

Chapter 9

Psychosocial Hazards and Musculoskeletal Disorders: Are There Different Roles for Workplace Factors Between Office Workers in Malaysia and Australia?

Jodi Oakman, Ismail Maakip and Tessa Keegel

Abstract Musculoskeletal disorders (MSDs) are considered to be a major occupational health problem contributing significantly to absenteeism, disability and loss of productivity. The majority of studies related to MSDs have been conducted in developed countries such as Australia, and it is proposed that contributing factors linked with MSD development might operate differently in developing countries like Malaysia, as a result of sociocultural differences. A key issue in the development of MSDs is the contribution of psychosocial factors; however, this is not reflected in current management practices which tend to focus predominately on physical factors. Malaysia and Australia have very different societal structures, which influence the way work is organised and the expectations of employees at their workplaces. Therefore, it is plausible that the contribution of workplace factors to MSD development might differ. This chapter will explore a range of issues in relation to the development of MSDs and use a population of office workers in Australia and Malaysia to explore different explanatory models. A survey tool was used to assess a range of workplace and personal factors, including: work–life balance, job satisfaction, physical hazards, coping strategies, and psychosocial hazards. Analysis was undertaken to assess relevant predictors for each population and then a comparison undertaken to identify key differences between the populations. The chapter will also discuss the results from a qualitative study of female Malaysian office workers who were asked about their coping strategies for persistent musculoskeletal pain. Despite similarities in the prevalence of musculoskeletal discomfort in both the Australian and Malaysian populations, differences were identified in the relative contribution of factors. The findings from this study provide insights into future policy development of management of MSDs. Malaysia is at a formative stage in term of risk management for MSDs and as such a different focus is needed to adequately address relevant workplace factors.

J. Oakman (✉) · I. Maakip · T. Keegel
Department of Public Health, Centre for Ergonomics and Human Factors,
La Trobe University, Bundoora 3086, Australia
e-mail: j.oakman@latrobe.edu.au

Keywords Risk management · Musculoskeletal disorders · Psychosocial · Physical · Hazards

Background

The aetiology of musculoskeletal disorders (MSDs) is multifactorial as a range of physical, psychosocial and individual hazards contribute to the development and exacerbation of MSDs (Bongers et al. 2002; Janwantanakul et al. 2010; Oakman 2014). However, most research in the area of MSDs has been undertaken in developed countries and may not be applicable to industrially developing countries (IDC) such as Malaysia. Previous studies have reported that the prevalence of MSDs varies between countries (Madan et al. 2008; Punnett et al. 2005), while Coggon et al. (2013) demonstrated large variations in the occurrence of disabling musculoskeletal illness between countries among occupational groups. This was partially explained by personal demographic, physical and psychosocial risk factors. Such variations may be also due to differences in the sociocultural context between countries and influences at an international, national, state, and local level (Dollard et al. 2014). Differences in work practices and culture have been reported to influence the differences in the prevalence and risk factors associated with MSDs (Carter and Bannister 1994; Janwantanakul et al. 2010). Madan et al. (2008) and Coggon (2005) argue that variation in the prevalence and risk factors of MSDs among workers performing similar jobs might be due to the differences in the sociocultural context of individual's lives and work environments, as recent studies have demonstrated the importance of the sociocultural context affecting the risk factors associated with MSDs (Vargas-Prada et al. 2013; Farioli et al. 2014). It is estimated that the greatest increase in the prevalence of MSDs in the next decade will be in industrially developing countries (World Health Organization 2003).

Occupational Health and Safety Systems in Malaysia and Australia

Regulatory frameworks influence the development and utilisation of risk management systems in organisations. Malaysia and Australia both have health and safety legislation based on the British system (Johnstone 1997). However, the interpretation of legislation and workplace practices is highly influenced by the expectations of employer and employees and the acceptance of what constitutes an acceptable level of risk. Cultural differences are likely to strongly influence what is considered acceptable practice in workplaces. Malaysian society values hierarchy and deference to those in higher positions (Hofstede 2001). This is very different to Australia where a more open discussion is valued with contributions from everyone encouraged. In workplaces, employees are expected and encouraged to raise issues of concern so that appropriate risk management strategies can be undertaken.

To most effectively manage conditions such as MSDs, regular and open communication is needed between employers or supervisors and employees to develop the most appropriate workplace accommodations to assist with the maintenance of workplace productivity. Disclosure of personal conditions is always challenging as it can result in negative consequences. However, without disclosure of a condition employees are restricted in the type of accommodations (e.g., modifications to duties, changes to work hours) they can access, relying more on colleagues and individually based modifications rather than systemic or organisational level changes.

