

Evidence Synthesis – Musculoskeletal Injuries in Healthcare Staff

The extent of the problem

In 2013 Paterson reported (Paterson, 2013) that the NHS had spent more than a £1bn on sick pay over the last three years. An audit of NHS Occupational Health (Anonymous, 2011) in 2011 found that NHS staff who took sick leave were having to wait for 12 weeks before being referred to occupational health while 5% waited six months or more. Paton (Paton, 2015) reported that 6,000 NHS staff miss work every day because of musculoskeletal problems.

Policy Background

In 2005 NHS Employers updated the Blue Book with guidance on addressing workplace injuries (Duffin, 2005) urging employers to be more proactive when staff are off ill. The guidelines recommended that managers assessed staff after a pre-determined period of absence and then offer them rehabilitation services such as physiotherapy or counselling if necessary.

In 2009 the [NHS Health and Wellbeing report](#) found that 10m working days were lost each year through staff ill health costing the NHS £1.7bn – equivalent to the annual salaries of 82,000 full-time band 5 nurses (Dean, 2009). The report called for early, effective interventions for common musculoskeletal problems and said that staff should be able to refer themselves to physiotherapists.

In 2015 the NHS launched a £5m health-and-wellbeing initiative (Fordham, 2015) giving employees access to physiotherapy services. The programme is to be extended to all NHS employers over the next five years targeting areas with the highest rates of sickness absence and recruitment and retention pressures in 2016-17.

The NHS set up a “national incentive fund,” worth £450m for 2016/17 which Trusts and other healthcare providers could access if they could show they were investing in staff health and wellbeing initiatives. This included offering front-line nurses, therapists, doctors, care assistants and other staff access to workplace physiotherapy (Paton, 2016).

Organisations who do early referral schemes

A Freedom of Information request reported by *Occupational Health* found that the NHS had spent nearly £1.6m on fast-track private health treatment over the past three years (Anonymous, 2009)

Hounslow and Spelthorne Community and Mental Health NHS Trust (Mather & Hill, 1999) introduced a fast-track physiotherapy service for staff with musculoskeletal problems which led to a reduction in absences from these conditions.

In 2001 **West Suffolk Hospitals NHS Trust** introduced a fast-track physiotherapy referral service for staff leading to a 40% reduction in working days lost compared to the previous year. The direct costs of musculoskeletal injuries were reduced by more than £170,000 at a cost of only £21,000 (Dinsdale, 2003).

Darent Valley Hospital introduced a fast-track system in 2004 (Duffin, 2005).

NHS Lanarkshire introduced Easy Access to Support for You (EASY) (Anonymous, 2008) in which nurses calling in sick have to contact Occupational Health straight away. If they have a bad back they will be immediately offered a physiotherapy appointment. The project led to a drop in sickness levels and the use of bank nurses. The EASY service was evaluated in 2015 (J. P. Brown et al., 2015) and found to have led to a reduction in sickness absence levels of 21%.

Robert Jones and Agnes Hunt Orthopaedic Hospital started a self-referral physiotherapy scheme for staff (Anonymous, 2014) which treats 250 staff every year.

Hertfordshire County Council (Calnan, 2015) refer people with musculoskeletal conditions immediately and found that musculoskeletal-related absences decreased by 1,000 between February 2014 and January 2015.

Walton Centre NHS Foundation Trust in Liverpool (Trueland, 2015) introduced a programme of subsidised fitness classes and wellbeing activities for staff, the cost of which was more than recouped by reducing sickness absence and reliance on agency staff.

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Cheshire and Wirral Partnership NHS Foundation Trust (Dyble, 2014) introduced a third-party physiotherapy service to help improve staff health and reduce absence levels. Employees suffering from musculoskeletal problems are contacted by Physio Med within four working hours of their line manager referring the injury. They get a telephone assessment and are then contacted by a senior chartered physiotherapist within three days and evaluated to see if the condition can be self-managed – if not they are referred for face-to-face treatment. 62% of employees used it successfully without needing face-to-face treatment and 85% of those reporting a musculoskeletal problem were still in work when they were referred leading to a huge effect on productivity.

The John Lewis partnership (Clayton, 2016b) worked with Physio Med to offer a physiotherapy advice line service providing fast access to a blended approach of fast-track telephone triage, remote multi-media self-management and on site face-to-face treatment and advice. The service enabled a much faster response which typically facilitated much greater recovery during the first 10 days. Partners' recovery rates improved while they were able to continue work and improve their productivity.

