Research Journal of Family, Community and Consumer Sciences _____E-ISSN 2320 – 902X
Vol. **4(2),** 1-5, February **(2016)** *Res. J. Family, Community and Consumer Sci.*

Review Paper

Work related Musculoskeletal Disorders among Construction Workers of India

Neerja Jaiswal and Vashima Veerkumar
Department of Family and Community Resource Management, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India
neerja_jaiswal@rediffmail.com

Available online at: www.isca.in, www.isca.me
Received 10th December 2015, revised 30th January 2016, accepted 10th February 2016

Abstract

Construction work comprises of building and civil engineering. Building engineering includes work which involves structures like house, office, industry, educational centre. Civil engineering includes to structures in the surroundings like roads, canals, railway tracks, docks, dams, tunnel. Modernization and urbanization ha led to a high rise in the construction industry. The construction workers work in huge constructions of industries, houses, offices, as well as construction of city beautification work. The construction workers belong ti unorganized work forces. Due to this, they are exploited since ages by not providing proper shelter, pay, proper leaves, mediclaims, medical attention. The construction workers are provided with improper equipment's and no safety equipment. The workers are recruited by many urban cities and areas. The task of the workers put them at a greater risk for acute and chronic work related musculoskeletal disorders. The work task demand the workers to do repetitious movements, awkward postures and high force levels which lead to WRMSD develop over a period of time and are not curable. The data was collected through secondary sources. The researches have recorded musculoskeletal disorders and discomfort among construction workers which occur due to poorly designed ladders, unsuitable or poorly maintained lifting appliances, improper material handling, improper walking surfaces high platforms, improperly stored trenches, badly maintained tools and inadequate illuminations. Construction work accidents contribute to 16.4% of fatal global occupational accidents. The researcher compiled the data available and recommended certain principles. Certain changes in the workplace, work equipment, worker condition, wok tasks and work management can help in improving the condition of workers.

Keywords: Construction, Workers, Work, Musculoskeletal disorders.

Introduction

Construction Industry: Construction industry is the major and important industry of the world. Construction industry is broadly classified as building and civil engineering[1]. Building works include structures such as houses, offices, shops, malls, industries, schools. Civil engineering on the other hand, applies to the built structure in the surroundings like roads, railway tracks, dams, canals, docks and tunnels[1,2].

Construction industry has been on a high rise due to modernization and industrialization. Small towns and cities are becoming urbanized due to which the construction industry is also boosting. Irrespective of the fluctuations in the economy of India, the construction industry is yet growing faster. With the old and traditional urban and industrial centre, new industrial and urban centres are also conducting some major construction work on a large scale. Due to the development, in the construction industry which opens new employment opportunities, larger number of workers are attracted to join the industry[3,4].

Construction Workers: Construction in building and civil engineering have greater risks in gradually affecting their health and developing sickness as compared to other industries[3]. They are vulnerable to multiple physical, chemical and biological elements, thus developing various health problems like respiratory problems, dermatitis, musculo-skeletal disorders and gastro-intestinal diseases[1,4]. Their work comprises of hard physical labor, under difficult conditions like adverse weather conditions and the nature of work, hours of work, low pay, poor living conditions with lack of basic amenitiesand separation from family, lack of job security and lack of access to proper occupational health services make the situation worse[2,4,5]. Due to ergonomic issues they are also vulnerable to degenerative disorders[1]. Apart from this, in most of construction projects the workers employed are unorganized in nature and often not guided by the legislations made for the health and welfare of the workers and hence are not eligible for free or subsidized care[2,6]. The reports have reported that there are more than 20 million construction workers in India at present. There are 600 thousand construction workers in Delhi. The number of construction

workers is expanding at fast rate in developing cities, like Jamnagar (Gujarat), Guwahati and Shillong (Northeast)[7].

