

Morbidity Profile and Associated Risk Factors among Construction Workers in an Urban Area of Kancheepuram District, Tamil Nadu, India

P MOHANKUMAR¹, S GOPALAKRISHNAN², M MUTHULAKSHMI³

ABSTRACT

Introduction: The construction industry is one of the world's major industries. Construction industries are an unorganised sector involving huge number of skilled and semi-skilled work force. Construction workers are at a greater risk of developing certain health disorders and sickness due to their poor working conditions and living environment.

Aim: To determine the morbidity profile and to identify the association between risk factors and morbidities among the construction workers in an urban area of Kancheepuram District, Tamil Nadu, India.

Materials and Methods: This was a cross-sectional descriptive study carried out in the urban area in Kancheepuram district. Using probability proportional to size and simple random sampling method, 312 construction workers were identified. The data were collected using a pretested structured questionnaire followed by clinical examination. Data was analysed using SPSS

version 21 software and presented as descriptive and analytical statistics.

Results: It was observed that, 80.1% of the workers had at least one health related morbidity problem at the time of the study. It was identified that musculoskeletal problem (71.5%) was the major cause of morbidities. This was followed by skin problems (59.3%), eye problems (53.3%), abdominal problems (52%), respiratory problems (51.7%) and external injuries (44.3%). There was a strong statistical association between the presence of morbidity and the presence of smoking, alcohol consumption, and use of other forms of tobacco, type/nature of work, marital status and type of diet they consumed.

Conclusion: There is a need to create awareness among the workers about their health and environmental safety issues at work place. Provision of health insurance coverage and health screening services should also be made available to help them lead a socially and economically productive life.

Keywords: Health problems, Occupational health, Unorganised sector

INTRODUCTION

An occupation is a regular activity performed for wage or salary, profit or family gain, to fulfil their requirements and to lead a financially secured life. Occupational health is concerned with health of the workers in its relation to work and working environment [1]. Based on the employment conditions, occupation has been classified into organised and unorganised sector. The organised sector is one that is incorporated with the appropriate authority or government and follows rules and regulations. On the contrary, the unorganised sector consists of small and scattered units which are not under the control of the government. It is characterised by low wages and insecure jobs [2].

Unorganised sectors consist of agricultural labourers, contract labourers, construction workers, home based workers enrolled in activities such as beedi rolling, agarbatti making, pappad making, tailoring, and embroidery work [3]. In India, the unorganised sector contributes two-third to the Net Domestic Product [4]. Construction workers form the second largest unorganised sector after agriculture workers [5].

There are two broad categories of construction works namely, building engineering sector and civil engineering sector. Building engineering applies to works involving structures such as houses, offices, shops, factories and schools. Civil engineering applies to all the other built structures like roads, tunnels, canals, dams, railways, and docks [5].

Presently the global workforce is about 2600 million, with 75% of the people working in the developing countries. The total labour force in India is estimated to be 317 million, where 8.5% of the employees belong to the organized sector, while 91.5% of the employees belong to the unorganised sectors. Construction industry in India

always remains as a highly labour-intensive industry. It often employs relatively inexpensive technologies due to financial constraints [6]. This industry thus generates a demand for both skilled and semi-skilled labour force [7].

Construction workers are exposed to a wide variety of health hazards at work. The exposure differs from one occupation to another [8]. As the construction activities go on throughout the year, the workers are exposed to multiple physical, chemical and biological agents and multifactorial causes which make them vulnerable to various health problems that include musculoskeletal disorders, dermatitis, injuries, respiratory problems, and gastrointestinal diseases etc., [5,9].

Based on this background, this study was planned to determine the morbidity profile of construction workers in an urban area of Kancheepuram District, Tamil Nadu and to identify the association between socio-demographic risk factors and morbidities identified among them.

Another study to identify the prevalence and determinants of external injuries among the workers was also carried out in the same study population previously by authors [10].

MATERIALS AND METHODS

This was a community based cross-sectional descriptive study carried out in an industrial belt, in and around Ankaputhur and Pammal Municipality of Kancheepuram District, during the period August 2016 to January 2017.

The sample size for the study was calculated based on the highest morbidity status in a previous study done by Adsul BB et al., where 23.11% of the construction workers were found to be suffering

from fever [4]. This prevalence rate of fever was taken as reference value and using the formula $4PQ/D^2$, the sample size was calculated with an absolute precision of 5%. Adding 10% as refusal rate, the sample size was calculated to be 312.

