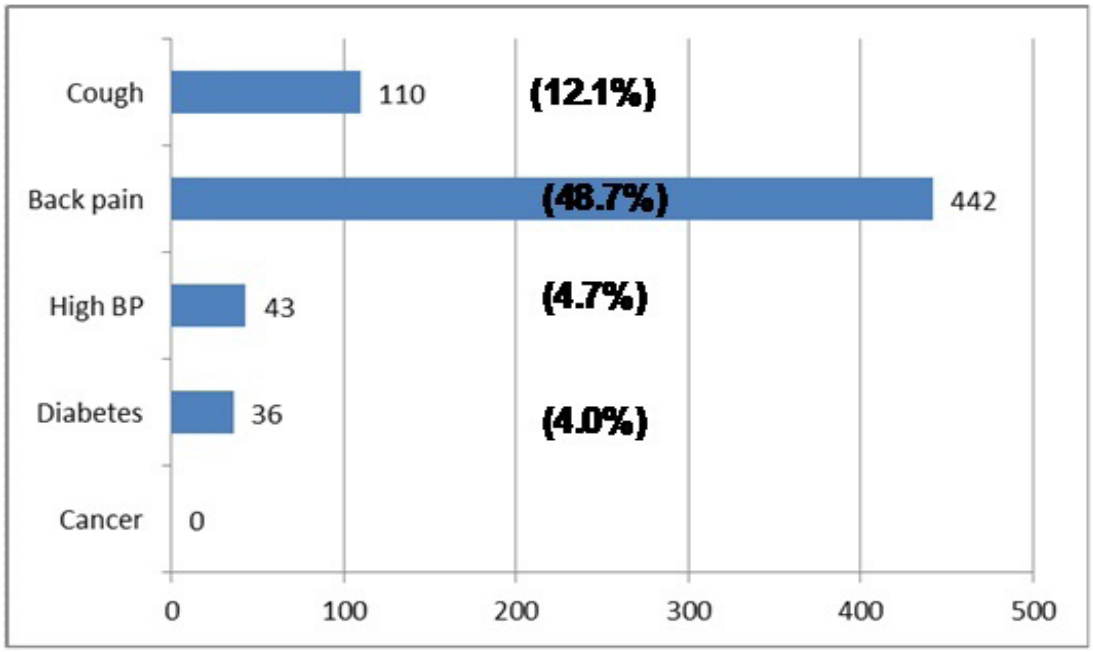

Figure 3: Self-reported morbidity profile of the employees (n=907)

GENDER DIFFERENCES

A study in ten Indian industrial settings among the employees and their family members has shown overall prevalence of most NCD risk factors was high, with 50.9% of men and 51.9% of women being overweight, central obesity (30%) and current tobacco use (40.2%). Self reported prevalence of Diabetes (10.1%) and hypertension (27.7%) was reported when measured clinically and biochemically.[2] Another study done among all employees aged 20-59 years of a large industry near Delhi (n=2935) demonstrated high prevalence of CVD and its risk factors against a background of poor awareness and control among a comparatively young male population in a north Indian industrial setting.[6]

A study by Confederation of Indian Industry (CII) revealed that the 11.6% employees had habits (smoking, consuming alcohol and an addiction to other tobacco products) for more than 5 years. 37% people indulging in all three addictions are proven diabetics, 66% had reported heart problems, 74% had high blood pressure, 48% had COPD, 53% cancer and 47% had shown symptoms of gastroenteritis, insomnia and a range of other disease. About two third (63%) of people at sedentary jobs are more stressed and the level of stress is apparently more for respondents working in the services sector (Information and Technology). About 46% of the respondents in the service sector with stress had diabetics, 39% heart problems, 49% had a history of high blood pressure and 31% showed symptoms of COPD.[3]

High levels of risk factors in industrial populations have also been reported in other studies in India. In a study done in Chennai, to assess the risk of cardiovascular disease in an industrial population age-adjusted prevalence of major risk factors were as follows: diabetes 11.9%; hypertension 25.4%; dyslipidaemia 40.2%; hypertriglyceridaemia 28.3%; overweight (BMI > 23 kg/m2) 60.2%; metabolic syndrome 34.1%; use of tobacco (22.9% of men) and sedentary lifestyle (79%).[9] Another study done in Chennai among 2262 males indicated high prevalence of behavioural risk factors, central obesity, hypertension and diabetes - current smokers 20.2%, BMI > 23 kg/m2 was 66.8%, central obesity 70.2%, hypertension 27.2%, diabetes mellitus 16.3% and total cholesterol > 200mg/dl in 30.3% subjects.[8]

Work related morbidity like backache is also high in this industrial sector. Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations. Apart from lowering the quality of workers' life and reducing the productivity, WMSDs are the most expensive form of work disability, attributing to about 40% of all costs toward the treatment of work-related injuries.[4]

The Strategy on Occupational Health for All, endorsed by the World Health Assembly of 1995, emphasized the importance of primary prevention and encouraged countries to establish national policies and programs for occupational health, with guidance and support from WHO and ILO. This was followed by the Global Plan of Action on Workers Health (2008-2017) with the objectives of devising and implementing policy instruments on workers' health, protecting and promoting health at the workplace, improving access to occupational health services, providing evidence for action and practice and incorporating workers' health into other policies.[11]

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Successful interventions must target underlying workplace and organizational factors for individual employees including physical and psychosocial work environment and health promotion, in order to prevent the consequences of NCDs and ill health in this young working group.

This study was the first step in establishing the prevalence of risk factors in a young industrial population. As this study primarily aims at cardiovascular risk factors, other NCDs like cancers and chronic diseases were not included in this study. Moreover the risk factors for chronic kidney diseases and cancers are either related to these common risk factors (like hypertension, diabetes) or belong to a wide range of systems (reproductive system, respiratory system, etc.). Abdominal obesity was not captured as this was perceived to be operationally difficult in a work setting by the management.

CONCLUSION

The study indicates high levels of behavioral risk factors and high prevalence of obesity and hypertension in a young working population. The long-term follow-up in such occupational settings will provide an opportunity to design interventions targetting physical and psychosocial environment and health promotion in order to control the outcomes of non communicable diseases.

ABBREVIATION

Occupational Health Problems and CVD risk factor distribution in an Industrial population of South India.

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