MSDs in the Asia Pacific Region

The Asia Pacific region is a very diverse region covering some of the richest and the poorest countries (ILO 2014). As a result work practices across the region vary with some countries mostly agriculturally based and others more industrially orientated. Accurate workplace data is challenging to obtain particularly where much work is undertaken in the informal sector and workers are not covered by formal compensation schemes. Estimates of those affected by MSDs are likely to underrepresent real figures. Analysis undertaken as part of the global burden of disease study (Driscoll et al. 2014) estimated that disability adjusted life years (DALYs), which is a measure of overall disease burden expressed in terms of the number of years lost due to ill-health, disability or early death for low back pain, were 331 in Australia compared to 482 in South East Asia, where a large reliance on physically demanding work contributes significantly to these differences. These figures do not include informal workers or cumulative exposures and so are considered indicative of risk rather than absolute figures. Further insights are required to understand why these differences occur and the role of work organisation in the development of MSDs.

Workplace Factors and MSDs in Office Workers

MSDs are a major problem among office employees (Frumkin 2005) and considered to be a leading cause of occupational illness, resulting in absenteeism (Bongers et al. 2006) and reduced productivity (Ranasinghe et al. 2011). Office workers are exposed to a range of factors associated with increased risk of MSD development including: individual (age and gender); physical (static postures, prolonged sitting and repetitive movements); and psychosocial factors (e.g. workload, time pressures and job control) (Huysmans et al. 2011; Klusmann et al. 2008).

Many theoretical models have been proposed which describe links between a range of factors, workplace and individual and the development of MSDs (Bongers et al. 1993; Feuerstein 1996; Sauter and Swanson 1996; National Research Council (NRC) 2001; Karsh 2006; Côté et al. 2008). A model developed by Sauter and Swanson (1996) almost 20 years ago specifically described MSD development in office workers proposing that work organisation, psychological strain and

individual factors influence the relationship between biomechanical strain and MSDs, and the manner by which workers detect and respond to physical hazards. The development of symptoms may be influenced by both the social context and the individual's own experience and as such the prevalence rates and predictors associated with MSD may differ from one country to another (Madan et al. 2008) as the context of employment and expectations from employee groups is different. The Sauter and Swanson model, despite the extensive changes in office work, still provides a highly relevant framework to consider MSD development in a contemporary office environment. What is less clear is the relevance of MSD models based on theories and research undertaken in developed countries such as Australia, European countries and the United States, for industrially developing countries such as Malaysia.

As the Malaysian economy develops and employment in the knowledge sectors increases compared to more physically demanding roles it is important to improve understanding of the role of work organisation and psychosocial factors on health conditions such as MSDs.

The following case studies are taken from a body of work, which aimed to examine the prevalence and predictors associated with MSDs in office workers in two countries, Malaysia and Australia. The aim of first case study was to identify if the prevalence rate of self-reported MSD discomfort differs between Malaysian and Australian employees. Second, it aimed to identify differences in predictors associated with self-reported MSD discomfort in each country. The second case study aimed to explore potential coping strategies amongst female office workers who stay at work despite having musculoskeletal discomfort.

Case Study 1: Comparison of Predictors and Prevalence of MSDs Between Malaysia and Australian Office Workers

The aim of this study was to examine and compare the prevalence and predictors associated with musculoskeletal discomfort between both Malaysian and Australian office workers.

Method

The study population consisted of 1184 public sector office workers in Malaysia and Australia, with 417 Malaysian (response rate: 65.5 %) and 767 Australian (response rate: 54.2 %) respondents. The majority of participants in both samples were females, with 333 (79.8 %) in Malaysia and 559 (72.9 %) in Australia, compared to only 84 (20.2 %) males in Malaysia and 208 (27.1 %) in Australia. A survey tool (described in detail elsewhere, see Oakman et al. 2014) was used to measure a range of workplace and personal factors, including: work–life balance,

job satisfaction, physical hazards, coping strategies and psychosocial hazards. The Malaysian version underwent an in-depth translation process (Maakip et al. 2015).

Job satisfaction was measured using the item “Overall, how happy or satisfied are you with your job here, as a whole taking everything into account?” whilst for work–life balance, the question was “How satisfied are you with the balance between your home life and your work—considering how much time and energy you have?” (Oakman et al. 2014). Single items, with five-point response scales were used to measure job satisfaction and work–life balance (1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, and 5 = highly satisfied).

Physical demands were assessed using a 12-item measure and a five-point response scale (1 = never or hardly ever, 2 = seldom, 3 = sometimes, 4 = often, 5 = almost all the time) to assess participants’ exposure to workplace physical hazards.

