JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

PREVALENCE OF CARDIPULMONARY RISK FACTORS AMONG INDUSTRIAL WORKERS.

[1]E.shanmugananth, [2]Ajeet Kumar Saharan, [3]Manisha Saharan, [4]Vaishnavi, [5]Muthukumaran, [6]Srinivasan. M

[1] HOD, Sri balaji vidyapeeth, MGMCRI, Department Of Physiotherapy, Puducherry.
[2]Dean & Principal - Jaipur Physiotherapy College, Maharaj Vinayak Global University, Jaipur.
[3]Assoc Professor. - Jaipur Physiotherapy College, Maharaj Vinayak Global University, Jaipur.
[4]Assoc Professor, - Principal Incharge, Mayor Radhakrishnan College of Pharmacy. Cuddalore.
[5]Professor, Saveetha college of Physiotherapy, SIMATS, Chennai.
[6]Assoc Professor, Sri balaji vidyapeeth, MGMCRI, Department Of Physiotherapy, Puducherry.

ABSTRACT: The aim of the study is to find out the prevalence of cardiopulmonary risk factors among industrial workers. Methodology: A cross sectional study was conducted among 372 subjects aged between 25-45 years who were recruited from twelve industries through cluster sampling method and interviewed. Technical, skilled professionals who were working for more than five years were included in this study. The data was collected using a pre-tested semi-structured questionnaire. Questions were adopted from WHO STEPS questionnaire[7]. The questionnaire was used to elicit information from each study participant for socio-demographic characteristics, lifestyle-related factors and physical and bio-chemical measurements, lifestyle-related factors, physical and bio-chemical measurements. Result Analysis: A face to face semi-structured interview was done among 494 industrial workers. In total participants (n=372) 81% were male population and 19% were female. Average age of participants was 33.2±8. 90% of participants were liberated and above secondary. Physical and biochemical parameter showed mean pulse rate of 75.04 ± 8.85 beats/min. About 40.6 % were pre-hypertensive. Body mass index (BMI) was at increased risk and at high risk for 44.1 % of the participants as per the BMI for Asian classification. Almost half of them had central obesity. Hyperglycemia was seen in 6.2 % and dyslipidemia in 65.5 % of the workers . HDL level was decreased in 65.8% of participants. Conclusion: There is high prevalence of CVD risk factors among industrial workers. Although the study population was not representative of general industrial population we believe that it does represent the similar kind of CVD risk factors burden among many of medium and large size industries.

BACKGROUND:

Workplaces provide opportunities for health risk assessment and promotion initiatives that have the potential for reaching out to large working populations[1], [2]. Such initiatives can help to reduce employees' chronic diseases risk factors, contribute to safeguarding their health and hence, their productivity[3], [4]. Importantly, workplace initiatives can provide valuable encouragement or triggers for employees who otherwise do not undergo health checks elsewhere[5]. This is particularly relevant to workers in the construction industry who may be less educated and knowledgeable about health risks. Cardiopulmonary disease are the major cause of death globally, more people die annually from cardiopulmonary disease than from any other cause. An estimated 17.5 million people died from cardiopulmonary disease in 2012, representing 46.2 % of all Non-communicable disease (NCD) death.

Of these deaths, an estimated 7.4 million were due to heart attack and 6.7 million were due to stroke. Low middle income country (LMIC) are disproportionally affected by Cardiovascular disease (CVD), over 80 % of CVD deaths takes place in LMIC. In 2012 heart disease and stroke were among the top three causes of years of life lost due to premature mortality. The number of people, dying from CVDs, mainly heart disease and stroke, will increase to reach 23.3 million by 2030. Over the last four decades, the rate of death from CVD has declined in high- income countries, owing to reduction in CVD risk factors and better management.

