

of fall in the sampled kilns were high. The musculoskeletal disorder related pain and discomfort was experienced by 73 per cent of working children in Bhaktapur and 58 per cent in Sarlahi. It was identified that work related injuries in young workers majorly affected upper and lower limbs. The odds ratio suggests that young workers were 8 times more likely to experience trouble or body pain compared to non-working children.

Discussion This study finds that presence of inferior physical environment, working conditions and practices has contributed to musculoskeletal injuries and problems exposing young workers to risks and hazards. This study was based on a small sample; nevertheless it portrays an overview of musculoskeletal disorders in the brick kilns focusing on young workers.

283 REAL-TIME BIOFEEDBACK AND ITS ABILITY TO AFFECT CHANGES IN SPINAL POSTURE DURING REPETITIVE LIFTING

¹MG Boocock, ¹Yanto Naude, ²Jeff Kilby, ¹GA Mawston. ¹Health and Rehabilitation Research Institute, Auckland University of Technology, Auckland, New Zealand; ²School of Engineering, Computing and Mathematical Sciences, Auckland University of Technology, Auckland, New Zealand

10.1136/oemed-2018-ICOHabstracts.766

Introduction Low back pain (LBP) is the leading cause of disability globally. Occupational risk factors associated with LBP include heavy, repetitive lifting, and awkward and flexed postures. Studies suggest younger people may be at an increased risk of LBP compared to older individuals. Postural feedback as an early intervention may provide a viable preventative approach for reducing the risk of LBP in the workplace.

Methods Thirty-four healthy, young participants were randomly allocated biofeedback (BF) or no biofeedback (NBF). Participants lifted a box weighing 13 kg at a frequency of 10 lifts per minute for up to 20 min. Real-time biofeedback on lumbar posture was provided using two wireless inertial sensors attached to the lumbar spine and sacrum. The BF group received an audible cue when lumbar flexion exceeded 80% maximum flexion. Three-dimensional motion analysis and ground reaction forces were used to estimate moments at the base of the spine and on the passive structures of the lumbar spine. Participants rated perceived exertion throughout the task using Borg's scale.

Results Both the BF and NBF groups increased lumbar flexion over the duration of the lifting task, although the rate of change (slope) of peak lumbar flexion with BF was significantly less compared to NBF ($p=0.009$). Normalised bending moments resisted by passive structures of the spine were higher in the NBF group (0.7 Nm/kg) compared to the BF group (0.12 Nm/kg) at 20 min. The BF group demonstrated lower levels of perceived exertion.

Discussion Real-time biofeedback provides a viable approach to increase spinal postural awareness during repetitive lifting tasks, helping to reduce loads on the passive structures of the lumbar spine. A simple wireless inertial system for monitoring posture has potential for use in the work environment, and further evaluations should be undertaken to determine the long-term effectiveness of this approach.

293 INVESTIGATION ON THE PREVALENCE OF MUSCULO-SKELETAL DISORDERS AMONG JUTE MILL WORKERS IN INDIA

¹Somnath Gangopadhyay*, ²Syantika Das, ²Shreya Sinha, ³Santi Ranjan Dasgupta, ⁴Subrata Goswami. ¹Professor; Occupational Ergonomics Laboratory, Department of Physiology, University College of Science and Technology, University of Calcutta, Kolkata, India; ²Research Scholar; Occupational Ergonomics Laboratory, Department of Physiology, University College of Science and Technology, University of Calcutta, India; ³Research Investigator; ESI Institute of Pain Management, ESI Hospital, Sealdah, Kolkata, West Bengal, India; ⁴Coarse coordinator; ESI Institute of Pain Management, ESI Hospital, Sealdah, Kolkata, West Bengal, India

10.1136/oemed-2018-ICOHabstracts.767

Introduction Musculoskeletal disorders (MSDs) are reported maximum among jute mill workers of India. The present study is designed to find out the actual magnitude of the problems among jute mill workers and to identify the possible associations between discomforts and working postures of these workers.