Workplace psychosocial hazards were assessed using 26 items from the Work Organisation Assessment Questionnaire (WOAQ) (Griffiths et al. 2006) with responses on a five-point scale (5 = very good, 1 = major problem).

Musculoskeletal discomfort was assessed with the following question: “In the last 6 months, have you ever experienced discomfort or pain towards the end of your working day?” (yes or no). Respondents who reported discomfort were then asked further questions related to severity and frequency of MSD discomfort for five body regions: (1) neck and shoulder, (2) hand and fingers, (3) arms, (4) middle to lower back and (5) hips, bottom, legs and feet. Frequency was recorded on a scale of 0 = never, 1 almost never, 2 = sometimes, 3 = often, 4 = almost always and severity from 1 = mild, 2 = moderate, 3 = severe discomfort. An overall discomfort score was calculated by multiplying frequency and severity for each body region and then summing.

Results

Prevalence of Musculoskeletal Discomfort Between Malaysia and Australia

Prevalence of musculoskeletal discomfort in the last 6 months differed between the two countries with 92.8 % of Malaysian respondents reporting musculoskeletal discomfort compared to 71.2 % of Australian respondents; the difference was significant using a t-test ($p < 0.001$).

Predictors of Musculoskeletal Discomfort in Malaysia and Australia

Hierarchical multiple regression was conducted separately for Malaysia and Australia to examine predictors associated with musculoskeletal discomfort (See Table 9.1). For Malaysia, the overall regression model was significant (F (6,

Table 9.1 Comparison by country of hierarchical multiple regression on self-reported MSD discomfort

| Step | Variable | β | t | p | R^2 | ΔR^2 | F |
|----------------------------|----------------------|---------|-------|--------|-------|--------------|---------|
| <i>Malaysia (n = 387)</i> | | | | | | | |
| 1 | Age | -0.03 | -0.68 | 0.49 | 0.01 | 0.01 | 2.33 |
| | Gender | 0.10 | 2.10 | 0.03* | | | |
| 2 | Age | -0.00 | -0.27 | 0.97 | 0.05 | 0.04 | 5.73** |
| | Gender | 0.09 | 1.91 | 0.05* | | | |
| | Work-life balance | -0.15 | -2.63 | 0.00** | | | |
| | Job satisfaction | -0.09 | -1.51 | 0.13 | | | |
| 3 | Age | 0.02 | 0.57 | 0.56 | 0.22 | 0.16 | 17.35** |
| | Gender | 0.14 | 3.13 | 0.00** | | | |
| | Work-life balance | -0.13 | -2.50 | 0.01** | | | |
| | Job satisfaction | -0.02 | -0.46 | 0.64 | | | |
| | Physical hazards | 0.38 | 8.24 | 0.00** | | | |
| | Psychosocial hazards | -0.10 | -1.94 | 0.05* | | | |
| <i>Australia (n = 546)</i> | | | | | | | |
| 1 | Age | 0.06 | 1.47 | 0.14 | 0.02 | 0.02 | 6.11** |
| | Gender | 1.28 | 3.01 | 0.00 | | | |
| 2 | Age | 0.04 | 1.06 | 0.28 | 0.07 | 0.05 | 11.27** |
| | Gender | 0.16 | 3.92 | 0.00** | | | |
| | Work-life balance | -0.12 | -2.50 | 0.01* | | | |
| | Job satisfaction | -0.14 | -3.00 | 0.00** | | | |
| 3 | Age | 0.06 | 1.56 | 0.11 | 0.15 | 0.07 | 16.47** |
| | Gender | 0.14 | 3.66 | 0.00** | | | |
| | Work-life balance | -0.05 | -1.10 | 0.26 | | | |
| | Job satisfaction | -0.03 | -0.57 | 0.56 | | | |
| | Physical hazards | 0.24 | 5.78 | 0.00** | | | |
| | Psychosocial hazards | -0.17 | -3.27 | 0.00** | | | |

* $p < 0.05$; ** $p < 0.01$; β = Beta

370) = 17.35, $p < 0.001$). The model for the Malaysian sample showed that gender ($\beta = 0.14$, $p < 0.01$), work-life balance ($\beta = -0.13$, $p < 0.01$), physical ($\beta = 0.38$, $p < 0.01$) and psychosocial hazards ($\beta = -0.10$, $p < 0.05$) were significantly associated with musculoskeletal discomfort. For Australian respondents, the overall regression model was also significant (F [6, 539] = 16.47; $p < 0.001$). Gender ($\beta = 0.14$, $p < 0.01$), physical ($\beta = 0.24$, $p < 0.01$) and psychosocial hazards ($\beta = -0.17$, $p < 0.01$) were significantly associated with musculoskeletal discomfort for the Australian sample.