Recent studies indicate that, although the risk-factor burden is lower in low-income countries, the rates of major CVD and death are substantially higher than high-income countries. CVD mortality rates in the South Asian countries are much higher than the East Asian countries. Estimates from the Global Burden of Disease (GBD) study suggest that by the year 2020, India alone will have more individuals with CVD than in any other region. Many of the 2.9 billion workers across the globe are exposed to hazardous risks at their workplaces. These workers are at a higher risk of musculoskeletal disorders, cardiovascular disease, pulmonary problems and all-cause mortality. The occupational risk factors accounted for an estimated 37% of back pain, 16% of hearing loss, 13% of chronic obstructive pulmonary disease (COPD), 11% of asthma, 8% of injuries, 9% of lung cancer and 2% of leukemia. These work-related risks caused 775000 deaths worldwide in 2000. There were five times as many deaths in males as in females (647000 vs 128000). The leading occupational cause of death among the six risk factors was unintentional injuries (41%) followed by COPD (40%) and cancer of the trachea, bronchus or lung (13%). Workers who developed outcomes related to the occupational risk factors lost about 22 million years of healthy life. By far the main cause of years of healthy life lost (measured in disability-adjusted life years [DALYs]), within occupational diseases, was unintentional injuries with 48% of the burden. This was followed by hearing loss due to occupational noise (19%) and COPD due to occupational agents (17%). Males experienced almost five times greater loss of healthy years (DALYs) than females. Low back pain and hearing loss have in common the fact that they do not directly produce premature mortality, but they cause substantial disability and have multiple consequences for the individual and society, particularly for workers suffering the outcomes at an early age. These health related consequences are due to high physical workload, sedentary lifestyle, occupational exposure in industries.

An accurate characteristic of the cardiopulmonary risk factors in a specified population is essential for the implementation of educational campaigns. Identifying risk factors and implementing certain intervention will definitely help to reduce cardiopulmonary risk. However, there are no reliable study on burden of risk factors, awareness and treatment of cardiopulmonary risks in industrial setting of south India. We aimed to assess CVDs risk factors among men age 25-45 years in one of the largest industrial corridor of Southern India.

METHODOLOGY:

A cross sectional study was conducted among 372 subjects aged between 25-45 years who were recruited from twelve industries through cluster sampling method and interviewed. The intention was not to select particular type of industry (e.g. metal, beverages etc.) but to select an isolated population whose CVD burden are still hidden and where preventive programs can be initiated. Industrial setting, with their intramural resources and healthcare infrastructure, are ideal for initiating preventive activities to increase the awareness and control of CVD. Technical, skilled professionals who were working for more than five years were included in this study. Since it is unlikely that contractors would have purposefully rearranged work schedules to allow the participation of certain workers, worker release did not follow any clear patterns that we were aware of and sampling bias is thus minimized. Despite careful scheduling of workers groups, each of 30 workers, there was disordered arrival and flow of work groups due to various reasons including work schedule delays, poor weather and staggered breaks. The two major participating employee subgroups included construction workers (frontline skilled or unskilled (laborer) tradesmen working at the infrastructure worksite) and office clerks/professionals (clerical staff, architects, engineers, surveyors, management level staff, safety officers and technicians.

The data was collected using a pre-tested semi-structured questionnaire. Questions were adopted from WHO STEPS questionnaire[7]. The questionnaire was used to elicit information from each study participant for socio-demographic characteristics, lifestyle-related factors and physical and bio-chemical measurements. Two blood pressure measurements were taken using standard techniques. The measurements were obtained half an hour apart. The lower of the two measurements was used for analysis. Height was measured in meters. Weight was measured in kilogram[8]. Waists circumference (WC) was measured at the centre point of the subcostal

margin in the mid-axillary line and the highest point of the iliac crest in the mid-axillary line. Hip circumferences (HC) were measured at the level of the greater trochanter. ECGs were read by cardiologist and coded using the Minnesota coding system[9]. Blood samples were drawn by trained personnel, centrifuged and stored for analysis. Laboratory measurements included estimation of fasting blood glucose, total cholesterol, triglycerides, high density lipoprotein (HDL) and LDL.

ANALYSIS: All data was entered in Microsoft XP Excel spread sheet and converted into SPSS (Statistical Package for Social Sciences) Version 17 program for statistical analysis. The probability of significance was set at 5 % level of significance and 95%confidence interval. Odd's ratio was calculated.

RESULTS: A face to face semi-structured interview was done among 494 industrial workers. In total participants (n=372) 81% were male population and 19% were female. Average age of participants were 33.2±8. 90% of participants were literated and above secondary.

