



Musculoskeletal Disorders in Healthcare Settings

TU32 : Occupational Health issues and challenges in Healthcare on 16 July 2019, Auditorium Hospital Sungai Buluh, Selangor













About the faculty





Professor Dr Victor Hoe

MBBS, MPH, MPH(OH), MEng(SHE), MOSH, Ph.D., FAOEMM, AMM

Professor of Occupational and Public Health

Head of Academic and International Division Department of Social and Preventive Medicine Faculty of Medicine, University of Malaya

Council Member for AOEMM Council Member for CPHM-AMM Executive Member for MMA Wilayah Executive Member of APACPH ICOH National Secretary for Malaysia















MSDs

- MSDs
 - inflammatory and degenerative
 - affecting the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels
- Classification
 - Specific conditions
 - Non-specific conditions





MSDs

Category of MSDs	Specific Conditions
tendon-related disorders	tendonitis, peritendinitis, tenosynovitis, synovitis, epicondylitis, De Quervain's disease, Dupuytren's contracture, trigger finger, ganglion cyst
peripheral-nerve entrapment	carpal tunnel syndrome, cubital tunnel syndrome, Guyon canal syndrome, pronator teres syndrome, radial tunnel syndrome, thoracic outlet syndrome, cervical syndrome, digital neuritis
muscle-related disorders	tension neck syndrome, muscle sprain and strain, myalgia and myositis
neurovascular/ vascular disorders	Raynaud's syndrome, hand-arm vibration syndrome, hypothenar hammer syndrome
Joint / joint-capsule disorders	osteoarthritis
bursa-related disorders	bursitis

Modified from Buckle and Devereux. Applied Ergonomics 2002; Vol. 33; Number 3; 207-217.





Musculoskeletal disorders constitutes a major public health burden and have a major impact on society

	Low Back Pain	Neck Pain
GDB	9.4% (95% CI : 9.0 to 9.8)	4.9% (95% Cl: 4.6 to 5.3)
Overall burden	sixth	21st
YLDs	highest	Fourth highest

Hoy D, et al., Annals of the Rheumatic Diseases 2014; Vol. 73; Number 7; 1309-15





• Global Estimated Rate (2017)

- LBP 7,552 (95%CI: 6,792 to 8,340) per 100,000 population
- NP 3,779 (95%CI: 3,334 to 4,234) per 100,000 population
- LBP and NP is the leading cause of global YLDs
 - 1990 14.75 million YLDs (95%CI: 10.31 to 20.48 million)
 - 2015 20.98 million YLDs (95%CI: 14.6 to 129.19 million)







Global Estimates - Number of years lived with disabilities (YLDs) compare with rate of YLDs per 100,000 due to low back and neck pain from occupational risk factors from 1990 to 2015

Note: data derived from the Global Health Data Exchange of the Institute for Health Metrics and Evaluation 1990 to 2015 dataset - Global Health Data Exchange. Institute of Health Matrix and Evaluation: Data - Global Burden of Disease Results Tool. 2015; http://ghdx.healthdata.org/gbd-results-tool. Accessed July, 2017.







Comparing Global and Malaysia estimates on rate of YLDs per 100,000 persons due to low back and neck pain from occupational risk factors from 1990 to 2015

Note: data derived from the Global Health Data Exchange of the Institute for Health Metrics and Evaluation 1990 to 2015 dataset - Global Health Data Exchange. Institute of Health Matrix and Evaluation: Data - Global Burden of Disease Results Tool. 2015; http://ghdx.healthdata.org/gbd-results-tool. Accessed July, 2017.







Data from Social Security Organization (SOCSO) - Number of occupational diseases claims and rate per 100,000 active contributors from 2008 to 2015

Note: Data obtained from SOSCO's annual report 2010-2015 – (1) SOCSO. Social Security Organization Annual Report 2015; (2) SOCSO. Social Security Organization Annual Report 2010. 2010; (3) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (5) SOCSO. Social Security Organization Annual Report 2014. 2014; (6) SOCSO. Social Security Organization Annual Report 2014. 2014; (6) SOCSO. Social Security Organization Annual Report 2014. 2014; (6) SOCSO. Social Security Organization Annual Report 2014. 2014; (7) SOCSO. Social Security Organization Annual Report 2014. 2014; (7) SOCSO. Social Security Organization Annual Report 2014. 2014; (7) SOCSO. Social Security Organization Annual Report 2014. 2014; (7) SOCSO. Social Security Organization Annual Report 2014. 2







Data from Social Security Organization (SOCSO) - number of Musculoskeletal Disorders (MSDs) claims and rate per 100,000 active contributors from 2008 to 2015

Note: Data obtained from SOSCO's annual report 2010-2015 – (1) SOCSO. Social Security Organization Annual Report 2015; (2) SOCSO. Social Security Organization Annual Report 2010. 2010; .(3) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2012. 2012; (6) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2013. 2013; (5) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014. 2014; (4) SOCSO. Social Security Organization Annual Report 2014.





