

## Federation University ResearchOnline

<https://researchonline.federation.edu.au>

Copyright Notice

This is an accepted manuscript of an article published by Taylor & Francis in Issues in Mental Health Nursing on 11 February 2021 available at :

<https://www.tandfonline.com/doi/full/10.1080/01612840.2021.1875276>

See this record in Federation ResearchOnline at:

<http://researchonline.federation.edu.au/vital/access/HandleResolver/1959.17/189803>

## **Home-Based Work and Ergonomics: Physical and psychosocial considerations**

### **Working from home**

The advent of the COVID-19 pandemic in early 2020 gave rise to a number of measures to control the spread of the virus, including (self-)isolation, ‘lockdown’, and/or quarantine (Baldwin & Mauro, 2020). These measures led to many workers being required to ‘telecommute’ or work remotely from home, supported by a range of information and communication technologies (ICTs), rather than congregate with colleagues in shared offices (Oakman, Kinsman, Stuckey, Graham, & Weale, 2020). Prior to the COVID-19 pandemic, global figures estimated that only 7.9% of the world’s workforce (self-employed and workers) undertook home-based work (HBW) on a permanent basis (Berg, Bonnet, & Soares, 2020). During the COVID-19 pandemic, a reported 81% of the global workforce were impacted by full or partial workplace closures including changes to their work location, including the requirement for many people to undertaking home-based work (HBW) (International Labour Organization, 2020).

Developments in ICTs have enabled workers to undertake HBW ‘virtually’, with a range of positive outcomes (Hoey & Aslett, 2020). The benefits of HBW can include less time spent commuting between home and work, and reductions in the associated fatigue, transport congestion and other environmental impacts; together with increased flexibility, productivity, and work-life balance (Allen, Golden, & Shockley, 2015). Moretti et al. (2020) also report financial benefits for workers, with reduced transport costs and expenditure on snacks or food items purchased when working in the corporate workplace.

On the other hand, HBW can also present a number of health challenges for workers. For example, physical issues that can arise from problematic home-based office set-ups, including

poor postural habits that lead to musculoskeletal conditions, have been identified (Moretti et al., 2020; Sesenes et al., 2018). Psychosocial issues are also common, and include increased feelings of isolation, decreased work-life balance, loss of motivation, and increases in stress and anxiety (Bellmann & Hübler, 2020).

Reasons for such increases in stress and anxiety can include work-family conflict, which occurs when the demands of work impinge on domestic and family commitments (Canady, 2020; K. G. Davis et al., 2020). For example, many workers undertaking HBW reported stress-related issues and reduced levels of productivity while working at home and also caring for / home-schooling children (Chapman & Thamrin, 2020). Additionally, people undertaking HBW reported feeling uncertain about workplace expectations, stressed from dealing with complex ICT issues without assistance, overworked, and stressed related to a general lack of support from employers (Oakman et al., 2020).

This column considers some health and psychosocial impacts of HBW during the COVID-19 pandemic. It also discusses the ways and means by which workers can support themselves and others, physically and psychosocially, while working at home, whether during times of crisis or as common practice in the future.

### **Maintaining physical health when working from home**

HBW can affect the physical health of workers in a range of ways, including a lack of exercise, over-eating, musculoskeletal issues, and pain (Hoy et al., 2014; Moretti et al., 2020). One of the reasons for the advent of physical health issues is the ergonomically poor set-up of many home workstations. workstations can give rise to a range of musculoskeletal disorders, as a result of the overuse of muscles and poor posture, including the lack of maintaining a neutral spine (Pelta, 2020). This is demonstrated in a cross-sectional study undertaken by Moretti et al. (2020), which comprised 51 mobile office workers and found that 41.2% of participants

experienced lower back pain and 23.5% experienced neck and other pain. Of concern is that these percentages increased, over-time, and led to lower levels of job satisfaction.