Inclusion and Exclusion Criteria: All workers, above the age of 18 years, who were working in the identified sites for more than 6 months and who were willing to participate were included in the study. Workers above 60 years of age and those not willing were excluded from the study.

Sampling technique: Out of the total of 15 construction sites identified in the study area, four sites were selected based on the permission given to carry out the study by the supervisors of the sites. Out of the approved sites, 3 sites were situated in Ankaputhur (Site A, B, C) and 1 site was situated in Pammal (D). Probability Proportional to Size (PPS) sampling was used to select the total number of workers to be studied from each site. The workers from each site were selected by simple random sampling method using computer generated random numbers. Site A and C consisted of 88 workers each, site B of 71 workers and site D consisted of 65 workers.

Data collection tools: A pretested structured questionnaire was used to collect the data. The questionnaire consisted of the socio-demographic profile and morbidity profile of the workers. Recording of height, weight and blood pressure was also carried out. Hypertension classified as per the guidelines established by the JNC 7 classification, which was used as criteria for identifying hypertension at the time of this study [11]. Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults as per the WHO guidelines [12].

Data collection: Data was collected from the 4 identified sites using a pretested structured questionnaire. Help of a translator was used, for collecting data from migrant construction workers. Height, weight and blood pressure was recorded using standardised instruments. The clinical examination and verification of the available medical records were carried out by trained medical professionals.

Ethical committee approval and informed consent: Institutional Ethical Committee approval had been obtained before the commencement of the study. (Ref.No.002/SBMC/IHEC/2013-117). The participants were briefed about the study and informed consent was obtained prior for the data collection. A translator was used to get consent from migrated workers.

STATISTICAL ANALYSIS

Data was entered and analysed using SPSS Software Version 21. Descriptive statistics was presented using percentages and statistical association were analysed using Chi-square test.

RESULTS

The study on morbidity profile in an urban area was carried out among 312 construction workers. However, the data of 10 study subjects were excluded from the analysis, due to incomplete information and hence result was analysed for 302 study samples only. The study outcome showed interesting results which is described below:

The socio-demographic characteristics of the construction workers are represented in [Table/Fig-1]. Majority of the study subjects belonged to less than 35 years of age (75.8%) and most of them belonged to Hindu religion (95.4%). Most of the respondents were illiterates (47%) and belonged to lower socio economic class status (49.7%).

The [Table/Fig-2] represents the general characteristics of the study subjects. Nearly 63.9% of the study subjects smoked, 57.6% workers consumed other forms of tobacco and 62.9% had the habit of consuming alcohol. It was found that majority of the workers were diagnosed with Pre-hypertension (69.9%) followed by Stage 1 hypertension (14.2%). Based on the BMI, most of them were found to be within normal BMI range (87.4%).

S No.	Parameters	Frequency (N=302)	Percentage (%)
1.	Age group (in years)		
	Less than or equal to 25	97	32.1
	26-30	71	23.5
	31-35	61	20.2
	More than or equal to 36	73	24.2
2.	Religion		
	Hindu	288	95.4
	Muslim	12	4.0
	Christian	2	0.6
3.	Level of education		
	Illiterate	142	47.0
	Primary school	65	21.5
	Middle school	83	27.5
	High school	11	3.7
	Diploma/Graduation	1	0.3
4.	Socio-economic status (Modified Kuppusamy Scale)		
	Lower Middle	32	10.6
	Upper Lower	120	39.7
	Lower	150	49.7
5.	Type of family		
	Nuclear	148	49.0
	Joint Family	154	51.0
6.	Marital status		
	Married	142	47.0
	Unmarried	160	53.0
7.	Type of food		
	Vegetarian	14	4.6
	Non-Vegetarian	288	95.4

[Table/Fig-1]: Socio-Demographic characteristics of the study subjects.

S No.	Parameters	Frequency (N=302)	Percentage (%)
1.	Migration (Place of Origin)		
	Tamil Nadu	89	29.5
	Andhra Pradesh	78	25.8
	Orissa	57	18.9
	West Bengal	28	9.3
	Jharkhand	20	6.6
	Bihar	17	5.6
	Uttar Pradesh	13	4.3
2.	Type of work		
	Helper	125	41.4
	Mason	99	32.8
	Centering work	60	19.9
	Painter	14	4.6
	Carpenter	4	1.3
3.	Smoking habits		
	Present	193	63.9
	Absent	109	36
4.	Alcohol habits		
	Present	190	62.9
	Absent	112	37.1
5.	Use of other forms of Tobacco use		
	Present	174	57.6
	Absent	128	42.4

6.	Hypertension		
	Stage 2 hypertension	3	1.0
	Stage 1 hypertension	43	14.2
	Pre hypertension	211	69.9
	Normal	45	14.9
7.	Body Mass Index (BMI) Grouped		
	Underweight	16	5.3
	Normal	264	87.4
	Overweight	21	7.0
	Obese	1	0.3

[Table/Fig-2]: General characteristics of the study subjects.