Gender differences were tested in both samples with no significant differences found. However, in the Australian population women reported higher levels of satisfaction with work-home balance than men. No differences were found in the Malaysian sample.

Implications

This study identified differences in the prevalence rate of musculoskeletal discomfort between Malaysia and Australia. Work organisation including the nature of work, workstations, tool and equipment design, policies and procedures have been identified as potential causal factors for MSD development (Smith and Carayon-Sainfort 1989), these are likely to differ between Australia and Malaysia and provide some explanation for the difference in prevalence rates. Another possible explanation for the different prevalence rates between the Australian and Malaysian workers relates to the recognition of MSDs as an important work-related problem. In Australia, significant efforts have been undertaken to mitigate hazards and risks associated with MSDs (Ireland 1995; Macdonald and Oakman 2015). However, this is not the case in Malaysia where MSDs have only recently been recognised as a work-related problem (Lee 2007) and preventive measures such as addressing hazards relating to the psychosocial work environment are still underdeveloped (Idris et al. 2010).

This study identified three predictors: gender, physical hazards and psychosocial hazards that were associated with self-reported MSD discomfort in both countries, consistent with previous research involving office workers (Griffiths et al. 2012; Paksaichol et al. 2012). Work–life balance was only associated with increased MSD discomfort in the Malaysian population. This might be partially explained by the changing roles for women within Malaysian society. The Malaysian government has actively encouraged women to participate in the labour market (Joseph 2014); however, infrastructure to support them in managing this has not followed. In comparison, Australia has a wide range of initiatives including flexible or part-time working arrangements, or the ability to work from home, which assist with reducing work–life conflict (Baird 2011).

Of note is the difference in the level of contribution of physical and psychosocial hazards to MSD risk. In Malaysia, physical hazards were more strongly associated with MSD risk than psychosocial factors. In comparison, in Australia the contribution of physical and psychosocial factors to MSD risk was similar. This suggests potential different expectations in relation to workplace factors between the two countries. Sociocultural values may explain these differences and expectations of employees from their workplaces in relation to the provision of a safe working environment.

In addition, other factors such as work organisation, work culture and practices may also contribute to the differences in the development and experience of MSDs that exist between cultures. Previous studies reported that work organisation influences physical demands and musculoskeletal outcomes (Amick et al. 1999) and also psychosocial features such as job demands (work pace) and low decision latitude (Punnett and Wegman 2004). The way work is organised is known to differ from one country to another (Erez 2010) and this might also influence the experience of MSDs. This needs to be considered in the development of effective risk management strategies.

Case Study 2: The Voice of Malaysian Women Working with Musculoskeletal Pain

Thirteen women were interviewed to explore the strategies employed by Malaysian female office workers with musculoskeletal pain (MSP) in order to maintain productive employment. Participants were part of the larger study reported in Case Study 1 and had expressed interest in being interviewed to discuss their experiences relating to working with musculoskeletal pain. Twenty-five female office workers with musculoskeletal pain expressed interest in being interviewed by providing contact details, but only 18 of these could be contacted, and of those 13 agreed to participate.

All interview transcriptions (in Malay) were read, verified and checked by the first author [IM] against the original audio for accuracy and grammar twice, first in Malay and then in English. The interview data were classified and coded into tentative emerging themes and a basic framework. Two interviews were coded independently by two of the authors, and an iterative discussion was used to further develop the emerging codes and modify the coding framework. A further stage of coding was undertaken to eliminate redundant codes and establish analytic connections between distinct themes (Braun and Clarke 2006).

Work was of high importance to the women in this study, and they reported a strong sense of responsibility in contributing to their family and society through their workforce participation. A range of challenges were reported by these women, in maintaining their workload despite their musculoskeletal pain, and many had developed a range of personal strategies to enable them to remain productively employed. Women were working in a range of roles, but a common theme was their low level of control in how their work was allocated, as well as limited opportunity for them to make decisions independently due to the hierarchical structure of the work organisation. A sample of quotes to support the findings is provided.

Workplace Support

Colleagues provided a range of support mechanisms to participants, from completing work so that medical appointments could be attended, or assisting with physical tasks/work when pain levels made these tasks difficult. Lack of support from supervisors led participants to manage their condition independently. Numerous strategies included the delegation of duties to colleagues, provision of therapies such as massage machines or exercise classes and reflexology, and the use of spirituality were employed to manage painful conditions.