Bradford District Care Foundation Trust used Physio Med for fast-track physiotherapy at three of its sites, enabling the NHS workers to reduce their pain levels, facilitating a quicker return to work and increasing their productivity. They achieved a return on investment of 15:1 (Clayton, 2016a)

Epidemiology of musculoskeletal problems

Job risk factors for low back pain include: heavy lifting; repetitive lifts, especially while bending or twisting; prolonged sitting; working in a stooped or awkward position and operating vibrating machinery (Phillips, Forrester, & Brown, 1996). Personal risk factors include: being young, lack of job experience, obesity, smoking, heavy drinking, job dissatisfaction, negative thinking, recent back injury, motherhood and lack of strength or physical fitness.

Back injuries affect up to 38% of all nurses. Two-thirds of disabling injuries in nursing are due to sprains and strains, mostly over-extension injuries to the back or trunk from lifting patients and nurses have 30% more sick days each year due to back pain than the general population (Nawar, 2000).

Luime (Luime, Koes, Miedem, Verhaar, & Burdorf, 2005) found that each year 21-38% of staff sought medical care for neck or shoulder pain. Luime found that neck and shoulder pain run a recurrent course characterised by a strong variation in occurrence and a self-limiting course.

In 2005 Brown (J. Brown, Reetoo, Murray, Thom, & Macdonald, 2005) found that diseases of the musculoskeletal system were the most common reason for retiring due to ill health.

Cunningham (C. Cunningham, Flynn, & Blake, 2006) studied 246 Irish health workers and found an annual rate of low-back-pain-related sick leave of 30%. There was no significant difference in back-pain

prevalence among different occupational groups but general support and nursing staff had the highest rates of sick leave. Involvement in manual handling did *not* predict either low back pain or related sick leave.

Lee (Lee, 2007) found that significant predictors for safer work behaviour included: better safety climate; higher effort-reward imbalance; less over-commitment; greater social support and day shifts. Predictors for greater risk *perception* included: greater job strain; higher physical workload index; more frequent patient handling; higher musculoskeletal symptom index and a lack of lifting devices.

Leggat (Leggat, Smith, & Clark, 2008) studied low-back pain in physiotherapy students and found that 64.6% had experienced it, 46.9% had had it for more than two days, 38.8% had had low back pain that had affected their daily lives and 24.5% had sought medical treatment for low back pain. Year of study and weekly computer usage were statistically-significant risk factors for low back pain.

Cunningham (Caitriona Cunningham, Doody, & Blake, 2008) examined managers' attitude to, and knowledge of, low back pain. She found that 54% of them incorrectly believed that people needed to be pain free before they came back to work. Managers said they found it difficult to deal with the colleagues of people who had low back pain and to know the work capacity of the workers with low-back pain. They believed more information, easier access to health services, more ergonomic training and better staff resources were necessary supports in facilitating the management of workers with low-back pain.

Darragh (Darragh, Huddleston, & King, 2009) studied rates of musculoskeletal injuries in physical therapists and occupational therapists. She found the rate among occupational therapists was 16.5 injuries per 100 full-time workers while for physical therapists it was 16.9 injuries per 100 full-time workers. King compared older and younger therapists (King, Huddleston, & Darragh, 2009) and found that older therapists tended to report more severe pain symptoms than younger ones and were two-and-a-half times more likely to change jobs due to pain. Older workers had the same number of injuries as younger ones but were more likely to take more time off after them.

A qualitative study by Gropelli (T. M. P. Gropelli & Corle, 2010) found that nurses and physical therapists accepted occupational injuries as part of the job and took no action – or initiated only minor interventions – to prevent work-related injuries. In 2011 Gropelli (T. Gropelli & Corle, 2011) found that health-care professionals aged between 50 and 59 were injured most frequently. Most employees reported the injury on the day of the injury and did not lost work time. Surgical services had the most injuries and back injuries were the most common type of musculoskeletal injury.

Passier (Passier & McPhail, 2011) examined risks in the workplace and what would allow people to continue to work in physically-demanding roles. Risks included: work postures and movements, lifting or carrying, patient-related factors and repetitive tasks. Ways of working longer included: organisational strategies, workload or work allocation, work practices, work environment and equipment, physical condition and capacity and education and training.

