P-165  NATIONAL EPIDEMIOLOGIC PROFILE OF UPPER LIMB MUSCULOSKELETAL DISORDERS IN THE TUNISIAN WORKFORCE AND PREDICTIONS FOR 2026.

1Ors Grisa, Mohamed Manita, Marouane Hayouni, Ines Rassas, Charfeddine Amri, Neila Chaari, Adlene Henchi, Mohamed Akrout, Ihem Boussarsar, Irtyah Merchouai.  
2Faculty of Medicine of Monastir, University of Monastir, Tunisia

10.1136/OEM-2021-EPI.215

Introduction Upper limb Musculoskeletal disorders (UL-MSDs) in occupationally active populations represent an important health issue that affect millions of people worldwide. They lead to high healthcare costs and represent a significant burden to the national economy.

Objectives To assess the incidence of UL-MSDs in the industrial private sector since 2000 and to determine projection for 2026.

Methods Using a national retrospective study that concerned all the Occupational MSDs reported to the Tunisian National Health Insurance Fund, in all industrial private sectors from January 2000 to May 2018, we gathered all the medical and administrative data available.

Results Six thousand and forty-two cases of UL-MSDs were totaled. Most of the declared occupational UL-MSDs were those of female workers (sex ratio=0.15). Moreover, the present study showed a young age of declaration of MSDs (44 ± 7.5 years). The most common industrial sector affected was in textile manufacturing (63.9%). Mono-site MSDs were significantly more prevalent in almost all the industrial sectors. Central district had a significantly higher yearly number of cases than the two others (p<10^-3). The study showed that approximately 71% of all initial medical certificates were accepted by the recognition committee (p=0.007). In 2026, it is expected to count 2,626 new occupational declared UL-MSDs, with a crude prevalence in female workers 27 times as high as in male workers. The textile and clothing manufacturing will remain the main affected sector by the UL-MSDs till 2026.

Conclusion The risk of UL-MSDs in the Tunisian private sector workforce is considerable; it requires the implementation of rapid ergonomic preventive measures in the next decade. Further biomechanical and psycho-organizational studies of the most at-risk workstations in the Tunisian clothing industry are key to preventing these occupational disorders.

P-166  WORKPLACE STUDY OF A LOADING AND UNLOADING AUToclave WORKSTATION IN THE STERILIZATION UNIT OF THE UNIVERSITY HOSPITAL OF MONASTIR-TUNISIA.

1Irtyah Merchaoui, Marouen Hayouni, Hibat Allah Mosbah, Nezine Mars, Ines Rassas, Charfeddine Amri, Neila Chaari, Adlene Henchi, Mohamed Akrout.  
2University of Monastir, Tunisia

10.1136/OEM-2021-EPI.216

Introduction In sterilization units, autoclaves are commonly used to guarantee equipment asepsis in sensitive environment. They should be loaded many times a day to guarantee the continuity of medical activity.

Objectives At the behest of the hygiene department boss, following autoclave health workers complaints about low back and upper limb pain, we carried out an analysis of the activity in order to identify the main occupational risk factors and propose consequent ergonomic recommendations.

Methods We proceeded to activity analysis based on observation method and operators’ interviews. We finally assessed the autoclave loading and unloading lumbar and musculoskeletal disorders (MSD) risks respectively through NIOSH and Ergonom analyses.

Results For the autoclave loading station, carrying of weight loads ranged from 5 to 40 kg. The NIOSH recommended load limit ranged from 2.0 to 11.8 kg in the autoclave loading station, and from 1.4 to 11.4 kg in the unloading station with a risk of low back pain of 4% for men and 15% for women. For upper limb MSD, Ergonom analyses proved a high risk of tendonitis of the rotator cuff (dominant shoulder in flexion or abduction > 60° in isometry or with heavy load bearing) and of elbow due to a 60 to 100° flexion/contraction over 73% of the working time. For the unloading station, there was an overall risk related to the hand grip. The risk of tendonitis of both elbows was related to a 60 to 100° prolonged flexion over 85% of the working time.

Conclusion In the light of the obtained results, in order to avoid MSDs and low back pain in healthcare technicians of the autoclave in the sterilization unit, we recommended the handling load of material to sterilize should be limited to 11 kg and the use of the trolleys preferably with adjustable height and with dynamic racks.

P-169  INFLUENCE OF ORGANIZATIONAL JOB CHARACTERISTICS ON NURSES’ OCCUPATIONAL WELLBEING.

1Irtyah Merchouai, Marouen Hayouni, Salma Kammoun, Ines Rassas, Mohamed Akrout, Jaques Malchaire, Neila Chaari.  
2University of Monastir, Tunisia

10.1136/OEM-2021-EPI.217

Introduction Nurses’ well-being has become a point of interest due to their stressful environment and consequent possible burnout.

Objectives to assess the influence of Tunisian nurses’ job perception on their occupational well-being and to identify its main determinants.