Table: 1 Demography of participants:

SOCIO-DEMOGRAPHIC CHARACTERISTICS	TOTAL(n=372) n%
GENDER	
MALE	**301(81.0)**
FEMALE	**71(19.0)**
AGE(YEARS)	
MEAN	**33.2± 8**
Educational attainment	
Primary or below	**37(10)**
Secondary	**223(60)**
Tertiaryor or above	**112(30)**

Physical and biochemical parameter showed mean pulse rate of 75.04 ± 8.85 beats/min. About 40.6 % were pre-hypertensive. Body mass index (BMI) was at increased risk and at high risk for 44.1 % of the participants as per
the BMI for Asian classification. Almost half of them had central obesity. Hyperglycemia was seen in 6.2 % and dyslipidemia in 65.5 % of the workers . HDL level was decreased in 65.8% of participants.

Table 2: Physical and Biochemical profile of workers:

	TOTAL (n=372) n(%)
Blood pressure	
Normal	24
Pre-hypertension	40.6
Hypertension	30.6
BMI	
Underweight (<18.5 kg/m2)	7.3

Increased but acceptable risk (18.5- 23 kg/m2)	48.6
Increased risk (23–27.5 kg/m2)	36.6
High risk (≥27.5 kg/m2)	7.5
Waist- Hip Ratio	
Normal (<0.90)	51
Central obesity (>0.90)	49
Serum Biochemistry Profile	
Diabetes (≥126 mg/dl)	6.2
Impaired fasting blood glucose (≥110 mg/dl and <126 mg/dl)	35
Hypercholesterolemia	65
Hypertriglyceridemia	54.6
Decreased HDL	65.8
Dyslipidemia	65.5
Peak expiratory flow (PEF) value	
Low PEF (high risk)	29.8
Normal PEF	70.2
Physical activity	
No exercise	65
Moderate intensity exercise	24
Vigorous intensity exercise	11

DISCUSSION:

This study done in industrial setting among relatively young urban population, found prevalence of cardiovascular risk factors to be high. More than half of the workers had completed some secondary education in our study which were comparatively less than study done by Prabhakharan et al. in Northern India where 66.4 % were graduate/postgraduate/professional[9]. Workers were involved in moderate and vigorous physical activity at any time during work, leisure time and household activities. Although workers showed high physical activity at work presence of risk factors still seemed to be high. In a study done by Mehan et al. in industrial setting none of the subjects, including workers, were found to be engaged in heavy activities at workplace. Majority of subjects were engaged in light activities and moderate activities[6].

Dyslipidemia were seen among 65.5 % of the respondents. With growing population, changes in lifestyle and food-habit especially in suburban and rural areas of the country, there is a potential threat of increasing risk factor for CVDs especially Coronary Heart Disease (CHD). The healthy traditional plant-based diets are being replaced by cheaper calorie dense high-fat foods. There is high intake of saturated and trans-saturated fatty acid. All factors have led to the occurrence of dyslipidemia especially hypercholesterolemia[10]. Hyperglycemia was about 6.2% in participants.

Workplace health risk assessments are important for healthy workplaces particularly for industrial workers where health literacy is likely low and health-related misconceptions are prevalent. This study demonstrated the feasibility of an inexpensive workplace cardiopulmonary risk-screening program for underserved industrial workers. Industrial workers frequently involved in physically demanding work and exposed to poor work conditions may not be well-educated, be poorly informed about health risks and would probably not have sought healthcare elsewhere are likely to have benefited the most. Similar objective health risk assessments carried out at worksites minimizing participants' work schedule disruption conducted on a regular basis would be beneficial in raising health awareness. Identifying employees at high cardiopulmonary risk is an important aim of worksite lifestyle-based CVD prevention interventions targeting improved worker health and performance. Importantly, this study identified different risk and lifestyle profiles for industrial workers and office clerks/professionals, implying the need to develop separate health promotion initiatives targeted at employees in different segments of the same work industry.

CONCLUSIONS:

There is high prevalence of CVD risk factors among industrial workers. Although the study population was not representative of general industrial population we believe that it does represent the similar kind of CVD risk factors burden among many of medium and large size industries. Though this seems to be a small occupational health survey but it adds on the risk factors prevalent in the industrial set-up and thus focuses the attention of cardiovascular epidemiologist and researcher to conduct more studies. Inexpensive workplace health risk assessments can identify employees at potentially high cardiopulmonary risk for onward screening referral. In the industrial workforce multiple cardiopulmonary risk factors were observed in large numbers of respondents. Relevant health promotion interventions that target different employee subgroups in the construction industry may be beneficial.