Prevalence of various morbidities among the construction workers is shown in [Table/Fig-3]. It was identified that musculoskeletal problem (71.5%) was the major cause of morbidities, followed by skin and eye problems.

S No.	Types of Morbidity	Frequency (N=302)	Prevalence (%)
1.	Musculoskeletal problems	216	71.5
2.	Skin problems	179	59.3
3.	Eye problems	161	53.3
4.	Abdominal symptoms	157	52.0
5.	Respiratory problems	156	51.7
6.	External injury	133	44.3
7.	Urinary problems	120	39.9
8.	Dental problems	111	36.8
9.	Fever	79	26.2
10.	ENT problems	68	22.5
11.	CNS problems	47	15.6
12.	Cardiac problems	46	15.2
13.	Prevalence of any one morbidity	242	80.1

[Table/Fig-3]: Prevalence of various morbidities among the construction workers. *Multiple responses for each variable

The association between risk factors and the presence of any one morbidity pattern is represented in [Table/Fig-4]. There was strong statistical association found between the presence of any one morbidity pattern and the presence of smoking habit (OR-7.5, p-0.001), habit of alcohol consumption (OR-7.8, p-0.001), use of other forms of tobacco (OR-3.5, p-0.001), type/nature of work (OR-6.1, p-0.001), marital status (OR-2.2, p-0.008) and type of diet they consumed (OR-0.3, p-0.027).

DISCUSSION

The results of this study, done among 302 construction workers in an urban area, show that nearly 80% of the construction workers suffer from at least one health related problem. Almost 71.5% of the construction workers suffer from musculoskeletal disorders followed by skin and eye problems.

This study shows that almost 70.5% workers were migrants from other states like Andhra, Orissa, West Bengal, Jharkand, Bihar and Uttar Pradesh. Similarly in studies conducted elsewhere, the number of migrant workers were found to be more than the local workers [4,13,14]. This study highlighted the origin of place of study participants with an idea of finding out, how many participants work away from their home town, due to socio-economic compulsions, which in turn could affect the health of the construction workers. The migrant populations could be a source of certain endemic diseases transmitted to the migrant area and vice versa, highlighting the importance of diseases transmitted between the stable and the migrant population if any. But, no such disease transmission was identified during this study.

S No.	Demo-graphic risk factor	N=302	Presence of any one morbidity pattern		Chi-square value	p-value	Odds Ratio (95% CI)
			No.	(%)			
1.	Smoking habit						
	Present	193	177	91.7	45.0	0.001*	7.5 3.9-14.2
	Absent	109	65	59.6			
2.	Alcohol habit						
	Present	190	175	92.1	46.1	0.001*	7.8 4.1-14.9
	Absent	112	67	59.8			
3.	Use of other forms of Tobacco						
	Present	174	154	88.5	18.1	0.001*	3.5 1.9-6.4
	Absent	128	88	68.8			
4.	Type of work						
	Skilled	177	162	91.5	34.9	0.001*	6.1 3.2-11.5
	Unskilled	125	80	64			
5.	Marital status						
	Married	142	123	86.6	7.1	0.008*	2.2 1.2-4.1
	Unmarried	160	119	74.4			
6.	Type of food						
	Vegetarian	14	8	57.1	4.9	0.027*	0.3 0.1-0.9
	Non-vegetarian	288	234	81.2			

[Table/Fig-4]: Association between risk factors and presence of any one morbidity pattern among the workers. (*p<0.05; Statistically Significant at 95% CI using chi-square test)

This study reveals that 63.9% of the workers smoked, 57.6% used tobacco in other forms and 62.9% consumed alcohol. These habits were found to be common among workers in other study areas as well. In a study by Patel HC et al., 48.3% chewed tobacco, 19.3% smoked and 6.45% consumed alcohol [13]. In a study by Laad PS et al., 21.6% workers smoked, 15.8% consumed alcohol and 46.1% used smokeless forms of tobacco [14]. When compared to other studies, the prevalence of smoking, alcohol consumption and tobacco use was very high in this study. Personal habits turn out to be risk factors for various diseases. So, this could be a reason for increased prevalence of morbidity in this study. The presence of these risk factors warrants interventions like lifestyle modification and behavioural change among the construction workers.