Methods Our exploratory survey of job perception included an ergonomic chronological observation of 55 workstations in Monastir and Mahdia university hospitals in order to evaluate workload factors. The choice of the observed positions was based on the type of care department, nurse age and gender. Nurses’ occupational well-being determinants were identified through a questionnaire driven by the Karasek and satisfaction scales.

Results The analysis of nurse job strain has shown that direct care requiring higher cognitive demands represents 27.26% of the total working time while administrative activities represent a higher proportion of nursing work. Furthermore, painful postures and movements were observed during about 20% of working time. Standing posture was adopted during 58.22% of the total working time, while sitting position was adopted only for a quarter (26.6%) of it.

Subjective perceived workload of occupational well-being was found to be higher than on the day of activity observation. However, 69.1% of nurses felt stressed at work with a lack of autonomy and a lot of routine. They also reported to
be under estimated by their supervisor while they are supported by their colleagues. In addition, most of them felt unsatisfied with their salary and were not confident in their career evolution.

**Conclusion** The discrepancy raised by our study between the real workload and the perceived well-being seems to be conditioned by organizational dysfunction and dissatisfaction with conditions of work performance. New organizational possibilities with brainstorming approaches of the nurses’ work environment are recommended and are being built through interdisciplinary research-action studies.

**P-171 AIR RECIRCULATION IN VENTILATION SYSTEM AND ITS IMPACT ON TRICHLORAMINE EXPOSURES IN A SWIMMING POOL HALL: A NUMERICAL INVESTIGATION**

1Hélène Proulx, Maximilien Debia, Stéphane Hallé. 2École de technologie supérieure, Canada

10.1136/OEM-2021-EPI.218

**Introduction** Trichloramine (NCl3) is an irritant gas commonly found in the air of indoor swimming pools, causing health problems to swimmers and workers who are often exposed to this contaminant. ASHRAE recommends a supply air delivery rate of 4 to 8 air changes per hour to remove trichloramine in aquatic centers. However, the fraction of recirculated air can have a significant impact on the exposure level.

**Objective** The main objective of this study is to investigate the impact of air recirculation by mechanical ventilation systems on NCl3 exposures for five user groups: i) swimmers in the basin, ii) people sitting or iii) standing on the deck, iv) lifeguards in surveillance chairs and v) spectators in mezzanine area.

**Methods** Exposure to NCl3 levels in a 9300 m3 swimming pool hall located in Montreal (Canada) is evaluated with a computational fluid dynamic software (Fire Dynamic Simulator). Simulations are performed for five recirculation ratios starting from the reference case at 77% down to 0% (100% fresh air). Emission rate of NCl3 is based on equations found in literature for a fully occupied pool. The numerical model was experimentally validated with tracer gas injection in situ.

**Results** The tracer gas simulation results show good agreement with the experimental results. Compared to the reference case (77% recirculation condition), a 100% fresh air ventilation strategy decreases the NCl3 levels of the five groups from: i) swimmers in the basin, ii) people sitting or iii) standing on the deck, iv) lifeguards in surveillance chairs and v) spectators in mezzanine area.

**Conclusion** Reducing the recirculation rate reduces the NCl3 concentrations. However, recirculation of air has less impact on the concentrations in the breathing zones located near the water surface compared to the other zones. The best air quality improvement with the 100% fresh air strategy is for spectators. Other ventilation strategies have to be investigated to improve air quality in the lower breathing zones as well.

**P-177 TEMPORARY AND PERMANENT AUDITORY EFFECTS ASSOCIATED WITH OCCUPATIONAL CO-EXPOSURE TO LOW LEVELS OF SOLVENTS AND NOISE**

1Adriana Lacerda, Vanessa Bohn, Maria Renata José, Simone Mariotti Roggia, Fernanda Zuck, Bernolt Pouyatos, Thomas Venet, Edward Krieg, Thais C Morata. 1Universidade Tuiuti do Parana, Brazil

10.1136/OEM-2021-EPI.220

**Introduction** The effect of combined exposures to noise and solvents on hearing has been studied for decades, but the characterization of the risk is incomplete.

**Objective** To assess the temporary and permanent auditory effects associated with occupational co-exposures to low levels of solvents and noise.

**Method** Cross-sectional study with 25 printing industry workers (mean age 36.2 years) simultaneously exposed to low levels of solvents and noise (< 8 0 dBA TWA). The control group composed of 29 industry workers (mean age 36.7 years) without exposure to noise and/or solvents. Participants answered a questionnaire and underwent pure-tone audiometry (PTA), acoustic immittance tests, auditory brainstem response regression models.

**Results** SOT was associated with significantly higher odds of employment and lower material deprivation. Dialysis, transplant and occupational health professionals should support SOT and dialysis patients overcoming barriers to maintain and RTW. RTW post-SOT is complex and likely associated with personal, professional, societal and medical factors.