Construction workers are manly workers who have migrated from different regions and states, leaving their native vilages for employment. These workers travel from one area to other area along with their families. They usually live in accommodation provided by the contractor of the construction industry company or sometimes they build a temporary shelter on the site. They have a lot of mobility due to the nature of their work[7,8]. These workers are involved in gigantic industrial constructions, residential colonies or row houses and city beautification work. The construction workers are a part of unorganized sector and thus are the most exploited ones. In the recent past, the recruitment of the construction workers are being done in big cities and urban areas of the country. Most of the construction workers are illiterate thus providing them with limited choices for limited choices for employment for survival. Due to illiteracy, they face numerable problems due to lack of experience and skill.

Conditions of Construction Workers: The construction companies are concerned with the health of labourers. Almost all companies do not provide mediclaim is to the workers. Although some companies along with the site labourers mutually over the medical expenditure incurred for the medical treatment. There are no maternity leaves provided to the women workers. Mostly the companies do not pay off the employee's partial or full injuries and are also not covered by life insurance. Safety materials and equipments like helmets, hand Gloves and shoes, safety belts, protection eye wear are also rarely provided to the construction workers[8.9].

The construction workers are not provided leave facilities. Some companies provide inefficient medical leaves and maternity leaves to their workers. The construction site is recommended by no holiday policy. The working hours of the construction workers vary, majority of them make provisions for 8-11 hours a day of work[7].

Work related Musculoskeletal Disorders: The inflammatory and degenerative conditions that affect the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels with consequent ache, pain or discomfort are termed as musculoskeletal disorders. Work related musculoskeletal disorders (WRMSDs) are defined as musculoskeletal disorders that results from work related events[10]. The common health problems among construction workers apart from a number of fatalities are WRMSD which occur due to the nature of work.

The hazards in construction industry are rated as 8 times more risky than those from any manufacturing industry. WRMSD affect the quality of life of the construction worker by causing a lot of absenteeism, increasing work restriction and disability thus affecting the economic status of the employee. The work task demands repetitive movements, awkward postures and high force levels which expose them to greater risk of acute and cumulative WRMSD[12]. The WRMSD develop over a period of time anf are not curable, however some suitable coping strategies can be adopted in regulating development of WRMSD.

WRMSD affect productivity at work thus affecting the economic aspect of the worker and the industry. The economic burden involves the compensation which is to be provided by the company to the workers, health care facilities at the construction site and provision of insurance. Heavy workloads lead to exertion of force which is concentrated on the body[13,14].

Objectives: i. To review related theory and researches conducted in India on work related musculoskeletal disorders in construction industry. ii. To provide recommendations for the construction industry which helps reduce the work related musculoskeletal disorders.

Methodology

A review of related theory and researches were collected through secondary data. The researches related to construction industry in India were collected and recommendations based on review were given

Findings

There are 26 million construction workers in India[16,13]. The studies have revaled that the type of work the construction workers undertake under the difficult environment and the physical hazards alon with the low economic status aggravates them vulnerable to ill health. The researches on Indian construction industry practices have witnessed adoption of poor work habits, improper or ignorance of ergonomic principles, extreme long working hours accompanied with irregular to negligible rest periods, dangerous working condition. The migrant and illiterate workers who are unaware of their basic fundamental rights have to bear the wrong doings of the contractors. Since the workers are weak socially and financially the contractors take undue advantage of their situation by exploiing their basic rights of healthcare facilities as well. Musculoskeletal disorders are the commonest physical ailments among these workers with an estimated 33% prevalence in the general population and a prevalence of 77% among construction workers[17].

The results of MSD have a direct and indirect implication on the health of the worker. The physical/ direct dimensions of health includes physical injuries, these injuries do not heal immediately due to repetitive nature of the work and insufficient rest breaks. Studies have also reported that due to MSD workers face lost workdays which affect their mental health as they live on daily wages at times and their survival becomes difficult with each day that is lost, thus affecting their mental, social as well as emotional health.