Most of the workers in this study were found to be suffering from pre-hypertension (69.9%) while 15.2% suffered from hypertension. In a study by Sandeep H, 40.1% were diagnosed to have pre-hypertension and 40.2% were found to be normal and nearly 19.63% suffered from hypertension [15]. It is evident that prevalence of pre-hypertension was more in this study. But, the prevalence of hypertension was less in this study compared to the study by Sandeep H et al. This study shows that the BMI of 87.4% study subjects was within normal limits, 7% were overweight and 5.3% were underweight. In a study by Sandeep H et al., 58.7% were in the normal range, almost 30.8% were underweight, 9.8% were overweight and 0.6% was obese [15].

The prevalence of overweight among construction workers in this study was less compared to the other study. Probably, the young age range of this study participants could be the reason for the lesser prevalence of hypertension and overweight/underweight compared to the study done by Sandeep H et al., in Bangalore.

Regarding the prevalence of atleast one health related morbidity among the study subjects, about 80.1% of the workers had at least one health related morbidity problem, which was found to be similar to the study findings by Adsul BB et al., (80.9%) [4]. In another study by Patel C, nearly 48.4% had medical complaints, while in a study by Jasani PK et al., 62.5% of the construction workers did not have any problem, while 37.5% had at least one morbidity, showing that there is wide variation in this criteria [13,16].

This study shows that majority of the study subjects suffered from musculoskeletal disorders (71.5%), which were followed by skin problems (59.3%) and ophthalmic problems (53.3%).

Another study shows that only 19.5% suffered from musculoskeletal disorders [16]. In a study by Patel C et al., 38.7% suffered from chronic body ache [13]. Another study by Adsul BB et al., showed that 23.1% suffered from fever [4]. In a study by Jayakrishnan T et al., 16.1% suffered from skin problems [17].

Shobhana D et al., conducted a study among the female construction workers and found that 95.5% had urinary tract infection [18]. Another study by Deshmukh SA et al., showed 45.3% were having cough [19]. In a study by Sandeep H et al., almost 43.68% suffered from psychological distress [15].

The prevalence of morbidity in this study is very high compared to other studies. The high prevalence may be due to improper training and inadequate use of protective devices, lack of safety measures at work place, increased use of smoking, tobacco chewing and alcohol consumption, unhygienic practises etc.

This study reveals that there was a strong statistical association between the presence of any morbidity and the presence of smoking habit, habit of alcohol consumption, use of other forms of tobacco, type of work, marital status and the type of diet they consumed.

Other studies done elsewhere also revealed a similar trend. In a study by Patel C et al., they found that there was a strong statistical association between the type of work, duration of work, habits, and health of construction workers [13]. The study by Adsul BB et al., showed that there was a strong statistical association between age, marital status, education, socio-economic status, type of work and health status of the workers [4]. In another study by Jayakrishnan T et al., it was found to have a statistical significant association between morbidity and consumption of alcohol and health related behaviour while there was no statistical significant association between uses of tobacco, marital status and health related behaviour [17]. In a study by Gupta A et al., there was statistical significant association between age, marital status, occupation, and duration of work and presence of any symptom [8].

Thus, it was found that almost all the earlier studies reviewed had almost the same morbidity pattern which was similar to this study findings but with varying percentages. This also reveals that the construction workers were doing hard physical work while most of them were suffering from one or other form of illness. The day to day unhealthy habits of the construction workers also play a major role in the presence of high morbidity among them and the different health related issues they face.

LIMITATION

The study has certain limitations. The epidemiological pattern of the morbidity profile among the construction workers was not analysed in detail. The main aim of the study was to identify the prevalence of various morbidities and its associated risk factors. Certain information on the social security measure, details regarding use of safety measures and availability and utilisation of health care could have been included. The scope of this study should have been extended to a wider sample size covering a broader geographical area, to get a better realistic picture of the problem.

CONCLUSION

It is evident from this study that nearly 80% of the construction workers suffer from at least one health related problem. There is an urgent need to create awareness among the workers about their health and safety issues, working environment, proper use of protective wears, provision of first aid, referral services and sanitation at their living and workplace. Strengthening and creating awareness about the already existing programs and acts such as, 'The Unorganized Workers Social Security Act 2008', 'Rashtriya Swasthya Bima Yajana', 'The Building and Other Construction Workers Act, 1996' and 'The Inter-State Migrant Workmen Act, 1979' is necessary. Improving the health and wellbeing of the people working in the unorganised sectors will help them to lead a socially and economically productive life.