He gives the work. We are the ones who have to find the solution as we are the ones who have the knowledge. He enquires. If we have a problem we will not ask him. He is not involved in coding. He is the forefront of the diagram or flowchart. So the supervisor is of little help. (P2)

Personal Strategies

Numerous personal strategies were employed to manage pain at work and included medication and the use of distraction techniques. Both pharmaceutical and traditional medications were used with variable effect. A range of activities was used to minimise the impact of pain on work performance, such as focusing on workplace tasks, taking breaks and regular movement (e.g. stretching and exercising) which acted as distractors from the pain. Spiritual strategies were also used by some to provide distraction from musculoskeletal pain. These strategies included listening to recordings of the Quran to manage pain, the morning bath, and ‘ruku’ (bowing/prostration) during prayers.

For my back pain I did ruku’ (bowing/prostration). Praise be to God it worked. I went for a course in the Science of Solat. They said the way we move makes us healthy so after that I tried it. I had a back pain and I did that Praise be to God, it worked. (P1).

Implications

Despite the long-term nature of their condition, only four women reported informing their supervisors of their musculoskeletal pain, suggesting the difficulty most had communicating effectively with their manager or employer. In Malaysia, where a strong hierarchical structure is evident with a reluctance to discuss matters of a personal nature with those more senior, disclosure of musculoskeletal pain is unlikely. The patriarchal nature of Malaysian society (Noor 2006) is an additional disincentive for women, such as those in the current study, to report their condition and negotiate for appropriate workplace accommodations to support them in managing their work.

One possible reason women in this study did not disclose their condition to supervisors is influenced by the need to avoid the ‘*malu*’ (ashamed/embarrassed) and ‘*segan*’ (reluctant) personality which are akin to hypersensitivity to what other people are thinking about one’s self (Goddard 1996) and has a strong influence of communication in Malaysian workplaces, particularly between superiors and subordinates (Abdullah 1992). In addition, Malaysian women and particularly those who are Malay, are generally less open, less expressive, more inhibited and timid than their western counterparts (Noor 1999). A strong culture of adherence to the rules and norms of society which respects the avoidance of criticism or disagreement is a likely contributor to a reluctance to disclose personal conditions to one’s supervisor.

Without disclosure and organisational support, workplace accommodations need to be developed at an individual or peer-related level. Rather than rely on supervisory support, women were much more likely to manage their workplace situation by negotiating support from their colleagues. Support from colleagues included

listening, helping to complete work to meet deadlines and undertaking extra duties when required. These supports demonstrate the collective nature of Malaysian society which values long-term commitment to the 'member' group and responsibility for fellow members of the group (Abdullah 1992). Prioritisation of group benefits over individual benefits has been identified as a characteristic of collective societies (Ahmad 2001). This collective culture is demonstrated by the actions of the women in this study, through their expectations of and acceptance of assistance from their fellow workers in preference to that of their supervisors.

Supervisors were approached for support regarding work-related matters, where decisions required senior input, but not for personal matters. In the context of group membership, supervisors were considered at a different level and expectations of support were different to that of colleagues. This is consistent with the hierarchical nature of Malaysian society which values distinct roles with a large power distance between those with and without power (e.g. the supervisor and the worker) (Carroll et al. 2010). Direct discussion or consultation with supervisors is neither expected nor valued, with employees more likely to confide in colleagues than those in more senior roles than themselves.

Furthermore, Malaysia is a patriarchal society, where males are more often in positions of leadership and women work in jobs with low control (Tan 1991). Participation of Malaysian females in the work force is high at 53.6 % (Malaysian Statistics Department 2015), and despite working full-time employed women are also expected to manage the majority of home duties, potentially exposing them to additional and different hazards and risks than their male peers (Noor 2006). Availability of organisational support or services such as flexible work hours or formal childcare, to assist with managing the demands of dual work and home roles is limited, a risk factor for taking time off work (Hooftman et al. 2008). This raises challenges for those at work with conditions such as MSDs and in particular women who are managing these dual roles. The creation of a supportive work environment where nonwork roles are valued and supported is important but will require managers to be skilled in area so that they can discuss and deal with a range of issues which influence employees working lives (Hassan et al. 2014).

