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# BMJ Open

## Working at home in Australia during the COVID-19 pandemic: Baseline results for the Employees Working at Home (EWAH) study.

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3 1 **Working at home in Australia during the COVID-19 pandemic: Baseline results for the Employees**

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5 2 **Working at Home (EWAH) study.**

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3 27 **ABSTRACT**  
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5 28 **Objectives:** To investigate the impacts, on mental and physical health, of a mandatory shift to  
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7 29 working at home during the COVID-19 pandemic.

8  
9 30 **Design:** Cross sectional, online national survey.

10  
11 31 **Setting:** Online survey was conducted from x 2020 to x 2020 in the general population.

12  
13 32 **Participants:** Australian residents working at home for at least two days a week at some time in  
14  
15 33 2020 during the COVID-19 pandemic.

16  
17 34 **Main outcome measures:** demographics, caring responsibilities, working at home arrangements,  
18  
19 35 work-related technology, work–family interface, psychosocial and physical working conditions, and  
20  
21 36 reported stress and musculoskeletal pain.

22  
23 37 **Results:** 924 Australians responded to the online questionnaire. Respondents were mostly women  
24  
25 38 (75.5%) based in Victoria (83.7%) and employed in the education and training and healthcare  
26  
27 39 sectors. Approximately 70% of respondents worked five or more days from home, with only 60%  
28  
29 40 having a dedicated workstation in an uninterrupted space. Over 70% of all respondents reported  
30  
31 41 experiencing musculoskeletal pain or discomfort. Gendered differences were observed; men  
32  
33 42 reported higher levels of family to work conflict, and lower levels of recognition for their work,  
34  
35 43 compared to women. For women, stress and musculoskeletal pain levels were higher than men and  
36  
37 44 they also reported more concerns about their job security than men.

38  
39 45 **Conclusions:** Preliminary evidence from the current study revealed that working at home does  
40  
41 46 impact employees' physical and mental health, and that this impact is gendered. This knowledge can  
42  
43 47 assist employers to develop protocols and policies to optimise working at home conditions and  
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45 48 reduce potential negative physical and mental health impacts on their employees.

46  
47 49 **Article Summary:**

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49 50 ***Strengths and limitations of this study***  
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3 51 • A key strength of the study is the use of a range of validated measurement tools to examine  
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5 52 the environmental exposures for workers whilst working at home during the COVID-19  
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7 53 pandemic.  
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9  
10 54 • The baseline data was collected during a period of sustained lockdown in one of the states  
11  
12 55 (Victoria) which provides some unique insights into the experiences of people working at  
13  
14 56 home under those conditions.  
15  
16 57 • The population sample has a higher proportion of respondents based in Victoria, the  
17  
18 58 southern state of Australia which experienced longer periods of lockdown and more severe  
19  
20 59 restrictions, so the impacts on this group are likely to differ from those elsewhere in  
21  
22 60 Australia.  
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24  
25 61 • The use of a convenience sample is a limitation and recruitment of females was higher than  
26  
27 62 males; however, this is consistent with emerging research in COVID-19 studies  
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31  
32 64 Key words: COVID 19, mental health, risk management  
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35 65