A survey of 600 Canadian occupational therapists by Dyrkacz (Dyrkacz, Mak, & Heck, 2012) found that over half reported at least one work-related injury with patient-handling injuries and equipment-related incidents accounting for the largest proportion. Dyrkacz found that “injured occupational therapists tended to minimise the extent and impact of their injuries by under-reporting incidents and continuing to work after injury.

A study of general surgeons by Desai (Desai, Ellapen, & Van Heerden, 2012) found that 69.74% had experienced musculoskeletal pain in one or more anatomical location, of which lower back pain (60.38%) was the most prevalent.

A qualitative study of midwives by Long (M. H. Long, F. E. Bogossian, & V. Johnston, 2013) found that most participants thought musculoskeletal problems were normal occurrences and to be expected. Long

concluded that “coping strategies that enhance well-being may be most effective. The workplace culture must encourage injury reporting to monitor safety issues and decrease costs at all levels.” Long (M. H. P. C. N. M. Long, F. E. P. R. N. R. M. Bogossian, & V. P. B. Johnston, 2013) also looked into the prevalence of neck, shoulder and upper-back musculoskeletal disorders among midwives, nurses and physicians and found mean annual prevalence rates of 45% for neck pain, 40% for shoulder pain and 35% for upper-back pain.

Sembajwe (Sembajwe et al., 2013) found there were statistically-significant associations between psychosocial demands and multi-site musculoskeletal pain among patient-care associates, nurses and administrative personnel and that supervisor support played a significant role for nurses and women.

Reed studied foot and ankle problems in nurses (Reed, Battistutta, Young, & Newman, 2014) and found that foot and ankle problems were the most common conditions experienced by nurses during the last seven days, the second-most prevalent musculoskeletal problem to impair physical activity and the third-most prevalent musculoskeletal problem (after lower-back and neck problems) in the last year. Obesity, poor general health, existing foot conditions and working in the intensive-care unit were all risk factors for developing foot-and-ankle problems.

Kim (Kim et al., 2014) found a significant association between perceived inadequate staffing and back pain.

Cougot (Cougot et al., 2015) carried out a study on workers with chronic low-back pain. Cougot found that 77.3% of workers returned to work after two years. Being a healthcare worker, having had less than 112 sick-leave days, having a small fingertip-floor distance, having a low anxiety/depression score and having a low impact of back pain on quality of life were all statistically associated with a return to work after two years.

Vijendren (Vijendren, Yung, Sanchez, & Duffield, 2016) looked into musculoskeletal pain among ENT surgeons and found that 47.4% of them had experienced work-related problems. 85% of the affected surgeons sought treatment with 22.9% taking time off work and six retiring early.

In a study of 416 hospital staff Genç (Genç, Kahraman, & Göz, 2016) found a one-year prevalence of low-back, neck, upper-back and shoulder pain of 73.8%, 59.9%, 59.4% and 52.2% respectively. Low back (39.2%), upper back (29.7%) and neck (24.5%) pain were the most common complaints keeping people from work. Low-back pain affected nurses the most with a one-year prevalence of 81.3% and 57.1% were prevented from working.

Milhem (Milhem, Kalichman, Ezra, & Alperovitch-Najenson, 2016) carried out a narrative review into musculoskeletal pain in physiotherapists. He found a high prevalence with lifetime prevalence of between 55-91%, and 12-month prevalence of 40-91.3%. The lower back was the most-frequently affected area with a lifetime prevalence of 26-79.6% and a 12-month prevalence of 22-73.1%. The major risk factors were: lifting, transferring, repetitive movements, awkward and static postures, physical loads, treating a large number of patients in a day and working while injured. Women, younger physiotherapists, and physiotherapists working in rehabilitation were all more vulnerable. Ways of dealing with pain included seeking treatment, modifying one’s activities, using aids and equipment and either changing one’s specialty or leaving physiotherapy altogether. Skills and knowledge about correct body mechanics did *not* prevent work-related injuries.

Williams (Williams, Penkala, Smith, Haines, & Kelly-Ann, 2017) studied musculoskeletal problems in podiatrists and found that 79% had suffered from them at some point in their career. The majority of injuries were reported in the first five years of practice with the lower back being the most common area. Being a woman and working in private practice were associated with an increased likelihood of problems.