Physical work-related injuries have a substantial economic cost. For example, in Australia in 2014-15, musculoskeletal disorders with traumatic joint/ligament and muscle/tendon injuries, account for almost 45% of serious workers' compensation claims (Safe Work Australia, 2020b). Moreover, in 2012-2013 the total economic cost of work-related injuries and disease is estimated to be \$61.8 billion dollars (Safe Work Australia, 2020a). This suggests the need to ensure that all workplaces, including home-based offices, are safe.

### *Issues with home-based offices*

For a home-based office to be ergonomically effective, efficient, healthy, safe and usable, there must be a designated work-space and designated tools, including a computer, desk, chair, telephone and internet connection (Thatcher, 2013). The lack of tools in many home-based offices, however, together with limited or absent education on how best to set up an ergonomically sound workstation, has resulted in many workers operating in suboptimal conditions when undertaking HBW (K. G. Davis et al., 2020). For example, with the sudden and unexpected advent of HBW during the COVID-19 pandemic, many workers found themselves utilizing household furniture commonly used by other members of the family (e.g., kitchen table, dining chairs, bedrooms) with the ergonomic configurations less than ideal.

Specifically, in a survey conducted on the ergonomics of home-based offices during COVID-19, K. G. Davis et al. (2020) identified a number of potential issues, including the position of the screen; together with the type of chair being used (arm rests, lumbar support, height of seat), work surface, input device and workstation types. Evaluations of the workstations identified that 43% of the participants had incorrect seating positions, with the majority of these too low (K. G. Davis et al., 2020). Additionally, many of the chairs had arm rests that were

either improperly adjusted or not used; few of the chairs had corrective lumbar support; many of the chair-heights were such that the worker could not rest their feet appropriately on the ground; and 50% of monitors were either set up too low or were incorrectly centred (K. G. Davis et al., 2020). Other concerns included poor lighting, such as glare or darkness.

Addressing issues related to home-office configurations, to minimise the impact on physical health, can be achieved when workers employ the guidelines provided by employers and/or utilise the resources available online to support self-assessment. Additionally, forward planning in relation to the ergonomics of a home-based office can ensure a safe and suitable work environment and minimise the development of musculoskeletal issues and pain.

#### *Issues with exercise and nutrition*

Although HBW has reduced travel time and costs, together with expenditure related to eating out, many workers have found themselves exercising less and eating more while at home. There are a number of possible reasons for this.

First, workers may be less likely to move around in the home, compared to when they travelled to and from work and, once at work, moved around different parts of the building or other locations to attend meetings. Second, workers may be unable to access usual venues for exercise, due to limitations or closure of facilities; and may be more likely to frequent a well-stocked refrigerator and pantry in their home than in a corporate workplace. Third, workers in quarantine, who are unable to leave their house, will be less likely or unable to structure specific exercise time into their working day.

Sedentary postures have long been linked to a number of physical health risks, including diabetes, weight-gain and high cholesterol levels (K. G. Davis et al., 2020). For example, high volumes of sedentary time are associated with elevated risk of type 2 diabetes and cardiovascular disease, and with adverse cardiometabolic risk profiles (Dempsey et al., 2018).

A recent systematic review (Patterson et al., 2018) demonstrated an association between sedentary behaviour (> 6-8 hours a day of total sitting and >3-4 hours a day of TV viewing), greater risk of cardiovascular disease. More disturbingly, a recent meta-analysis by (Ekelund et al., 2020) showed higher sedentary time to be associated with higher risk for premature mortality 'statistical significantly higher risk of death was observed for sedentary times of 9.5 or more hours daily' (p.1). Ekelund et al. (2020) go on recommend about 30-40 minutes of moderate to vigorous physical activity per day to reduce the risk for premature mortality.

