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## LUBA

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Musculoskeletal Disorders (MSDs)

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LUBA

(% / )

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( $p < /$  )

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Spielholz )

. (et al. 2001

( awkward posture)

.( Jafry and O'Neill 2000; Bernard 1997 )

Johansson 1994 )

(Malchaire et al. 2001; Battenvi 1998

.( Miedema 1997; Aaras and Strandén 1988)

.(OSHA 3125)

(MSDs)

Musculoskeletal Disorders

Shahnavaz 2003 )

.(1987; Maul et al.

Quintana 1999)

; (and Pawlowitz

( LUBA

.(Kee 2001 ; Kemmlert 1994)

US Department of ( BLS)

% labor

(Mattila, Vilkki

. 1999 )

; (Shahnavaz 1987)

( d = % )

%

Postural Loud Index ( PLI )

$$n_0 = \frac{z_{1-\frac{\alpha}{2}}^2 p (1 - p)}{d^2}$$

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( Kuorinka et al. 1987 )

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.( Kee 2001)

STATA

SPSS (ver 11/5) (Release 7)

MSDs

MSDs

MSDs

MSDs

(  $p < 1$  )

: MSDs

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MSDs

(Cut off)

(% / ) ( % / )

(% / ) ( % / )

(% / )

MSDs

(  $p < 1$  )

Hussain 2004; Bao 1995 )

.( Lin 1991 ; Chee and Rampal 2004;

:MSDs

(

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O'sullivan and Gallwey )

( 2002; Chee and Rampal 2004 .(p< / )

.(p< / ) (OR) /  
:( LUBA) ( / ) /

.(% / )

.(p< / ) /  
(Bernard 1997; Bao 1995 )

MSDs /

Malchaire )  
et al. 2001; Battenvi et al. 1998; Johansson  
(1994; Lin 1991; Chee and Rampal 2004

.(Hussain 2004)

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P-value < /

Chi-squar Test:





- Miedema, M., 1997. Recommended maximum holding time for prevention of discomfort of static standing postures. *International journal of industrial ergonomics*, **19**, pp. 9-18.
- O'sullivan, L.W. and Gallwey, T.J., 2002. Effects Of Gender And Reach Distance on Risks of Musculoskeletal Injuries an Assembly Task. *International Journal Of Industrial Ergonomic*. **29**, pp. 61-71.
- Quintana, R., Pawlowitz, I., 1999. A Poisson model for work-related musculoskeletal disorder cost estimation. *Safety Science*. **32**. pp. 19-31.
- Shahnavaz H., 1987. Workplace injuries in the developing countries. *Ergonomics*, **30**(2), pp. 397– 404.
- Spielholz, P., Silverstein, B., Morgan, M., Checkoway, H. and Kaufman, J., 2001. Comparison of self-report, video observation and direct measurement methods for upper extremity musculoskeletal disorder physical risk factors. *Ergonomics*, **44**(6), pp. 588–613.
- Women Workers in the Semiconductor Industry in Peninsular Malaysia. *Int J Occup Environ Health*, **10**, pp. 63-71.
- Hussain, T., 2004. Musculoskeletal Symptoms Among Truck Assembly Workers. *Occupational Medicine*, **54**, pp. 506-512.
- Jafry, T. and O'Neill, D.H., 2000. The application of ergonomics in rural development: a review. *Appl Ergon*; **31**, pp. 263–8.
- Johansson, J.A., 1994. Work-related and non- work-related musculoskeletal Symptoms. *Applied Ergonomics*., **25**(4), pp. 248- 251.
- Kee, D.Y., 2001. LUBA :An assessment technique for postural loading the upper body based on joint motion discomfort and maximum holding time applied ergonomics, **32**, pp. 357-66
- Kemmlert, K., 1994. Labor inspectorate investigation for the prevention of occupational musculo-skeletal injuries [licentiate thesis]. Solna, Sweden: National Institute of Occupational Health.
- Kuorinka, I., Jonsson, B. and Kilbom, A., 1987. Standardied Nordic Questionnaires for the analysis of musculoskeletal symptoms. *Applied Ergonomics*, **18**(3), pp. 233-237.
- Lin, V., 1991. Health , Women's Work , and Industrialization : Semiconductor Workers in Singapore and Malaysia , 174, Garland Publishing, New York & London.
- Malchaire, J., Cock, N. and Vergracht, S., 2001. Review of the Factors Associated with Musculoskeletal Problems in Epidemiological Studies. *Int Arch Occup Environ Health*, **74**, pp. 79-90.
- Mattila, Vilkki, M., 1999. OWAS methods . In the Occupational Ergonomics handbook. CRC press LLC.
- Maul, A., Laubli, T. and Klipstein, A., 2003. Course of low back pain among nurses: a longitudinal study across eight years. *Occupational and Environmental Medicine*; **60**, pp. 497-503.