A study on workers of Andhra Pradesh in 2010 revealed that (20%) of the workers faced at least one musculoskeletal disorder during one month, 35(27%) workersalso reported morbidity on the WHO healthy day's module in the previous month of the study. The study also highlighted that the most common health problem was back or neck problem followed by arthritis among the workers[18].

A research also found out that the construction workers have a high risk of 50% for musculo-skeletal injuries, higher than other industrial workers[20,21]. The repeated postural changes like bending forward or standing and weight bearing may cause backache, low back pain and neck pain and so on[20]. In our study, the reported prevalence of musculo-skeletal problems was 1.1% with not much difference in the two groups. In previous studies, it was reported variably as 4%, 60.7% and 40% affecting neck to foot[4,5,22]. These symptoms have high positive correlation with age of person. Lower prevalence from the present study may be due to the younger age of the workers, use of good ergonomics and application of more mechanization in job. It may also be due to healthy worker effect; which happens when those with musculo-skeletal problems may be leave job earlier[19].

A study quoted that the occurrence rate of WRMSDs increased with increasing age but was lowest in the respondents who were over 50 years of age. Highest percentage of the respondents (24.4%) experienced their first incident of WRMSDs in the first five years of work. Most of the workers (54.6%) reported WRMSDs of gradual onset, 20.2% reported WRMSDs of sudden onset while only 2.5% implicated a known accident. The highest prevalence of 12 months period WRMSDs in unskilled women workers in construction industry according to body sites in the study was low back pain (44.1%), followed by neck (28.0%) and then knees (22.4%). Studies in biomechanics have also implicated factors such as physical loading, body flexion, rotation and weight loading in the aetiology of prevalent occupational LBP[23].

The researches have recorded occupational safety hazards in construction work occur due to poorly designed ladders, unsuitable or poorly maintained lifting appliances, improper material handling, improper walking surfaces high platforms, improperly shored trenches, badly maintained tools and inadequate illuminations[20]. Construction work accidents contribute to 16.4% of fatal global occupational accidents[1]. The fatal accident frequency rate was 15.8 incidents/1000 employees/year[20,4]. An operational study on accidents in construction industry reported that problems arising from workers were 70%, workplace issues 49%, shortcomings with equipment 56% and deficiencies with risk management (84%)[24]. In our study, around 12.1% had sustained work related accident/injury during last 1 year. Poor language skills prevent them from understanding the safety precautions given and to follow the instructions given by supervisors. Civil workers had high risk of injury (6.6% vs. 17.2%. P = 0.001) and most of them were mechanical injury, which may be due to high rate of manual works using sharp tools and falls. Injury constitute wounds (7.2%), contusion (1.8%), burns (0.5%) and fracture of bones(0.8%). Currently, 2.3% had signs or symptoms of injury with no significant difference in two groups. The prevalence of injuries in previous studies were 7.9%, 7.56% and 25.42%, [4,5,25]the reduction may be attributed to increased mechanization and good work practices. The risk of accidents increase with extremes of temperature, age, male gender, personal habits like use of alcohol, personality traits of risk-taking behavior and physical and mental state of the worker. [19] They were also less literate, which make them less aware of accident risks and precautions to be taken. Owing to their working in heights on moving cranes, unstable walking surfaces and probably poor illumination, the frequency of accidents were higher among building workers.

Recommendations

Based on the review, the authors suggest the following recommendations

Workplace: There should be effective implementation of health and safety management at construction sites. Work place safety measures should b e examined regularly to avoid the risk of occupational injuries. The officers of the labour department should visit the construction sites frequently so as to monitor the work conditions. Efforts should be made to improve the conditions to lessen the risk of injury, by providing proper lights, or reducing the chances of slip injuries while the workers are manual handling.

Work equipment: The tools that are used by the worker should be ergonomically designed such that they \reduce the force that is required for a task. A higher level of industrialized production and use of assembling techniques for prefabricated modules should be adopted by the construction companies. The availability of mechanical aids must be provided whenever demanded as per the task.

