

Introduction Musculoskeletal disorders (MSD) represent a significant occupational problem in intensive care unit (ICU) workers. This study aimed to determine ergonomic risk factors and the musculoskeletal symptoms in ICU workers in university hospital.

Methods Ergo team was created by the occupational health department in the hospital. The socio demographic data were obtained by a questionnaire. The clinical assessments were performed by a physiatrist. Cornell Musculoskeletal Discomfort Questionnaire was used for musculoskeletal symptoms assessment. Walk-through survey performed to determine main jobs and tasks in ICUs. The Rapid Entire Body Assessment (REBA) scale was used to assess the ergonomics risks for the nurses.

Results There were 30 patient' bed in both intensive care units. Twelve doctors(10.7%), sixty four nurses (62.7%) and twenty seven staff members (26.2%) worked in two ICUs included in the study. Each nurse was responsible for two patients while the doctors and staff members were responsible entire units. 102 workers of those 56 from internal medicine ICU (IMICU) (56%) and 46 from anaesthesia ICU (AICU) (46%) workers were participated to the study. 60.7% of the study group was female and the mean age was 32 ± 6.4 in IMICU and 33.1 ± 5.7 in AICU ($p=0.3$). According to the Cornell scale, 52 (50.9%) had neck pain, 58 (56.8%) had back pain and 25 (24.5%) had wrist pain. Two ergonomically high risk tasks (patient positioning and working with monitor) were identified. The nurses' mean REBA score was 9.7 ± 1.6 in anaesthesia ICU and 8.7 ± 2.0 in internal medicine ICU ($p=0.8$) for patient position taks. The mean REBA scores for anaesthesia ICU were 6.1 ± 1.6 and 4.8 ± 1.4 ($p=0.7$) respectively.

Conclusion More than half of ICU workers had neck, back and wrist pain. ICU nurses had high ergonomics risks. In these units, 'ergonomic risk prevention programmes' should be implemented by occupational health teams.

316 REDUCTION OF MUSCULOSKELETAL PAIN AMONG PROFESSIONAL MUSICIANS BY INTRODUCING RESISTANCE BAND TRAINING AT WORK

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Introduction Several studies have shown that professional symphony orchestra musicians have a higher prevalence of musculoskeletal complaints (MSC), compared to other work groups. MSC have a great impact on the musicians' workability and life quality, emphasising the importance of finding preventive measures

Methods A cross-sectional study, based on questionnaires before and after an intervention of resistance band training, among 350 musicians and administrative workers from 5 symphony orchestras in Denmark. The participant rated their degree of pain on a VAS scale from 0 to 10 and overall reduction of MSC. The changes from baseline to follow-up for each separate body region were evaluated using a linear mixed model.

Result MSC was most common in shoulders, neck, and lower back. Female musicians had a significantly higher prevalence of MSC than men. Low string group had the lowest prevalence of MSC, while high string, brass-winds and woodwind

groups had a relative high prevalence of MSC. Resistance band training showed a positive significant effect with a mean reduction of VAS-scores in shoulders at -0.88 and neck at -0.52 . 45% of the participants experienced an overall reduction in musculoskeletal pain.

Discussion In compliance with the purpose, MSC before and after the intervention were assessed, showing a positive effect with regards to MSC in shoulders and neck. Future research should explore how realistic implementing resistance band training is as a steady regime among professional symphony orchestra musicians, likewise assuring a long lasting positive effect.

170 STUDY ON WORK-RELATED MUSCULOSKELETAL SYMPTOMS AMONG TRAFFIC POLICE IN KATHMANDU VALLEY

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Introduction Occupational environment plays an important role in health of the exposed population. Traffic police personnel (TPP) are more vulnerable to this situation. Work-related Musculoskeletal symptoms (WRMSS) is defined as any trouble (ache, pain or discomfort) in nine topographic region of the body. The purpose of the study is to find the prevalence of WRMSS and to find the association between the various risk factors like-age, working hours, work in the field (years), body mass index(BMI), smoking, alcohol consumption, chewing tobacco with the development of WRMSS and to assess the sickness absenteeism and reduction in productivity.

Methods An analytical cross-sectional study of WRMSS was done among 355 traffic police from all 36 traffic booths of Kathmandu Valley. Data was collected using a questionnaires adapted from the Dutch and Nordic Musculoskeletal questionnaires. The number of traffic police was selected according to the proportion of the traffic police in each traffic booth.

Results The average age of the respondents with standard deviation were 29.59 ± 6.99 years and a majority were male (90.1%). Almost 70% of respondents had complain of WRMSS in any body parts during last 12 months and the most common site was low back (51.3%).WRMSS lead to 9.25% absenteeism from work and 2.25% change duties due to Musculoskeletal trouble. The variables age, duration of working hour, work in the field (years), BMI were significantly associated with WRMSS (all $p < 0.05$). There was no significant association between education, smoking, alcohol consumption, and chewing tobacco with WRMSS in Traffic police.

Conclusion WRMSS affects more than 70% of traffic police with most common site being the low back. Significant risk factors include- age, duration of working hour, work in the field (years) and body mass index. Periodic examination, ergonomics modification and health education will definitely help to improve the quality of life among this group.