Methodology This study was conducted among eight selected jute mills of India. 717 male jute mill workers actively engaged in work at least for one year were randomly selected in this study. Subjects with self-reported MSD complaints for at least last 12 weeks were included. A detailed posture analysis was performed among them by Ovako Working Posture Assessment System (OWAS) method.

Results Among all participants 55% had complained Chronic Low Back Pain (CLBP). Age had an important association with CLBP. Subjects in the age group of 40–59 years were more likely to have pain ($p=0.02$). Regarding ergonomic risk factors, lifting of load of more than 20 kg ($p=0.04$) and repetitive movements of limbs ($p=0.03$) had significant associations with CLBP.

Discussion Present study identifies a significant prevalence of CLBP among jute mill workers. Regarding ergonomic risk factors, the study has identified that MSD is significantly associated with work related awkward postures, lifting of load above 20 kg, repetitive movements of limbs and prolonged standing during work. Jute mill workers are exposed to heavy workload with repetitive and forceful motions, which generally adopt awkward and uncomfortable postures and carrying of excessive loads that ultimately has got a great impact on their health. Therefore, this study suggests the urgent need for work place interventions for improvement of work related health of 3,50,000 Jute workers of India.

333 RATING FORCE REQUIRED TO PERFORM SELECTED WORK ACTIVITIES

ZW Józwiak*, M Dania, M Kosobudzki, A Bortkiewicz. Department of Work Physiology and Ergonomics, Nofer Institute of Occupational Medicine, Łódź, Poland

10.1136/oemed-2018-ICOHabstracts.768

Introduction The rules for the use of force when performing work activities are specified for women and men in the Ordinance of the Minister of Labour and Social Policy of 14 March 2000 on health and safety at work in manual transport and later changes – Ordinance of the Minister of Family, Labour and Social Policy of 25 April 2017. In particular, these rules apply to manual transport,

but also contain guidance on the use of levers, cranks and wheels that are fitted to work stations.

Methods This paper presents the results of several research studies performed by NIOM researchers in the field of force necessary for the professional activities. The studies were done using the measuring set: tensometric dynamometer, force converter, amplifier and PC for data collection. Measurements were done at least 3 times for one activity, the average value of force was taken for further analysis.

Result During the tests, it was stated that, depending on the technical condition of the transport trolleys used in the hypermarkets (weight including the load of about 450 kg limited by law), kind of the pavement on which they moved and the way they were put into motion, the force necessary to start their movement was from 60 n to 650 n.

Discussion These values were 2–3 times higher than the applicable standards (300 n – for pushing, 250 n – for pulling). On the other hand, the measurements of the force needed to launch overloaded trucks used in the transport of gas cylinders or materials in the textile industry (up to about 1500 kg) indicate the necessity to use 500 n – 700 n force – well above the permissible. It is visible that the ergonomic interventions including education and training is necessary.

343 BIOMECHANICAL AND PHYSIOLOGICAL PARAMETERS FOR MANUAL MATERIAL HANDLING (MMH) RISK ASSESSMENT IN MARITIME WORKERS

¹A Silvetti*, ²E Munafó, ¹A Ranavolo, ¹F Draicchio. ¹INAIL, Monte Porzio Catone, Italy; ²ITAL UIL, Rome, Italy

10.1136/oemed-2018-ICOHabstracts.769

Introduction According to EU data, the fishing sector is the one with the highest injury rate of all other sectors. Aim of the study is to assess some MMH tasks in which it was possible to use the common standardised protocols in conditions where, although their restrictions, they could provide early indications.

Methods NIOSH protocol was used to assess unloading crates of fish (weight of 12 Kg or 16 Kg) out of the boat to the van and while unloading crates, inside the boat, from the refrigerator to the slipway. Unloading crates from the boat to the van was studied also by means of 3DSSPP to estimate compression force at L4/L5 level. Heart rate monitors were used to estimate CCr while handling crates inside refrigerator.