Interventions for musculoskeletal pain

Systematic Reviews

In a systematic review Tveito (Tveito, Hysing, & Eriksen, 2004) found that **exercise interventions** had a documented effect on sick leave, costs and new episodes of low-back pain and that **multidisciplinary interventions** had a documented effect on the level of pain. Tullar (Tullar et al., 2010) carried out a systematic review of research into interventions to reduce musculoskeletal symptoms in the health-care sector and found moderate evidence for **exercise interventions** and **multi-component patient handling** but no evidence that patient-handling training alone or cognitive-behaviour training alone had an effect on musculoskeletal health. A systematic review by Vargas-Prada (Vargas-Prada et al., 2016) found **“evidence of benefit of intervening during the first two weeks of sickness absence for musculoskeletal disorders.”**

Charney (Charney, Zimmerman, & Walara, 1991) examined the effectiveness of a **specialist lifting team** made up of hospital orderlies (porters) who were assessed physically and given special training. He found that the team significantly reduced the numbers of accidents and had the potential to save \$65,000 a year in costs for compensation with a greater saving if lost staff time was included. Hefti also found benefits to having a lift team (Hefti et al., 2003)

In a randomised trial Gerdle (Gerdle, Brulin, Elert, Eliasson, & Granlund, 1995) found that an **exercise programme** for home-care workers led to fewer musculoskeletal and psychosomatic complaints, less muscle tightness and better neck mobility, increased shoulder strength and better co-ordination.

Garrett (Garrett & Perry, 1996) describes how **Assist-O-Kinetic lifting techniques** - including movement and transfer techniques, therapeutic positioning, and proper use of equipment - dramatically reduced lost-time injury cases at the Department of Veterans Affairs Medical Centre at Lyons, New Jersey.

New England Hospital and Rehabilitation Centre (Hughes & Joanna Glattly' Rita, 1998) started a **modified-duty programme** that let injured workers work while they recuperated. They saw lost workdays decrease by 59%, saved \$1m and improved injured workers' morale.

Stewart-James (Stewart-James, 2002) found that **managed-care initiatives** led to substantial cost savings.

Nelson (Nelson, Lloyd, Menzel, & Gross, 2003) looked into **re-designing nine patient-handling tasks** that place nursing staff at high risk for musculoskeletal injuries with an expert panel re-designing the tasks using new patient-handling technologies and work-practice controls. She found that objective data revealed significant improvements in five of the re-designed tasks, while staff subjectively rated four of the re-designed tasks as significantly improved.

Nielsen (Nielsen, 2006) found that **viewing and scoring a video** of a patient transfer and then getting feedback from an instructor was “effective in increasing the safe behaviours related to patient transfers and reducing the possibility of back injuries among health-care workers in a skilled nursing facility.”

Silverwood (Silverwood & Haddock, 2006) found that **ceiling-mounted patient lifts** led to less fatigue, pain and frustration among nurses and a reduction in the time lost through illness.

Whitfill (Whitfill et al., 2010) found that people with low-back pain who received a **biopsychosocial early intervention programme** displayed significantly more symptom improvement, as well as cost savings, compared to people receiving standard care although the addition of a work-transition component to the programme made no difference.

Hinton describes the planning and implementation of a **safe patient handling/minimal-lift programme** in an acute-care hospital.(Hinton, 2010).