Addressing issues related to exercise and nutrition, while undertaking HBW, may be achieved by structuring a routine or schedule for work that is similar to that employed in the corporate workplace. For example, Kermit G Davis and Kotowski (2015) recommend dynamic workstations, for those undertaking HBW, with two-minute breaks of standing up and moving around, every 30 minutes. Alternatively, workers could identify their own specific times to break from work-related activities, and to eat well and exercise, as appropriate to the type of working they carry. This may include setting an alarm or similar to remind them to take these breaks.

### **Maintaining psychosocial health when working from home**

A number of studies have identified a range of benefits and challenges, in relation to mental health and psychosocial wellbeing, for workers who undertake HBW. For example, (Bellmann & Hübler, 2020) report higher levels of job satisfaction in those who work remotely from home. Likewise, Anderson, Kaplan, and Vega (2015) found that government workers undertaking HBW felt more at ease, grateful, enthusiastic, happy, and proud. In comparison, those who worked in corporate environments reported higher levels of boredom, frustration, anger, anxiety, and fatigue (Anderson et al., 2015).

Interestingly, individual variations were also identified in relation to the successes achieved through HBW, with personal traits or characteristics a key influencer. For example, while some workers reported that they relied on interactive communication with and support from colleagues in the corporate setting to mediate work-related stress, others reported positive benefits from being away from high-stress corporate settings (Vander Elst et al., 2017). Similarly, Anderson et al. (2015) suggest that success with undertaking HBW is supported by an individual's openness to new experiences, lower tendency to ruminate, and higher levels of social connectedness outside of work. It would seem, then, that if there is a choice to work from home, then prior screening for suitability to undertake HBW could assist in addressing pre-empting or addressing potential issues before they arise.

Individual characteristics notwithstanding, a number of mental health and psychosocial challenges have been identified for those who work remotely from home. For example, Oakman et al. (2020) report that HBW employees are more likely to experience feelings of personal and social isolation, with the opportunities to connect limited to the online (including telephone) or virtual environments. Also problematic is the loss of motivation that can be experienced by some workers who work from home.

There are four possible reasons for this loss of motivation. This includes, first, a loss of structure in the working day and the larger number of distractions in the home (Morin, 2020); second, increases in stress and anxiety due to the work-family conflict generated when the demands of work impinge on domestic and family commitments (Vander Elst et al., 2017); third, a negative impact of HBW on work-life balance, including work overload, as workers find it difficult to establish boundaries between their work and home life (Bellmann & Hübler, 2020); and fourth, role ambiguity, uncertainty about workplace expectations, together with a lack of support from employers (Canady, 2020; Chapman & Thamrin, 2020; Suh & Lee, 2017).

Other psychosocial issues related to HBW include the stress experienced when dealing with the complexity and pace of change in ICTs, together with the strain felt by some workers, from being in constant electronic contact with managers and colleagues. One possible reason for this may be that some managers are not comfortable with the virtual environment and feel the need to micromanage workers who are undertaking HBW (Evanoff et al., 2020). Such low-trust workplaces can de-motivate workers and undermine their confidence and capacity to produce high-quality work (Cleary, Hungerford, Lopez, & Cutcliffe, 2015; Catherine Hungerford & Cleary, 2020). In relation to virtual workplaces, this suggestion is supported by Bentley et al. (2016), who identified increased levels of mental health problems in HBW employees who felt that organisational support was lacking. Conversely, appropriate and high-trust organisational support can give rise to lower levels of role conflict, great autonomy and reduced feelings of exhaustion (Sardeshmukh, Sharma, & Golden, 2012).

#### *The importance of social connectedness*

An important mediator of the challenges related to HBW is social connectedness, including social relationships that are external to the workplace (Oakman et al., 2020). The social connectedness that develops within the workplace can take many forms, with social networks defined as a set of social activities – e.g. individuals, groups, families, communities – and the social relationships that connect them to one another in a larger structure (Jackson, Andrew, & Cleary, 2013; O’Rourke, Collins, & Sidani, 2018). This would include, for example, the professional and personal interactions that occur in the course of a workday, with social connectedness and connections stronger within the teams that comprise the larger workplace context. Constructive and cohesive relationships serve, not only to meet a range of interpersonal and social needs of many workers, but also provide the means by which productivity can be increased and outcomes achieved (Catherine Hungerford & Cleary, 2020; C. Hungerford, Sayers, & Cleary, 2016).