11



Number of cases of MSD - Notified to DOSH and Compensated by SOCSO







Fraction of Global Diseases and Injuries Attributable to Occupational Risk Factors (percent)

Rosenstock, L., Cullen, D. & Fingerhut, M. 2006. Occupational Health. In: JAMISON, D. T., BREMAN, J. G., MEASHAM, A. R. et. al. (eds.) Disease Control Priorities in Developing Countries. 2nd ed. Washington (DC): World Bank.





- YLDs due to MSDs globally and in Malaysia, may be decreasing because of change in employment distribution
- There are still a substantial number of workers who are disabled every year from MSDs
- In Malaysia, the number and rate of claims form occupational MSDs are both increasing
- This indicates that occupational MSDs is still an important condition that needs to be address and managed in an appropriate manner





Overall Prevalence of MSD

Region	Prevalence	95% CI
Neck	49%	40 to 58 %
Shoulder	49%	38 to 60%
Elbow	25%	19 to 31%
Wrist/Hand	25%	19 to 31%
Upper Back	41%	30 to 51%
Lower Back	52%	43 to 61%
Hips/Thigh	26%	19 to 32%
Knees	32%	24 to 40%
Ankles/Feet	30%	23 to 38%

Using Stata – metaprop command - This routine provides procedures for pooling proportions in a meta-analysis of multiple studies study and/or displays the results in a forest plot. The confidence intervals are based on score(Wilson) (Newcombe, R. G. 1998) or exact binomial(Clopper-Pearson) (Newcombe, R. G. 1998) procedures - using the Random Pooled Effect Model











Teacher

Zamri (2017) Mohd Anuar (2016) Abdul (2010) Subtotal (1^2 = .%, p = .)

Hospital Doctors

Abdulmonem (2015)

Academician

Mohan (2015) Sugumaran (2019) Subtotal (1^2 = .%, p = .)

Railway Workers Ganasegeran (2014)



0.48 (0.45, 0.51) 0.57 (0.47, 0.66) 0.40 (0.35, 0.47) 0.48 (0.41, 0.55)

0.59 (0.54, 0.64)

0.33 (0.27, 0.40) 0.41 (0.32, 0.50) 0.36 (0.31, 0.41)

0.35 (0.31, 0.40)





Plantation Workers

Henry (2015) Chow (2012) Ng (2015) Mohd Nawi (2016) *Subtotal (I^2 = 99.39%, p = 0.00)*

Construction Workers Abdol (2012)

Electronic Factory Workers

Chee (2004) Chandrasakaran (2003) Ho (1997) Subtotal (1^2 = .%, p = .)

Batik Workers Musa (2000)









s





19

Risk of MSD

Musculoskeletal Disorders in Healthcare Settings



Model for multifactorial interaction causing musculoskeletal disorders of the upper limb

Kumar S. Theories of musculoskeletal injury causation. Ergonomics 2001; 4:17-47. Aptel M, Aublet-Cuvelier A, Cnockaert JC. Work-related musculoskeletal disorders of the upper limb. Joint Bone Spine. 2002;69(6):546-55.

Musculoskeletal Disorders in Healthcare Settings



Simplified model for risk factors for musculoskeletal disorders of the upper limb

Claudon L, Cnockaert JC. Biomécanique des tissus mous: modèles biomécaniques d'analyse des contraintes au poste de travail dans le contexte des troubles musculosquelettiques. Document pour le Médecin du Travail 1994 ; 58 : 140-8.

Aptel M, Aublet-Cuvelier A, Cnockaert JC. Work-related musculoskeletal disorders of the upper limb. Joint Bone Spine. 2002;69(6):546-55.