- Anonymous. (2008). Support project reduces sickness absence. *Nursing Standard (through 2013)*, 23(12), 7.
- Anonymous. (2009). NHS pays £1m for fast-track treatments. *Occupational Health*, 61(12), 5.
- Anonymous. (2011). OH referral times still slow in NHS, says audit. *Occupational Health*, 63(2), 5.
- Anonymous. (2014). Self-referral helps trust to save money. *Occupational Health*, 66(1), 5.
- Brown, J., Reetoo, K. N., Murray, K. J., Thom, W., & Macdonald, E. B. (2005). The involvement of occupational health services prior to ill-health retirement in NHS staff in Scotland and predictors of re-employment. *Occupational Medicine*, 55(5), 357-363.
- Brown, J. P., Mackay, D. P., Demou, E. P., Craig, J. M. B. A., Frank, J. M. D., & Macdonald, E. B. M. (2015). The EASY (Early Access to Support for You) sickness absence service: a four-year evaluation of the impact on absenteeism. *Scandinavian journal of work, environment & health*, 41(2), 204-215.
- Calnan, M. (2015). Hertfordshire County Council uses rehab benefits to control absence. *Employee Benefits*.
- Charney, W. I. H., Zimmerman, K. P. T., & Walara, E. M. B. A. (1991). The Lifting Team: A Design Method to Reduce Lost Time Back Injury in Nursing. *AAOHN Journal*, 39(5), 231-234.
- Clayton, P. (2016a). A fast track back to health. *Occupational Health & Wellbeing*, 68(9), 25.
- Clayton, P. (2016b). John Lewis saves £2 million through OH physiotherapy intervention. *Occupational Health & Wellbeing*, 68(2), 24-25.
- Cougot, B., Petit, A., Paget, C., Roedlich, C., Fleury-Bahi, G., Fouquet, M., . . . Tripodi, D. (2015). Chronic low back pain among French healthcare workers and prognostic factors of return to work (RTW): a non-randomized controlled trial. *Journal of Occupational Medicine and Toxicology*, 10.
- Cunningham, C., Doody, C., & Blake, C. (2008). Managing low back pain: knowledge and attitudes of hospital managers. *Occupational Medicine*, 58(4), 282-288. doi: <http://dx.doi.org/10.1093/occmed/kqn015>
- Cunningham, C., Flynn, T., & Blake, C. (2006). Low back pain and occupation among Irish health service workers. *Occupational Medicine*, 56(7), 447-454.
- Darragh, A. R., Huddleston, W., & King, P. (2009). Work-Related Musculoskeletal Injuries and Disorders Among Occupational and Physical Therapists. *The American Journal of Occupational Therapy*, 63(3), 351-362.
- Dean, E. (2009). Burnham challenges NHS to improve the wellbeing of its 1.4m workers. *Nursing Standard (through 2013)*, 24(13), 12-13.
- Desai, F. A., Ellapen, T. J., & Van Heerden, H. J. (2012). The point prevalence of work-related musculoskeletal pain among general surgeons in KwaZulu-Natal, South Africa. *Ergonomics SA*, 24(2), 18-30.
- Dinsdale, P. (2003). Take the danger out of working. *Nursing Standard (through 2013)*, 17(34), 12-13.
- Duffin, C. (2005). Trusts told to cut injuries and offer fast-track rehab. *Nursing Standard (through 2013)*, 19(20), 5.
- Dyble, J. (2014). Cheshire NHS Trust introduces physiotherapy benefit. *Employee Benefits*.
- Dyrkacz, A. P., Mak, L. Y. M., & Heck, C. S. (2012). Work-related injuries in Canadian occupational therapy practice. *The Canadian Journal of Occupational Therapy*, 79(4), 237-247.
- Fordham, L. (2015). NHS to launch Pounds 5m health and wellbeing programme. *Employee Benefits*.
- Garrett, R. B., & Perry, A. J. (1996). A safer way to move patients. *Occupational Health & Safety*, 65(9), 60.
- Genç, A., Kahraman, T., & Göz, E. (2016). The prevalence differences of musculoskeletal problems and related physical workload among hospital staff. *Journal of back and musculoskeletal rehabilitation*, 29(3), 541-547. doi: <http://dx.doi.org/10.3233/BMR-160655>
- Gerdle, B., Brulin, C., Elert, J., Eliasson, P., & Granlund, B. (1995). Effect of a general fitness program on musculoskeletal symptoms, clinical status, physiological capacity, and perceived work