Challenges and Future Directions

The prevention of musculoskeletal discomfort is challenging. MSDs are complex with a multifactorial aetiology. In practical terms, the findings of this research support intervention strategies to reduce the prevalence of MSDs and its consequences in the workplace that address both physical and psychosocial factors (Macdonald and Oakman 2015). In addition, the sociocultural context of the target population needs to be taken into account when developing interventions targeting musculoskeletal discomfort in the workplace. Women in this study had limited control over their work, which was an inherent feature of their jobs. Increased job control may assist with development of risk management strategies to reduce work-home balance issues and

to manage MSDs at work. Future directions for workplaces risk management programs should incorporate the following:

1. Improving the identification of workplace hazards and risks—both physical and psychosocial should be made a priority. Psychosocial risks and work-related stress are still not well-understood and are not prioritised in developing countries (Kortum et al. 2010).
2. Improve workplace management of MSDs: a shift from a reliance on individual strategies to organisational strategies is required to reduce the level of workplace factors associated with MSD. This will require a significant shift in workplace practices for Malaysia, including the education of supervisors about the relevant hazards and risks that contribute to the development of MSDs and the importance of managing these ongoing issues.
3. Incorporate work–home balance issues in workplace risk management of MSDs: new policies are needed to actively support women managing their work and home life (Hassan et al. 2014). This study found that this was a significant issue and requires attention. These new policies could include improved availability of child care, leave options and flexible working hours.

Conclusion

This chapter highlighted the range of factors relevant in the development of musculoskeletal disorders in two Asia Pacific countries. The first case study presented a quantitative exploration of predictors of MSD in office workers based in Australia and Malaysia. The second study explored the voices of women working with musculoskeletal pain in Malaysia.

MSD prevalence rates were higher in Malaysia than Australia, and differences in predictors were identified. In the Malaysian context, psychosocial factors were not as strongly associated with MSD compared to Australia. The sociocultural context may explain these differences, as the working conditions and employee expectations are likely to influence the interpretation and subsequent assessment of the psychosocial work environment.

Significant challenges exist as the sociocultural context of each country strongly influences the working conditions and the subsequent beliefs and behaviours of individuals both in their experience and in their willingness to report musculoskeletal discomfort at work. Further work to examine the effects of culturally specific frameworks is warranted in a range of sectors including the public service, particularly as developing countries such as Malaysia continue to grow within in a global economy that has changing work practices. These case studies demonstrate that the country in which you work is likely to influence the importance of workplace factors, and as such the management of these needs to be culturally sensitive.

References

- Abdullah, A. (1992). *Understanding the Malaysian workforce*. Kuala Lumpur: Malaysian Institute of Management.
- Ahmad, K. (2001). Corporate leadership and workforce motivation in Malaysia. *International Journal of Commerce and Management*, 11, 82–101.
- Amick III, B. C., Swanson, N. G., & Chang, H. (1999). Office technology and musculoskeletal disorders: Building an ecological model. *Occupational Medicine*, 14(1), 97–112.
- Baird, M. (2011). The state, work and family in Australia. *International Journal of Human Resource Management*, 22(18), 3742–3754.
- Bongers, P., de Winter, C., Kompier, M., & Hilderbrandt, V. (1993). Psychosocial factors at work and musculoskeletal disease. *Scandinavian Journal of Work, Environment & Health*, 19(5), 297–312.
- Bongers, P. M., Ijmker, S., van den Huevel, S. G., & Blatter, B. M. (2006). Epidemiology of work related neck and upper limb problems: Psychosocial and personal risk factors (part I) and effective interventions from a bio behavioural perspective (part II). *Journal of Occupational Rehabilitation*, 16(3), 279–302.
- Bongers, P. M., Kremer, A. M., & ter Laak, J. (2002). Are psychosocial factors, risk factor for symptoms and signs of the shoulder, elbow, or hand/wrist? A review of the epidemiological literature. *American Journal of Industrial Medicine*, 41(5), 315–342.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–110.
- Carroll, C., Rick, J., Pilgrim, H., Cameron, J., & Hillage, J. (2010). Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: A systematic review of the effectiveness and cost-effectiveness of interventions. *Disability Rehabilitation*, 32, 607–621.
- Carter, J., & Bannister, E. (1994). Musculoskeletal problems in VDT work: Review. *Ergonomics*, 37(10), 1623–1648.
- Coggon, D. (2005). Occupational medicine at a turning point. *Journal of Occupational and Environmental Medicine*, 62(5), 281–283.
- Coggon, D., Ntani, G., Palmer, K., Felli, V., Harari, R., Barrero, L., et al. (2013). Disabling musculoskeletal pain in working populations: Is it the job, the person, or the culture? *Pain*, 154(6), 856–863.
- Côté, P., van der Velde, G., Cassidy, J., Carroll, L., Hogg-Johnson, S., Holm, L., et al. (2008). The burden and determinants of neck pain in workers. *Spine*, 33(S1), S60–S74.
- Dollard, M. F., Shimazu, S., Nordin, R. B., & Brough, P. (2014). Chapter 1 The context of psychosocial factors at work in the Asia Pacific. In M. F. Dollard, A. Shimazu, R. B. Nordin, P. Brough, & M. R. Tuckey (Eds.), *psychosocial factors at work in the Asia Pacific* (pp. 3–27). Dordrecht, The Netherlands: Springer International Publishing.
- Driscoll, T., Jacklyn, G., Orchard, J., Passmore, E., Vos, T., Freedman, G., et al. (2014). The global burden of occupationally related low back pain: Estimates from the Global Burden of Disease 2010 study. *Annals of the Rheumatic Diseases*, 73(6), 975–981.
- Erez, M. (2010). Culture and job design. *Journal of Organizational Behaviour*, 31(2–3), 389–400.
- Farioli, A., Mattioli, S., Quagliari, A., Curti, S., Violante, F., & Coggon, D. (2014). Musculoskeletal pain in Europe: The role of personal, occupational, and social risk factors. *Scandinavian Journal of Work, Environment & Health*, 40(1), 36–46.
- Feuerstein, M. (1996). Workstyle: Definition, empirical support, and implications for prevention, evaluation, and rehabilitation of occupational upper-extremity disorders. In S. D. Moon & S. L. Sauter (Eds.), *Beyond biomechanics: Psychosocial aspects of musculoskeletal disorders in office work* (pp. 177–206). London: Taylor & Francis.
- Frumkin, H. (2005). *Environmental health: From global to local*. San Francisco, CA: Wiley.
- Goddard, C. (1996). The ‘social emotions’ of Malay (Bahasa Melayu). *Ethos*, 24, 426–464.