Worker: The construction workers should be trained for increasing their knowledge about the ergonomic principles such that it aids them in knowing and avoiding unsafe working conditions. The workers need to be convinced to pay attention on prevention of hazardous conditions. Women workers should be given well fitted PPEs and PPC for safe and efficient performance. PPEs which do not hinder the free and fast movements of body and are comfortable should be designed. The design of PPEs and PPC for women should be based on female measurements and their use should be encouraged through demonstrations and subsidized schemes. Comfortable weather proof and warm high visibility jacket (Yellow coloured with additional high visibility reflective bands) should be used for winter. High visibility waistcoat should be used for summer season. Workers should accept safety performance. Women

construction workers should also find alternative ways of performing tasks at construction sites.

Policies: Women's prospective should be included in developing and applying macro economic and social policies by involving and preparing their participation in such processes. In order to improve the working conditions of women workers, concerted and deliberate efforts by various agencies like trade unions, employer associations, women organizations and NGOs are needed.

Work task: One of the major work task is to reduce the physical demands of the job, which means reducing the repiton, awkward posture, vibration, proper lighting and level of force. The work task often arises a need for using the manual material handling devices. For reducing production pressures, the main contractor and his subcontractors must consider making provisions for an increased number of manual labour for the work task. The risk factors should be addressed by the employers and workers at all level.

Work management includes practical planning of work and assuring safe systems of work. At the organisational level, their aim should be to reduce fatigue, organizing breaks, provding job rotation. At the corporate level, a safeenvironemnt should be encouraged. A cordial relationship between the developer and the general contractor is necessary not only in planning the work environment but also while putting it into practice. A broader worker participation in the pre-production planning should be planned for an ideal input about the potential risks and controls. Furthermore, sub-contractors must be encouraged by the contractors in taking part in the pre-production planning to avoid the identified health risks.

Physical work environment: Findings reveal that bad physical work environment result due to poor and inadequate planning. A proper site layout should be prepared for adjusting the constant changing construction workplace. The contracts and tenders must have a detail of the responsibilities and it must be ensured that they are discussed with the workers.

Role of NGOs: NGOs and other organizations can create awareness about better work conditions among women workers' unions and workers' cooperatives. Awareness raising for safe work section should be advocated. Labour Rights' NGOs should campaign for safe construction work. They should take initiative to develop credible monitoring and verification practices that will help improve working conditions. Government should also conduct awareness raising programmes about occupational health and safety in cooperation with the local NGOS and trade unions.

Conclusion

Construction Industry is an ongoing industry. With the increase in the population there is an increase in the demands of the construction works proportionately in the form of houses, malls, societies. The construction industry is at its highest point as of today. The government and the business holders must try and understand the situation of the construction worker. The health of the worker directly affects the work of the industry. Thus, good health of the worker must be the prime concern of the reformers. There must be efforts made for application of ergonomic principles such that the user is at comfort and the degenerative effects of the work are lessoned.

References

1. Kulkarni G.K. (2007). Construction industry: More needs to be done, *Indian Journal Occupational and Environmental Medicine,* 11, 1-2.

2. Shah K.R. and Tiwari R.R. (2010). Occupational skin problems in construction workers, *Indian J Dermatol*, 55, 348-51.

3. Taimela S., Läärä E., Malmivaara A., Tiekso J., Sintonen H. and Justén S., *et al*. (2007) Self-reported health problems and sickness absence in different age groups predominantly engaged in physical work. *Occup Environ Med.* 64, 739-46.

4. Gaurav R.B., Kartikeyan S., Wayal R. and Joshi S.D. (2005). Assessment of daily wage labourers., *Indian J Occup Environ Med.,* 9,115-7,

5. Adsul B.B., Laad P.S., Howal P.V. and Chaturvedi R.M. (2011). Health problems among migrant construction workers: A unique public-private partnership project, *Indian J Occup Environ Med.*, 15, 29-32.