## 36 66 INTRODUCTION

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39 67 The current global pandemic caused by COVID-19 has resulted in an unprecedented situation with  
40  
41 68 wide ranging health <sup>1</sup> and economic impacts <sup>2,3</sup> which differ markedly by gender <sup>4,5</sup>. The unexpected  
42  
43 69 and rapid global impact necessitated immediate actions and a key public health measure has been  
44  
45 70 the shift to working at home (WAH) where possible <sup>6</sup>. Whilst WAH is often used as a flexible work  
46  
47 71 benefit to improve the integration between work and other life activities, it is less commonly  
48  
49 72 undertaken in a full-time capacity or mandatory capacity <sup>7</sup>. In response to the public health  
50  
51 73 restrictions, organisations rapidly transitioned to WAH without a clear understanding of the impact  
52  
53 74 of ongoing WAH on mental and physical health <sup>8</sup>. Therefore, evidence is required to inform the  
54  
55 75 development of sustainable and healthy WAH conditions through policies and practices based on  
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57 76 contemporary evidence.  
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5 78 Workplace conditions, physical and psychosocial, have been associated with a range of negative  
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7 79 health outcomes which include musculoskeletal and stress-related mental health disorders <sup>9-11</sup>.  
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9  
10 80 Employers are required to undertake activities to support the protection of all workers and reduce  
11  
12 81 injury risk; early identification of adverse working conditions, regardless of where the work is being  
13  
14 82 undertaken, will enable targeted strategies to address potential risks <sup>12 13</sup>. Such workplace  
15  
16 83 assessment activities are traditionally undertaken by occupational health professionals, ergonomists  
17  
18 84 or health and safety representatives at the organisation, but the rapid shift to working at home  
19  
20  
21 85 meant that many of the usual work environment assessments were bypassed in order to comply  
22  
23 86 with governmental public health responses <sup>8</sup>.  
24  
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26 87  
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28 88 Working at home can have positive and negative impacts on the work family interface; where the  
29  
30 89 traditional boundary settings are challenged <sup>14 15</sup>; there is potential for increased role conflict <sup>16</sup> or  
31  
32 90 spill over between the two domains. High levels of work family conflict (WFC) are associated with  
33  
34 91 negative impacts on physical and mental health, low job satisfaction, and heightened intentions to  
35  
36 92 leave the workplace <sup>17-19</sup>. In the other direction, family to work (FWC) conflict can arise due to  
37  
38 93 interruptions from family and disruptions related to participation in home duties. As such, the  
39  
40 94 multiple role transitions required when WAH may reduce WFC but may increase FWC <sup>15 16</sup> and  
41  
42 95 impact employee productivity. Boundary theory <sup>20</sup> which underpins much of the work family  
43  
44 96 interface research area, proposes that individuals maintain psychological, physical and/or  
45  
46 97 behavioural boundaries around their different life roles, such as their work and home roles. The  
47  
48 98 rapid change to WAH during the COVID 19 pandemic required transitions for employees, to support  
49  
50 99 the greater public health need, without careful consideration of boundary setting. Previous research  
51  
52 100 has identified that employees WAH adjust their approach to managing the interface depending on  
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54 101 the number of days they are based at home <sup>7</sup>. Further investigation is required so that policy and  
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3 102 practices are based on contemporary evidence and experiences of workers who may now WAH for  
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5 103 more of their week than prior to the COVID 19 pandemic.  
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9  
10 105 A recent rapid review identified WAH as a complex occupational health issue, necessitating  
11  
12 106 organisations utilise a systems-based approach, taking into account the organisational, job and  
13  
14 107 individual aspects of work <sup>11</sup>. This approach is a distinct departure from more conventional  
15  
16 108 workplace assessment strategies which commonly focus on the physical aspects of a person's work  
17  
18 109 and fail to address the psychosocial conditions. The review identified a need for policies to be  
19  
20 110 implemented around work-home boundary management, role clarification, clear performance  
21  
22 111 indicators, appropriate technical support, facilitation of co-worker networking, and training for  
23  
24 112 managers. There appears to be a high likelihood that WAH will remain a central aspect of future  
25  
26 113 working conditions well beyond the current COVID 19 pandemic <sup>21</sup>; as such the overarching objective  
27  
28 114 of the EWAH study was to explore the relationships between a broad range of workplace  
29  
30 115 characteristics and the impact on employees health and wellbeing.  
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36 116  
37 117 The overall aim of this paper is to describe the baseline survey results of the Employees Working at  
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39 118 Home (EWAH) study. The objectives of the EWAH study are to examine 1) The impacts of  
40  
41 119 psychosocial and physical hazards, related to WAH, on mental and physical health, and 2) To  
42  
43 120 investigate differences in health outcomes between employees, based on gender (reported here),  
44  
45 121 age and job type (reported elsewhere).  
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## 50 123 **METHOD**