- Griffiths, A., Cox, T., Karanika, M., Khan, S., & Tomas, J. (2006). Work design and management in the manufacturing sector: Development and validation of the Work Organisation Assessment Questionnaire. *Journal of Occupational and Environmental Medicine*, 63(10), 669–675.
- Griffiths, K. L., Mackey, M. G., Adamson, B. J., & Peper, K. L. (2012). Prevalence and risk factors for musculoskeletal symptoms with computer based work across occupations. *Work*, 42(4), 533–541.
- Hassan, Z., Dollard, M. F., & Winefield, A. H. (2014). Chapter 15 Malaysian model of work-family interface: Similar or different from the West? In M. F. Dollard, A. Shimazu, R. B. Nordin, P. Brough, & M. R. Tuckey (Eds.), *Psychosocial factors at work in the Asia Pacific* (pp. 293–307). Dordrecht, The Netherlands: Springer International Publishing.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviour, institutions, and organisations across nations*. Thousand Oaks, CA: Sage.
- Hooftman, W. E., Westerman, M. J., van der Beek, A. J., Bongers, P. M., & van Mechelen, W. (2008). What makes men and women with musculoskeletal complaints decide they are too sick to work. *Scandinavian Journal of Work, Environment & Health*, 34, 107–112.
- Huysmans, M., Ijmker, S., Blatter, B., Knol, D., van Mechelen, W., Bongers, P. M., et al. (2011). The relative contribution of work exposure, leisure time exposure, and individual characteristics in the onset of arm-wrist-hand and neck-shoulder symptoms among office workers. *International Archives of Occupational Environmental Health*, 85(6), 651–666.
- Idris, M. A., Dollard, M. F., & Winefield, A. H. (2010). Lay theory explanation of occupational stress: The Malaysian context. *Cross Cultural Management: An International Journal*, 17(2), 135–153.
- International Labour Organization. (2014). *World of work report: Developing with jobs*. http://www.ilo.org/global/research/global-reports/world-of-work/2014/WCMS_243961/lang-en/index.htm. Accessed 4 Jan 2016.
- Ireland, D. C. (1995). Repetition strain injury: The Australian experience—1992 update. *Journal of Hand Surgery*, 20(3), S53–S56.
- Janwantanakul, P., Pensri, P., Jiamjarasrangi, W., & Sinsongsook, T. (2010). The relationship between upper extremity musculoskeletal symptoms attributed to work and risk factors in office workers. *International Archives of Occupational and Environmental Health*, 83(3), 273–281.
- Johnstone, R. (1997). *Occupational health and safety law and policy*. Sydney: The Law Book Company.
- Joseph, C. (2014). *Growing up female in multi-ethnic Malaysia*. Hoboken, NJ: Taylor & Francis.
- Karsh, B. T. (2006). Theories of work-related musculoskeletal disorders: Implications for ergonomic interventions. *Theoretical Issues in Ergonomics Science*, 7(1), 71–88.
- Klussmann, A., Gebhardt, H., Liebers, F., & Rieger, M. A. (2008). Musculoskeletal symptoms of the upper extremities and the neck: A cross-sectional study on prevalence and symptom-predicting factors at visual display terminal (VDT) workstations. *BMC Musculoskeletal Disorders*, 9, 96.
- Kortum, E., Leka, S., & Cox, T. (2010). Psychosocial risk and work-related stress in developing countries: Health impact, priorities, barriers and solutions. *International Journal of Occupational Medicine and Environmental Health*, 23(3), 225–238.
- Lee, L. T. (2007). Opening address of chairman, NIOSH Malaysia. In M. K. Halimahtun (Ed.), *Proceedings of the agriculture ergonomics development conference* (p. 6). Kuala Lumpur: IEA Press.
- Maakip, I., Keegel, T., & Oakman, J. (2015). Prevalence and predictors for musculoskeletal discomfort in Malaysian office workers: Investigating explanatory factors for a developing country. *Applied Ergonomics*. doi:10.1016/j.apergo.2015.10.008.
- Macdonald, W., & Oakman, J. (2015). Requirements for more effective prevention of work-related musculoskeletal disorders. *BMC Musculoskeletal*, 16, 293.
- Madan, I., Reading, I., Palmer, K. T., & Coggon, D. (2008). Cultural differences in musculoskeletal symptoms and disability. *International Journal of Epidemiology*, 37, 1181–1189.