Maintaining high levels of collegial social connectedness, when undertaking HBW, presents a range of challenges. For example, Vander Elst et al. (2017) consider the large number of factors involved in developing and maintaining good personal and social connections in the workplace, including the complex interactions that occur, formally and informally, between peers, managers and subordinates, within and across groups and teams; and also across the organisation itself. Opportunities to engage informally are often absent during virtual meetings; and the skills required different to those when working together face-to-face. There is a need, then, to develop innovative ways and means by which workers can interact more flexibly in the online environment, with a view to supporting the development and maintenance of social connections.

### **Working from home, into the future**

Despite the related challenges, the successes of HBW suggests that, post the COVID-19 pandemic, more workers will choose the benefits of working remotely at home; and more employers will support workers to make this choice. To help overcome the health challenges that can arise from HBW, physical and psychosocial, it is recommended that all those involved take the following steps:

- Search out and apply the range of credible resources, available online, to facilitate with better ergonomic planning and design to ensure a safe and suitable environment (e.g. National Institutes of Health, Office of Research Services, Division of Occupational Health and Safety: <https://www.ors.od.nih.gov/sr/dohs/Pages/default.aspx>).
- Stay physically active by moving outside at least once a day to exercise, for an hour or more. If possible, exercise in a group, to improve psychosocial connections.
- Avoid setting up a home-based workstation near the kitchen or in the bedroom, plan breaks, pre-prepare meals and drink water in preference to coffee.

- Utilise credible websites related to maintaining good psychosocial health, including ways to self-manage stress and to build and maintain social connectedness. Such websites include, without being limited to, the following:
  - American Psychiatric Association (<http://workplacementalhealth.org/Employer-Resources/Working-Remotely-During-COVID-19>),
  - Anxiety Canada (<https://www.anxietycanada.com/articles/covid19-balancing-public-health-and-mental-health>),
  - Beyondblue (Australia) (<https://coronavirus.beyondblue.org.au>),
  - Black Dog Institute (Australia) (<https://www.blackdoginstitute.org.au/news/working-from-home-a-checklist-to-support-your-mental-health-during-coronavirus/>),
  - National Health Service (UK) (<https://www.nhs.uk/oneyou/every-mind-matters/7-simple-tips-to-tackle-working-from-home>)
- Wherever possible, reach out to colleagues who are undertaking HBW, with a view to forging social connections. If possible, consider how to meet and interact with them in person, as well as virtually, to optimise opportunities and ensure that all people, regardless of individual or personal traits or preferences, are engaged.

## **Conclusion**

In this column, we discussed the health and psychosocial impacts of HBW during the COVID-19 pandemic and beyond. We also considered how workers can support themselves and others, physically and psychosocially. Ideas to support improvements in HBW were posited, including screening to pre-empt or address issues prior to them arising; and developing ways and means of developing social connected in a virtual workplace where opportunities for informal interactions are limited. ICTs have allowed workers to continue to contribute, regardless of

locations, leading to a substantial large growth in the number of people who work remotely. Learning to manage the challenges involved is an important means of adapting and overcoming the COVID-19 pandemic. The lessons learned will also enable workers to be well supported, in increasingly flexible workplaces, on into the future.