REFERENCES:

[1] "WHO | Global status report on noncommunicable diseases 2014," *WHO*. [Online]. Available: http://www.who.int/nmh/publications/ncd-status-report-2014/en/. [Accessed: 21-Nov-2017].

[2] O. C. Damman, A. J. van der Beek, and D. R. M. Timmermans, "Workers' knowledge and beliefs about cardiometabolic health risk," *J. Occup. Environ. Med.*, vol. 56, no. 1, pp. 92–100, Jan. 2014.

[3] L. M. Verweij, J. Coffeng, W. van Mechelen, and K. I. Proper, "Meta-analyses of workplace physical activity and dietary behaviour interventions on weight outcomes," *Obes. Rev. Off. J. Int. Assoc. Study Obes.*, vol. 12, no. 6, pp. 406–429, Jun. 2011.

[4] I. F. Groeneveld, K. I. Proper, A. J. van der Beek, V. H. Hildebrandt, and W. van Mechelen, "Lifestyle-focused interventions at the workplace to reduce the risk of cardiovascular disease--a systematic review," *Scand. J. Work. Environ. Health*, vol. 36, no. 3, pp. 202–215, May 2010.

[5] O. C. Damman, A. J. van der Beek, and D. R. M. Timmermans, "Workers' knowledge and beliefs about cardiometabolic health risk," *J. Occup. Environ. Med.*, vol. 56, no. 1, pp. 92–100, Jan. 2014.

[6] M. B. Mehan, N. Srivastava, and H. Pandya, "Profile of non communicable disease risk factors in an industrial setting," *J. Postgrad. Med.*, vol. 52, no. 3, pp. 167-171; discussion 171-173, Sep. 2006.

[7] "STEPS_Instrument_v2.1.pdf." .

[8] "Hutchison's Clinical Methods - 23rd Edition." [Online]. Available: https://www.elsevier.com/books/hutchisons-clinical-methods/glynn/978-0-7020-4091-7. [Accessed: 24-Nov-2017].

[9] D. Prabhakaran, P. Shah, V. Chaturvedi, L. Ramakrishnan, A. Manhapra, and K. S. Reddy, "Cardiovascular risk factor prevalence among men in a large industry of northern India," *Natl. Med. J. India*, vol. 18, no. 2, pp. 59–65, Apr. 2005.

[10] Y. R. Limbu *et al.*, "Lipid profile of adult Nepalese population," *Nepal Med. Coll. J. NMCJ*, vol. 10, no. 1, pp. 4–7, Mar. 2008.

[11]. Goyal A, Yusuf S. The burden of cardiovascular disease in the Indian subcontinent. Indian J Med Res. 2006;124(3):235–44. [PubMed]

[12]. World Health Organization. Guideline: Sodium intake for adults and children. ISBN 978 92 4 150483 6: Geneva, Switzerland;

2012. http://apps.who.int/iris/bitstream/10665/77985/1/9789241504836_eng.pdf?ua=1&ua=1 (accessed date 20 Dec 2015)

[13]. Shields M, Wilkins K. Smoking, smoking cessation and heart disease risk: A 16-year follow-up study. Health Reports. 2013;24(2):12–22. [PubMed]

[14]. Mannan H, Stevenson C, Peeters A, Walls H, McNeil J. Framingham risk prediction equations for incidence of cardiovascular disease using detailed measures for smoking. Heart Int. 2010;5(2):e11. doi: 10.4081/hi.2010.e11. [PMC free article] [PubMed] [Cross Ref]

[15]. Roy A, Prabhakaran D, Jeemon P, Thankappan KR, Mohan V, Ramkrishna L et al. Impact of alcohol on coronary heart disease in Indian men. Atherosclerosis 210 (2):531–5. http://www.ncbi.nlm.nih.gov/pubmed/20226461 (access date 20 Dec 2015) [PubMed]

[16]. Sharma SK, Ghimire A, Radhakrishnan J, Thapa L, Shrestha NR, Paudel N, et al. Prevalence of hypertension, obesity, diabetes, and metabolic syndrome in Nepal. Int J Hypertens. 2011;2011:821971. doi: 10.4061/2011/821971. [PMC free article] [PubMed] [Cross Ref]

[17]. Limbu YR, Rai SK, Ono K, Kurokawa M, Yanagida JI, Rai G, et al. Lipid profile of adult Nepalese population. NepalMedCollJ. 2008;10(1):4–7. [PubMed]