Result Results obtained using the NIOSH protocol show LIs between 2.55 and 6.34 and a RWL between 2.52 Kg e 4.69 Kg. 3DSSPP analysis reported L4/L5 compression force ranging between 2752N and 3946N and low strength percent capability at wrist, shoulder, trunk and hip joints. Unloading crates from refrigerator to slipway analysis reported LIs ranging from 1.63 to 5.83 and a RWL ranging from 2.74 Kg to 7.36 Kg. MMH inside refrigerator showed CCr values of 40.5% and 42.7%.

Discussion During boarding, we observed several activities worthy of attention under the biomechanical overload point of view. We investigated the most strenuous tasks according to the crew's information. All obtained values were largely over the limit for all used methods and are consistent with results from other studies. We observed MMH activities not assessable with any of the methods currently available in the literature because they cannot describe the tasks in their globality. It was also noted that the workers, based on their experience,

have adopted enhancements reducing vertical displacement, asymmetry angle and adopting an internal organisation of rotation during MMH tasks.

Acknowledgements This study has been accomplished with the support from UILA Pesc

362 DOCKWORKERS MUSCULOSKELETAL INJURY PREVENTION PROGRAM ON A BRAZILIAN TERMINAL

¹EB Lima*, ²JM Almeida, ³AS Alves, ⁴MA Pinto, ⁵FF Santos. ¹Occupational Physician in Terminal Exportador do Guarujá (TEG); ²In charge of Quality of Life (TEG); ³Work Nurse (TEG); ⁴QMSS Supervisor (TEG); ⁵Operation Manager (TEG)

10.1136/oemed-2018-ICOHabstracts.770

Introduction Terminals in the port of Santos, the largest in Latin America, are constantly working to minimise physical impacts of work on employees. Aiming at the prevention of musculoskeletal injuries and quality of life improvement, we implemented a series of functional and ergonomic measures in 2014, which resulted in significant absenteeism reduction and excellent acceptance from employees, with a relevant improvement to their quality of life.

Methods The program begins with a health evaluation on the employee's admission that includes anthropometry, dynamometry and surface electromyography. On the first month of work, the employee's last 40 min of the workday are held in a gym inside the terminal, where specific exercises, conducted by 3 physical educators professionals. After this period this routine becomes optional, but with a strong incentive for its continuity (outside of the work period). Also, there is a daily labour gymnastics program maintained for all employees. Concomitantly, research is done on ergonomic conditions, where employees give opinions about job satisfaction and possible adverse conditions, suggesting actions that will be evaluated by the Ergonomics Committee that study and treat these cases.

Result Since 2015, when the program started, if compared to 2014, there was a 30% reduction of absenteeism caused by osteomuscular injuries. From 2015 to 2016 there was a 46% absenteeism reduction from the same causes. When comparing 2014 with 2016, there was an overall reduction of 62%. Additionally, in 2016, 132 employees suggestions on ergonomic aspects were raised and addressed by the Ergonomics Committee. A relevant index show that 78% of the employees were practicing some physical activity by the end of 2016 and of those, 48% performed the activities inside the Terminal's gym.

Discussion Musculoskeletal injuries are the major causes of dockworkers absenteeism. The Program implementation and employees suggestions significantly reduced absenteeism rates, encouraged the physical activities practice in the workplace and consequently improved their quality of life.

445 A PRACTICAL NOVEL MODEL FOR OFFICE ERGONOMICS AWARENESS AMONGST GLOBAL CORPORATE OFFICE EMPLOYEES'. SHARING EXPERIENCE FROM 11 COUNTRIES

Kishore Madhwani. Hindustan Unilever Limited, Mumbai, India

10.1136/oemed-2018-ICOHabstracts.771

Introduction With increase in use of laptops, globally there is a need to spread awareness on office ergonomics. The