## References

- Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How Effective Is Telecommuting? Assessing the Status of Our Scientific Findings. *Psychological Science in the Public Interest*, 16(2), 40-68. doi:10.1177/1529100615593273
- Anderson, A. J., Kaplan, S. A., & Vega, R. P. (2015). The impact of telework on emotional experience: When, and for whom, does telework improve daily affective well-being? *European Journal of Work and Organizational Psychology*, 24(6), 882-897. doi:10.1080/1359432X.2014.966086
- Baldwin, R., & Mauro, B. W. d. (2020). Economics in the Time of COVID-19. In: CEPR Press.
- Bellmann, L., & Hübler, O. (2020). Working from home, job satisfaction and work–life balance—robust or heterogeneous links? *International Journal of Manpower*.
- Bentley, T. A., Teo, S. T. T., McLeod, L., Tan, F., Bosua, R., & Gloet, M. (2016). The role of organisational support in teleworker wellbeing: a socio-technical systems approach. *Applied ergonomics*, 52, 207-215. doi:10.1016/j.apergo.2015.07.019
- Berg, J., Bonnet, F., & Soares, S. (2020). Working from home: Estimating the worldwide potential. *VoxEU CEPR Policy Portal*, 11. Retrieved from <https://voxeu.org/article/working-home-estimating-worldwide-potential>
- Canady, V. A. (2020). APA stress report amid COVID-19 points to parental challenges. *Mental Health Weekly*, 30(22), 3-4. doi:<https://doi.org/10.1002/mhw.32385>
- Chapman, D. G., & Thamrin, C. (2020). Scientists in pyjamas: characterising the working arrangements and productivity of Australian medical researchers during the COVID-19 pandemic. *Medical Journal of Australia*, 213(11), 516-520. doi:<https://doi.org/10.5694/mja2.50860>
- Cleary, M., Hungerford, C., Lopez, V., & Cutcliffe, J. R. (2015). Towards Effective Management in Psychiatric-Mental Health Nursing: The Dangers and Consequences of Micromanagement. *Issues Ment Health Nurs*, 36(6), 424-429. doi:10.3109/01612840.2014.968694
- Davis, K. G., & Kotowski, S. E. (2015). Stand up and move; your musculoskeletal health depends on it. *Ergonomics in Design*, 23(3), 9-13.
- Davis, K. G., Kotowski, S. E., Daniel, D., Gerding, T., Naylor, J., & Syck, M. (2020). The Home Office: Ergonomic Lessons From the “New Normal”. *Ergonomics in Design*. doi:10.1177/1064804620937907
- Dempsey, P. C., Hadgraft, N. T., Winkler, E. A. H., Clark, B. K., Buman, M. P., Gardiner, P. A., . . . Dunstan, D. W. (2018). Associations of context-specific sitting time with markers of cardiometabolic risk in Australian adults. *International Journal of Behavioral Nutrition and Physical Activity*, 15(1), 114. doi:10.1186/s12966-018-0748-3
- Ekelund, U., Tarp, J., Fagerland, M. W., Johannessen, J. S., Hansen, B. H., Jefferis, B. J., . . . Howard, V. J. (2020). Joint associations of accelerometer measured physical activity and sedentary time with all-cause mortality: a harmonised meta-analysis in more than 44 000 middle-aged and older individuals.
- Evanoff, B. A., Strickland, J. R., Dale, A. M., Hayibor, L., Page, E., Duncan, J. G., . . . Gray, D. L. (2020). Work-Related and Personal Factors Associated With Mental Well-Being During the COVID-19 Response: Survey of Health Care and Other Workers. *Journal of medical Internet research*, 22(8), e21366-e21366. doi:10.2196/21366