Musculoskeletal Disorders in Healthcare Settings





Neck WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Psychosocial factors Smoking Gender Posture Co-morbidity	Heavy physical work Lifting Sedentarism Older age High BMI





Back WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Awkward posture Heavy physical work Lifting Psychosocial factors Younger age High BMI	Gender Race Smoking Co-morbidity





Non-specific upper limb WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Co-morbidities	Psychosocial factors Older age Smoking Heavy physical work High BMI





Shoulder WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Heavy physical work Psychosocial factors	Repetitive work Older age High BMI Sedentarism





Elbow/forearm WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Awkward posture Co-morbidity Repetitive work Older age	High BMI Heavy-physical work Female gender Monotonous work Associated upper limb WMSD





Wrist/hand WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Prolonged computer work Heavy physical work High BMI Older age Female gender Awkward posture Repetitive work	Smoking Co-morbidity Psychosocial factor





Non-specific lower limbs WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	None	Co-morbidity Psychosocial factors Smoking High BMI





Hip WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Lifting Heavy physical work	Repetitive work





Knee WMSD

Strong evidence	Reasonable evidence	Insufficient evidence
None	Awkward posture Lifting Repetition Co-morbidity	Psychological factor Smoking Heavy physical work High BMI





Risk of Work-related Carpal Tunnel Syndrome

- Reasonable evidence for regular, prolonged use of hand-held powered vibratory tools
- Substantial evidence for similar or even higher risks from prolonged and highly repetitious flexion and extension of the wrist, especially when allied with a forceful grip.
- On the balance of evidence keyboard and computer use do not cause CTS.

Palmer KT. Best Pract Res Clin Rheumatol. 2011;25(1):15-29.





Risk factors for non-specific musculoskeletal disorders

Extrinsic Factors		
Physical	Organisational and psychosocial	Intrinsic or Individual Factors
rapid work pace	poor job content	female gender
repetitive motion	low job control	younger/older age
precision work	lack of social and/or co-worker support	previous history of MSDs
heavy lifting and forceful exertion	increase job demand	low physical activity
non-neutral body posture	job dissatisfaction	high BMI
prolong work in a sedentary posture	job insecurity	being an ex-smoker
mechanical pressure, and vibration		





Determinants of multisite musculoskeletal disorders among school teachers in Malaysia

- A total of 6,796 teachers from 326 schools
 - Mean Age 41.16 years (SD 8.75)
 - Female 79.59% (95% CI 78.61 to 80.53%)
 - Malay 79.86% (95% CI 78.89 to 80.79%)
- Data derived from the CLUSTer Study



Moy FM, et al., BMC Public Health 2014; Vol. 14; Number 1; 611.





Prevalence based on number of anatomical with musculoskeletal pain among participants in the past month and 12-month

Number of anatomical site	Pain in the past 1 month	Pain in the past 12-months
0	25.6%	13.3%
1	17.0%	11.5%
2	15.3%	13.3%
>2	35.7%	57.1%
Missing	6.7%	4.9%





Findings

- The study found that pain in 3 or more sites increase with
 - Female gender
 - Overweight
 - Obesity
 - Hypercholesterolemia
 - Moderate-extreme anxiety
 - High job demand
 - Low social support
- It is also associated with reduced
 - Mental and Physical Health





36

Management of WMSD





Management of WMSD









Modified from the Guidelines on Occupational Health Services. Department of Occupational Safety and Health, Ministry of Human Resources Malaysia; 2005.





Conduct Risk Assessment







This tool is provided without warranty. The author has provided this tool as a simple means for applying the concepts provided in RULA.

© 2004 Neese Consulting, Inc rbarker@ergosmart.com (816) 444-1667

40

Ergonomic Assessment: Rapid Upper Limb Assessment (RULA)

Final RULA Scores	Definition
1 or 2	Indicates that posture is acceptable if it is not maintained or repeated for long periods.
3 or 4	Indicates that further investigation is needed and changes may be required.
5 or 6	Indicates investigation and changes are required soon.
7	Indicates investigation and changes are required immediately.

Musculoskeletal Disorders in Healthcare Settings

provided by Practical Ergonomics

42

Ergonomic Assessment: Rapid Entire Body Assessment (REBA)

REBA	Definition
Scores	
1	Negligible risk
2 or 3	Low risk, change may be needed
4 to 7	Medium risk, further investigation, change soon
8 to 10	High risk, investigate and implement change
11+	Very high risk, implement change

Summary

- WMSD is common in the World and Malaysia
- LBP and NSP has the highest disability
- Multisite MSD is more common than single site MSD
- Risk Factors of WMSD includes individual factors, and workplace physical organisational and psychosocial
- Identification and controlling those risk factors is important in managing WMSD

Conflict of Interest: None

Disclaimer: None

Email: drvictorhoe@gmail.com