- Malaysian Statistics Department. (2015). *Labour force survey report 2014*. Kuala Lumpur: Jabaran Perangkaan Negara.
- National Research Council and Institute of Medicine. (2001). Musculoskeletal disorders and the workplace: Low back and upper extremity. *Panel on musculoskeletal disorders and the workplace. Commission on behavioural and social sciences and education*. Washington, DC: National Academic Press.
- Noor, N. M. (1999). Roles and women's well-being: Some preliminary findings from Malaysia. *Sex Roles, 41*, 123–145.
- Noor, N. M. (2006). Malaysian women's state of well-being: Empirical validation of a conceptual model. *Journal of Social Psychology, 146*, 94–115.
- Oakman, J. (2014). Chapter 13 Using evidence to improve the management of work-related musculoskeletal disorders. In M. F. Dollard, A. Shimazu, R. B. Nordin, P. Brough, & M. R. Tuckey (Eds.), *Psychosocial factors at work in the Asia Pacific* (pp. 255–275). Dordrecht, The Netherlands: Springer International Publishing.
- Oakman, J., Macdonald, W., & Wells, Y. (2014). Developing a comprehensive approach to risk management of musculoskeletal disorder in non-nursing health care sector employees. *Applied Ergonomics, 45*(6), 1634–1640.
- Paksaichol, A., Janwantanakul, P., Purepong, N., Pensri, P., & van der Beek, A. (2012). Office workers' risk factors for the development of non-specific neck pain: A systematic review of prospective cohort studies. *Occupational and Environmental Medicine, 69*(9), 610–618.
- Punnett, L., Prüss-Üstün, A., Nelson, D. I., Fingerhut, M. A., Leigh, J., Tak, S. W., et al. (2005). Estimating the global burden of low back pain attributable to combined occupational exposures. *American Journal of Industrial Medicine, 48*(6), 459–469.
- Punnett, L., & Wegman, D. (2004). Work-related musculoskeletal disorders: The epidemiologic evidence and the debate. *Journal of Electromyography and Kinesiology, 14*(1), 13–23.
- Ranasinghe, P., Perera, Y., Lamabadusuriya, D., Kulatunga, S., Jayawardana, N., Rajapakse, S., et al. (2011). Work related complaints of neck, shoulder and arm among computer office workers: A cross-sectional evaluation of prevalence and risk factors in a developing country. *Environmental Health, 10*, 70.
- Sauter, S., & Swanson, N. (1996). An ecological model of musculoskeletal disorders in office workers. In S. D. Sauter & S. L. Moon (Eds.), *Beyond biomechanics: Psychosocial aspect of musculoskeletal disorders in office work* (pp. 2–18). Bristol: Taylor and Francis.
- Smith, M. J., & Carayon-Sainfort, P. (1989). A balance theory of job design for stress reduction. *International Journal of Industrial Ergonomics, 4*(1), 67–79.
- Tan, P. C. (1991). *Female participation at higher management levels in the public sector. Status and role of Malaysian women in development and family welfare*. Kuala Lumpur: National Population and Family.
- Vargas-Prada, S., Serra, C., Martinez, J. M., Ntani, G., Declos, G., Palmer, K. T., et al. (2013). Psychological and culturally-influenced risk factors for the incidence and persistence of low back pain and associated disability in Spanish workers: Findings from the CUPID study. *Journal of Occupational and Environmental Medicine, 70*(1), 57–62.
- World Health Organization (WHO). (2003). The burden of musculoskeletal conditions at the start of the new millennium. *World health organization technical report series 919*. Geneva: WHO.