- Hoy, D., March, L., Brooks, P., Blyth, F., Woolf, A., Bain, C., . . . Barendregt, J. (2014). The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Annals of the rheumatic diseases*, 73(6), 968-974. Retrieved from <https://ard.bmj.com/content/annrheumdis/73/6/968.full.pdf>
- Hungerford, C., & Cleary, M. (2020). 'High Trust' and 'Low Trust' Workplace Settings: Implications for Our Mental Health and Wellbeing. *Issues in Mental Health Nursing*, 1-9. doi:10.1080/01612840.2020.1822480
- Hungerford, C., Sayers, J., & Cleary, M. (2016). Facilitating Goodwill in Workplace Relationships: The Benefits and Challenges. *Issues Ment Health Nurs*, 37(7), 530-532. doi:10.1080/01612840.2016.1187503
- International Labour Organization. (2020). ILO: COVID-19 causes devastating losses in working hours and employment. Retrieved from [https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS\\_740893/lang--en/index.htm](https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_740893/lang--en/index.htm)
- Jackson, D., Andrew, S., & Cleary, M. (2013). Editorial. *Contemporary Nurse*, 45(1), 2-3. doi:10.5172/conu.2013.45.1.2
- Moretti, A., Menna, F., Aulicino, M., Paoletta, M., Liguori, S., & Iolascon, G. (2020). Characterization of Home Working Population during COVID-19 Emergency: A Cross-Sectional Analysis. *International Journal of Environmental Research and Public Health*, 17(17), 6284.
- Morin, A. (2020). How to stay motivated when you are working from home. *Verywellmind*(Accessed at: <https://www.verywellmind.com/work-from-home-motivation-4802480>).
- O'Rourke, H. M., Collins, L., & Sidani, S. (2018). Interventions to address social connectedness and loneliness for older adults: a scoping review. *BMC Geriatrics*, 18(1), 214. doi:10.1186/s12877-018-0897-x
- Oakman, J., Kinsman, N., Stuckey, R., Graham, M., & Weale, V. (2020). A rapid review of mental and physical health effects of working at home: how do we optimise health? *BMC Public Health*, 20(1), 1825. doi:10.1186/s12889-020-09875-z
- Patterson, R., McNamara, E., Tainio, M., de Sá, T. H., Smith, A. D., Sharp, S. J., . . . Wijndaele, K. (2018). Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *Eur J Epidemiol*, 33(9), 811-829. doi:10.1007/s10654-018-0380-1
- Pelta, R. (2020). Work-from-Home Ergonomics 101: Setting Up Your New Remote Office. *FlexJobs: Find a better way to work* Retrieved from <https://www.flexjobs.com/blog/post/work-from-home-ergonomics-101/>
- Safe Work Australia. (2020a). Cost of injury and illness statistics. Retrieved from <https://www.safeworkaustralia.gov.au/statistics-and-research/statistics/cost-injury-and-illness/cost-injury-and-illness-statistics>
- Safe Work Australia. (2020b). *Disease and injury statistics*. Retrieved from Canberra: <https://www.safeworkaustralia.gov.au/statistics-and-research/statistics/disease-and-injuries/disease-and-injury-statistics>
- Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: a job demands and job resources model. *New Technology, Work and Employment*, 27(3), 193-207. doi:<https://doi.org/10.1111/j.1468-005X.2012.00284.x>
- Sesenes, R. L., Contreras-Valenzuela, M. R., Duque-Álvarez, A. E., Guzmán-Clemente, A. D., León-Hernández, V. A., & Cuenca-Jiménez, F. (2018). How Poor Workstation Design Causes

Musculoskeletal Disorders: Research from QOC Matrix the Workers' Voice. In *Work-related Musculoskeletal Disorders*: IntechOpen.

Suh, A., & Lee, J. (2017). Understanding teleworkers' technostress and its influence on job satisfaction. *Internet Research*, 27(1), 140-159. doi:10.1108/IntR-06-2015-0181

Thatcher, A. (2013). Green ergonomics: definition and scope. *Ergonomics*, 56(3), 389-398. Retrieved from <https://www.tandfonline.com/doi/full/10.1080/00140139.2012.718371>

Vander Elst, T., Verhoogen, R., Sercu, M., Van den Broeck, A., Baillien, E., & Godderis, L. (2017). Not Extent of Telecommuting, But Job Characteristics as Proximal Predictors of Work-Related Well-Being. *J Occup Environ Med*, 59(10), e180-e186. doi:10.1097/jom.0000000000001132