6. Kumar N.A. (2011). Vulnerability of Migrants and Responsiveness' of the State: The Case of Unskilled Migrant Workers in Kerala, India. Working Paper No. 26. Kochi, Kerala: Centre for Socio-Economic and Environmental Studies.

7. Breman J. (1985). Of Peasants, Migrants and Paupers: Rural Labour and Capitalist Production in Western India, Delhi., Oxford University Press.

8. Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996, Ministry of Labour, Government of India.

9. Chamaraj K. (2003). Making Statues from Black Stone", *Humanscape Magazine*, 10 (8).

10. Salik Y and Ozcan A. (2004). Work related musculoskeletal disorders: A survey of physical therapists in Izmir-Turkey. *BMC Musculoskeletal Disorders*, 5, 27-32.

11. Silverstein B. and Vikari J. (2002) Use of preventive index to identify industries at high risk for work-related musculoskeletal disorders of the neck, back and upper extremity in Washington state, 1990-1998. *Am J Ind Med*, 41, 149-169.

12. Annual Report of Ministry of Labour for the year 2007-08. 2009 Aug 31. Available from: http://labour .nic.in/annrep/annrep2008.htm

13. Bernard BP. Washington, DC: [DHHS (NIOSH)] (1997). Department of Health and Human Services, National Institute of Occupational Safety and Health. Musculoskeletal Disorders (MSDs) and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back; 97–141.

14. Nahit E.S., Hunt I.M., Lunt M., Dunn G., Silman A.J. and Macfarlane G.J. (2003). Effects of psychosocial and individual psychological factors on the onset of musculoskeletal pain: Common and site-specific effects. *Ann Rheum Dis.,* 62, 755–60.

15. Tiwary G. and Gangopadhyay P.K. (2011). A review on the occupational health and social security of unorganized workers in the construction industry., *Indian J Occup Environ Med.,* 15, 18-24.

16. Punnett L and Wegman DH (2004). Work-related musculoskeletal disorders: The epidemiologic evidence and the debate. *J Electromyogr Kinesiol,* 14, 13-23 .

17. Valsangkar S. and Sai K.S. (2012) Impact of musculoskeletal disorders and social determinants on health in construction workers., International Journal of Biological and Medical Research., 3(2), 1727-1730.

18. Buckle PW (2002). Devereux JJ. The nature of work related neck upper limb musculoskeletal disorders. *Appl Ergon,* 33, 207-217.

19. Jayakrishnan J., Thomas B., Rao B. and George B. (2013). Occupational health problems of construction workers in India, *International Journal of Medicine and Public Heath,* 3(4), 225-229.

20. Tiwary G. and Gangopadhyay P.K. (2011). A review on the occupational health and social security of unorganized workers in the construction industry, *Indian J Occup Environ Med.,* 15, 18-24.

21. Schneider S.P. (2001) Musculoskeletal injuries in construction: A review of the literature, *Appl Occup Environ Hyg* 16, 1056-64.

22. Mohopatra R. (2002). Occupational health hazards in small scale and other industries. In: Mohopatra R, editor. Occupational Health Hazards and Remedies., New Delhi: Jaypee Brothers Medical Publishers Pvt. Ltd., 1st ed. 203-4.

23. Shah C.K. and Mehta H. (2009) Study of injuries among construction workers in Ahmadabad city, Gujarat, *Indian J Pract Doct.,* 5, 4-8.

24. Telaprolu N., Lal B. and Chekuri S. (2013). Work Related Musculoskeletal Disorders Among Unskilled Indian Women Construction Workers, *National Journal of Community Medicine,* 4(4), 658-661.

25. Joshi TK, Menon KK and Kishore J. (2001). Musculoskeletal disorders in industrial workers of Delhi. *International Journal of Occupational and Environmental Health,* 7(2), 17–21.