1495 IDENTIFICATION OF INFLAMMATORY BIOMARKERS FOR THE EARLY DETECTION OF TENDONITIS DURING REPETITIVE MANUAL ASSEMBLY TASKS

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Introduction The National Institute for Occupational Safety and Health (NIOSH) defines work related musculoskeletal disorders (WMSDs) as a group of disorders involving muscles, tendons and nerves. Symptoms of WMSDs are a common problem in the general population, and are considered the most common occupational disease causing limitations in daily activities. Even though there is an association between repetitive manual tasks, with short work cycles and force demanding tasks with the development of WMSDs, the particular cause of the physiological changes over a long period of time is a cause of debate. The study of the mechanisms underlying the physiological changes is essential for the early detection, diagnosis, and appropriate management of WMSDs.

Methods The study will include 30 healthy college students 18 year old and older with no previous history or exposure to repetitive or forceful tasks within the past eight weeks, and not receiving anti-inflammatory treatment. Participants will perform a manual task for 25 min daily for five days over a period of four weeks. A blood sample will be collected after the completion of the task on the fifth day. Blood serum levels of Interleukin 6 (IL-6), Interleukin 1 β (IL-1 β), Metalloproteinase 2 (MMP2) and Cyclooxygenase-2 (COX-2) will be measured using commercially available ELISA kits. Weekly levels of the biomarkers will be compared to baseline levels for significant differences.

Results Expected results of the study include an elevated expression of the targeted biomarkers before there is an inflammatory response, and an inflammatory response at the end of the intervention.

Conclusion The results of this study will help having a better understanding of the physiological changes resulting from repetitive manual tasks, and more importantly will provide the basis for the development of a rapid test to assess the risk to trigger an inflammatory response and prevent the development of WMSDs.

917 INJURED-BASED SPOT MAP AND ITS USE IN WORK DISABILITY PREVENTION

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Introduction Brazilian regulations oblige employers to prevent, track and make an early diagnosis of health problems related to work and to make a compulsory notification of occupational diseases. However, there is a great number of sub notification in Brazil, mostly due to ineffective programs of occupational hygiene and ergonomics. This paper suggests a strategy to make these programs more reliable for musculoskeletal condition prevention.

Methods This is a descriptive cross-section case study of an industrial plant in Nova Santa Rita, Rio Grande do Sul, Brazil. An intervention of Brazilian labour inspection due to a complaint of sub notification occurred in 2016, and secondary data source as official reports, ergonomic analysis and an injured-based spot map from 2010 to 2016 have been used. A spot map is used to display the location of each health-related state or event that occurs in a defined place and time. As an

evidence, it may highlight a possible link between injury and professional activities.

Results Non-notified musculoskeletal disorders and nerve injuries (101 cases) exceed the notified ones (52 cases) in 94,23%; in 4 of 15 industrial lines, the difference was even bigger: 210%. 13 non-notified cases had the same ICD-10 classification and workplace as 7 notified. An ergonomic study proved that non-notified injuries could be work-related, depending on individual anamnesis.

Conclusion Adopting a spot map is a strategy that helps the identification of worker's injury risks and the implementation of ergonomics solutions. It ends up preventing illness and minimising sub notification. By showing where injuries take place in a facility, occupational safety and health staff can prioritise control measures of identified ergonomics or other work-related risks. Authorities prerogatives, such as determine the alteration of working conditions to secure compliance with legal provisions on occupational safety and health, gain assertiveness if based on that organised data.

992 ERGONOMIC RISK EVALUATION IN AN AUTOMOBILE INDUSTRY FOR PREVENTING MUSCULOSKELETAL PROBLEMS

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Introduction A details ergonomics Risk assessment evaluation of some selected operation in an automotive plant was carried out. This evaluation was carried out with a view to assess the physiological cost of work among the operator during actual industrial operations, to assess the ergonomics risk factors at shop floor during actual operation with a view to minimise such risk factor through mechanisation or automation.

Methods Working heart rate of the workers were recorded manually to calculate the energy cost of work and workers ability to perform the shop floor operations. Risk factors were evaluated through extensive application of RULA and REBA at all pre-selected areas.

Results It could be observed from study that the mean working heart rate was found to be 112 \pm 1.3 beats.min⁻¹, oxygen uptake was computed to be 0.94 \pm 0.2 lit.min⁻¹. The concomitant energy expenditure was found to be 4.7 \pm 1.0 Kcal.min⁻¹ suggesting the job severity is varying from moderate to high. The sustainability of job @ 18.8 Kj.min⁻¹. Is well within physical capacity of operators. The average RULA score readings are varying from 3.43 \pm 0.84 suggesting that the immediate action is not warranted. The average REBA scale was found to be 4.32 \pm 0.89 which is in agreement with that of RULA.

Discussion The work stress, postural stress, and lifting index have shown positive results. The ergonomics risk factors is well within safe limits. Operators are safe, healthy and productive at this stage. The results of all three sections are assessed and the difference was not statistically significant thus the ergonomics risk factors are considered not serious can be continued. However any frequency (increase production) schedule change, distance variations as well as horizontal variations needs to keep constant in this present situation.