- environment among home care service personnel. *Journal of Occupational Rehabilitation*, 5(1), 1-16. doi: <http://dx.doi.org/10.1007/BF02117816>
- Gropelli, T., & Corle, K. (2011). Assessment of Nurses' and Therapists' Occupational Musculoskeletal Injuries. *Medsurg Nursing*, 20(6), 297-303; quiz 304.
- Gropelli, T. M. P., & Corle, K. M. S. N. M. H. A. (2010). Nurses' and Therapists' Experiences With Occupational Musculoskeletal Injuries. *AAOHN Journal*, 58(4), 159-166.
- Hefti, K. S. M. S. N. R. N. C. N. P., Farnham, R. J. D. M. D., Docken, L. B. S. N. R. N. C. I. C., Bentaas, R. B. A. N. R. N., Bossman, S. R. N., & Schaefer, J. B. A. N. R. N. (2003). Back injury prevention: A lift team success story. *AAOHN Journal*, 51(6), 246-251.
- Hinton, M. V. (2010). Establishing a Safe Patient Handling/Minimal Lift Program. *Orthopaedic Nursing*, 29(5), 325-330; quiz 331-322.
- Hughes, K. J., & Joanna Glattly' Rita, K.-D. (1998). A stay-at-work plan for injured employees. *Nursing Management*, 29(8), 42-43.
- Kim, S.-s., Okechukwu, C. A., Dennerlein, J. T., Boden, L. I., Hopcia, K., Hashimoto, D. M., & Sorensen, G. (2014). Association between perceived inadequate staffing and musculoskeletal pain among hospital patient care workers. *International archives of occupational and environmental health*, 87(3), 323-330. doi: <http://dx.doi.org/10.1007/s00420-013-0864-y>
- King, P., Huddleston, W., & Darragh, A. R. (2009). Work-Related Musculoskeletal Disorders and Injuries: Differences Among Older and Younger Occupational and Physical Therapists. *Journal of Occupational Rehabilitation*, 19(3), 274-283. doi: <http://dx.doi.org/10.1007/s10926-009-9184-1>
- Lee, S.-J. (2007). *Risk perception, safe work behavior, and work -related musculoskeletal disorders among critical care nurses*. (3286660 Ph.D.), University of California, San Francisco, Ann Arbor. Retrieved from <https://search.proquest.com/docview/304880161?accountid=48232> Hospital Premium Collection database.
- Leggat, P. A., Smith, D. R., & Clark, M. J. (2008). Prevalence and correlates of low back pain among occupational therapy students in Northern Queensland. *The Canadian Journal of Occupational Therapy*, 75(1), 35-41.
- Long, M. H., Bogossian, F. E., & Johnston, V. (2013). Midwives' Experiences of Work-Related Shoulder Musculoskeletal Problems. *International Journal of Childbirth*, 3(1), 52-64.
- Long, M. H. P. C. N. M., Bogossian, F. E. P. R. N. R. M., & Johnston, V. P. B. (2013). The Prevalence of Work-Related Neck, Shoulder, and Upper Back Musculoskeletal Disorders Among Midwives, Nurses, and Physicians: A Systematic Review. *Workplace Health & Safety*, 61(5), 223-229; quiz 230. doi: <http://dx.doi.org/10.3928/21650799-20130426-38>
- Luime, J. J., Koes, B. W., Miedem, H. S., Verhaar, J. A. N., & Burdorf, A. (2005). High incidence and recurrence of shoulder and neck pain in nursing home employees was demonstrated during a 2-year follow-up. *Journal of clinical epidemiology*, 58(4), 407-413. doi: <http://dx.doi.org/10.1016/j.jclinepi.2004.01.022>
- Mather, C., & Hill, N. (1999). Do you feel alright? *Nursing Standard (through 2013)*, 13(19), 24-25.
- Milhem, M., Kalichman, L., Ezra, D., & Alperovitch-Najenson, D. (2016). Work-related musculoskeletal disorders among physical therapists: a comprehensive narrative review. *International journal of occupational medicine and environmental health*, 29(5), 735-747. doi: <http://dx.doi.org/10.13075/ijomeh.1896.00620>
- Nawar, M. (2000). Back me up! Stop injuries now! *American Nurse*, 32(1), 22-23.
- Nelson, A. P. R. N. F., Lloyd, J. D. P. M. C. P. E., Menzel, N. P. R. N. C.-S., & Gross, C. P. C. P. E. F. (2003). Preventing nursing back injuries: Redesigning patient handling tasks. *AAOHN Journal*, 51(3), 126-134.
- Nielsen, D. (2006). *Patient handling safety for nursing staff*. (3243162 Ph.D.), Western Michigan University, Ann Arbor. Retrieved from <https://search.proquest.com/docview/304976795?accountid=48232> Hospital Premium Collection database.