REFERENCES

- [1] A community Health Nursing Manual. Trained Nurses Association of India, 3rd edition, TNAI Publication; 1998.
- [2] Difference Between Organised and Unorganised Sector. Key Differences. 2016. Available from; <http://keydifferences.com/difference-between-organised-and-unorganised-sector.html#ixzz4xMJ1G6Hf>. Last Accessed 4 Nov 2017.
- [3] Government of India, Ministry of Labour and Employment, Annual Report 2014-15, Pp. 65.
- [4] Adsul BB, Laad PS, Howal PV, Chaturvedi RM. Health problems among migrant construction workers: A unique public-private partnership project. *Indian J Occup Environ Med.* 2011;15(1):29-32.
- [5] Kulkarni GK. Construction Industry: More needs to be done. *Joint National Committee 7.* 2007;11(1):1-2.
- [6] Brindha V. Prevention of Occupation Health Hazards among stone workers. *Nightingale Nursing times.* 2005;1(9):17-19.
- [7] Nithin PRS, Vittal RK, Nagesha HN. Study on building and other construction workers welfare schemes/amenities in Karnataka. *SASTECH J.* 2011;10(1):59-66.
- [8] Gupta A, Gokhale RM. Study the association of demographic factors and health status of construction workers. *Int J Community Med Public Health.* 2016;3(8):2164-68.
- [9] Gurav RB, Kartikeyan S, Wayal R, Joshi SD. Assessment of daily wage laborers. *Indian J Occup Environ Med.* 2005;9(3):115-17.
- [10] Sashidharan C, Mohan Kumar P, Gopalakrishnan S. Prevalence and determinants of external injuries among industrial workers in an urban area of Kancheepuram district, Tamil Nadu. *Int J Community Med Public Health.* 2017;4:4722-27.
- [11] The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication. 2004; Pp.12, Table-3. Available from: <https://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf>. Last Accessed 4 Nov 2017.
- [12] Healthy weight. About Adult BMI. Centres for Disease Control and Prevention. Available from; https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html. Last Accessed 4 Nov 2017.
- [13] Patel HC, Moitra M, Momin MI, Kantharia SL. Working conditions of male construction worker and its impact on their life: a cross sectional study in Surat city. *Natl J Community Med.* 2012;3(4):652-56.
- [14] Laad PS, Adsul BB, Chaturvedi RM, Shaikh M. Prevalence of substance abuse among construction workers. *Paripex Indian J Res.* 2013;2(3):280-83.
- [15] Sandeep H, Shashikala M, Ramya KS. Morbidity profile of construction workers aged above 14 years in selected areas of Bangalore urban district. *Journal of Evolution of Medical and Dental Sciences.* 2015;4(49):8552-60.
- [16] Jasani PK, Nimavat JH, Joshi JB, Kartha GP. A study of morbidity profile amongst construction workers at selected construction sites in Surendranagar city. *Int J Med Sci Public Health.* 2017;6(2):382-87.
- [17] Jayakrishnan T, Thomas B, Rao B, George B. Occupational health problems of construction workers in India. *Int. J. Med. Public Health.* 2013;3(4):225-29.
- [18] Shobhana D, Nilam P. Assessment of occupational health illnesses and injuries encountered by female workers in building construction in Ahmedabad city. *International Journal of Multidisciplinary Research and Development.* 2017;4(7):497-99.
- [19] Deshmukh SA, Ghooli S. A Study of Morbidity Pattern among Construction Workers in Kalaburagi, North Karnataka, India. *Ntl J of Community Med.* 2015;6(3):411-14.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Community Medicine, Sree Balaji Medical College and Hospital, Bharath University, Chennai, Tamil Nadu, India.
2. Professor, Department of Community Medicine, Sree Balaji Medical College and Hospital, Bharath University, Chennai, Tamil Nadu, India.
3. Postgraduate Student, Department of Community Medicine, Sree Balaji Medical College and Hospital, Bharath University, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. S Gopalakrishnan,
Professor, Department of Community Medicine, Sree Balaji Medical College and Hospital, Bharath University,
Chennai-600044, Tamil Nadu, India.
E-mail: drsgopal@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Nov 05, 2017**

Date of Peer Review: **Feb 05, 2018**

Date of Acceptance: **May 18, 2018**

Date of Publishing: **Jul 01, 2018**