- Passier, L., & McPhail, S. (2011). Work related musculoskeletal disorders amongst therapists in physically demanding roles: qualitative analysis of risk factors and strategies for prevention. *BMC Musculoskeletal Disorders*, 12, 24. doi: <http://dx.doi.org/10.1186/1471-2474-12-24>
- Paterson, J. (2013). NHS trusts spent Pounds 1bn on sick pay in three years. *Employee Benefits*.
- Paton, N. (2015). Thousands of NHS workers are absent owing to MSDs or bullying. *Occupational Health*, 67(4), 4.
- Paton, N. (2016). NHS staff health and wellbeing fund targets front-line employees. *Occupational Health & Wellbeing*, 68(5), 5.
- Phillips, J. A. D. S. N. R. N., Forrester, B. M. D. M. P. H., & Brown, K. C. P. R. N. (1996). Low Back Pain: prevention and management. *AAOHN Journal*, 44(1), 40-53,48.
- Reed, L. F., Battistutta, D., Young, J., & Newman, B. (2014). Prevalence and risk factors for foot and ankle musculoskeletal disorders experienced by nurses. *BMC Musculoskeletal Disorders*, 15, 196. doi: <http://dx.doi.org/10.1186/1471-2474-15-196>
- Sembajwe, G. S. M., Tveito, T. H. P., Hopcia, K. S. A. N. P. B. C. C.-S., Kenwood, C. M. S., O'Day, E. T. M. M. S., Stoddard, A. M. S., . . . Sorensen, G. P. (2013). Psychosocial Stress and Multi-site Musculoskeletal Pain: A Cross-sectional Survey of Patient Care Workers. *Workplace Health & Safety*, 61(3), 117-125. doi: <http://dx.doi.org/10.3928/21650799-20130226-01>
- Silverwood, S. R. N., & Haddock, M. B. S. R. M. (2006). Reduction of musculoskeletal injuries in intensive care nurses using ceiling-mounted patient lifts. *Dynamics : The Official Journal of the Canadian Association of Nurses*, 17(3), 19-21.
- Stewart-James, J. E. (2002). *Managed occupational health vs. traditional care: A cost and satisfaction analysis of workers' compensation in healthcare workers*. (3075618 Ed.D.), The University of Texas at Austin, Ann Arbor. Retrieved from <https://search.proquest.com/docview/305513186?accountid=48232> Hospital Premium Collection database.
- Trueland, J. (2015). Keeping fit for purpose. *Nursing Standard (2014+)*, 29(51), 20. doi: <http://dx.doi.org/10.7748/ns.29.51.20.s22>
- Tullar, J. M., Brewer, S., Amick, B. C., Irvin, E., Mahood, Q., Pompeii, L. A., . . . Evanoff, B. (2010). Occupational Safety and Health Interventions to Reduce Musculoskeletal Symptoms in the Health Care Sector. *Journal of Occupational Rehabilitation*, 20(2), 199-219. doi: <http://dx.doi.org/10.1007/s10926-010-9231-y>
- Tveito, T. H., Hysing, M., & Eriksen, H. R. (2004). Low back pain interventions at the workplace: a systematic literature review. *Occupational Medicine*, 54(1), 3-13.
- Vargas-Prada, S. M. D. P., Demou, E. P., Lalloo, D. M. D., Avila-Palencia, I. M. P. H., Sanati, K. A. M. D., Sampere, M. M. D. P., . . . Macdonald, E. B. M. D. O. B. E. (2016). Effectiveness of very early workplace interventions to reduce sickness absence: a systematic review of the literature and meta-analysis. *Scandinavian journal of work, environment & health*, 42(4), 261-272. doi: <http://dx.doi.org/10.5271/sjweh.3576>
- Vijendren, A., Yung, M., Sanchez, J., & Duffield, K. (2016). Occupational musculoskeletal pain amongst ENT surgeons - are we looking at the tip of an iceberg? *The Journal of Laryngology and Otology*, 130(5), 490-496. doi: <http://dx.doi.org/10.1017/S0022215116001006>
- Whitfill, T., Haggard, R., Bierner, S. M., Pransky, G., Hassett, R. G., & Gatchel, R. J. (2010). Early Intervention Options for Acute Low Back Pain Patients: A Randomized Clinical Trial with One-Year Follow-Up Outcomes. *Journal of Occupational Rehabilitation*, 20(2), 256-263. doi: <http://dx.doi.org/10.1007/s10926-010-9238-4>
- Williams, C. M., Penkala, S., Smith, P., Haines, T., & Kelly-Ann, B. (2017). Exploring musculoskeletal injuries in the podiatry profession: an international cross sectional study. *Journal of Foot and Ankle Research*, 10. doi: <http://dx.doi.org/10.1186/s13047-016-0185-y>