### 51 52 124 **Study design**

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54 125 The EWAH study utilised a sequential mixed methods approach which included 1) a cross sectional  
55  
56 126 study (survey) and 2) a descriptive qualitative study (focus groups) <sup>22</sup>. The purpose of the cross-  
57  
58 127 sectional study was to explore the physical and psychosocial impacts of WAH. Using focus groups,  
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3 128 the descriptive qualitative study aimed to provide a more nuanced and in depth understanding of  
4  
5 129 WAH based on the findings from the cross-sectional study.  
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10 131 **Study population**

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12 132 A convenience sample of participants from across Australia was recruited. Eligible participants were  
13  
14 133 recruited through an advertisement distributed via the Facebook paid service. In addition, the  
15  
16 134 advertisement was circulated through professional and personal networks of the research team,  
17  
18 135 LinkedIn, and the La Trobe University Facebook page. The advertisement directed people to an  
19  
20 136 online questionnaire that contained screening questions to determine eligibility and only eligible  
21  
22 137 respondents were able to proceed and complete the questionnaire. The following inclusion criteria  
23  
24 138 were used to determine eligibility: being over 18 years of age, working from home at least 2 days per  
25  
26 139 week during the period following declaration of the COVID-19 pandemic in Australia, currently living  
27  
28 140 in Australia. Recruitment of questionnaire respondents occurred from September – November 2020.  
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32 141  
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34 142 At the completion of the anonymous questionnaire, participants were invited to indicate their  
35  
36 143 interest in being part of a focus group and if they were willing to undertake a follow up  
37  
38 144 questionnaire six months post baseline. If responding “yes”, they were required to provide some  
39  
40 145 identifiable data (i.e., email address or phone contact) so they could be contacted. Interested  
41  
42 146 participants were emailed a booking link to register for a focus group. Upon registration, participants  
43  
44 147 were sent a zoom link for the focus group. When the focus group had reached the maximum  
45  
46 148 number of registrations (each focus group had a maximum of six participants), any additional  
47  
48 149 interested participants were automatically placed on a waiting list. All focus group participants were  
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50 150 provided with a gift voucher to compensate for their time commitment.  
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55 151 **Ethics statement**  
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3 152 Ethics approval was obtained through La Trobe University Human Ethics Research Committee,  
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5 153 approval number HEC20388. All study participants were provided with written information about  
6  
7 154 the study. All participants provided informed consent prior to participation.  
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9

### 10 155 **Patient and public involvement**

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12  
13 156 Participants were not involved in the design or implementation of this study.  
14

### 15 157 **Data collection**

#### 16 158 **Survey**

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19 159 The online questionnaire was developed using internationally validated tools where possible.

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21  
22 160 Demographic data, including age, gender, nature of employment, the general experience of working  
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24 161 at home, satisfaction with the division of caring and/or household duties, and the provision and  
25  
26 162 comfort of workstation equipment, was collected. Other questionnaire constructs included:  
27  
28 163 sedentary behaviour, wellbeing and general health, work–family conflict, family–work conflict, work-  
29  
30 164 related psychosocial hazards, job satisfaction, comparison of work whilst working at home during  
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32 165 the COVID-19 pandemic with their work situation before the pandemic, musculoskeletal  
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34 166 discomfort/pain, and the use of work-related technology.  
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40 168 Sedentary behaviour was measured using the Occupational Sitting and Physical Activity  
41  
42 169 Questionnaire<sup>23</sup> to obtain subjective measures of time spent on various types of activities, i.e.,  
43  
44 170 sitting, standing, walking and physically demanding work.  
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47 171  
48  
49 172 Wellbeing and general health were measured using items from the Copenhagen Psychosocial  
50  
51 173 Questionnaire (COPSOQ)<sup>24</sup>. Wellbeing was measured with 13 items scored on a five-point Likert  
52  
53 174 scale ranging from *not at all* (1) to *all the time* (5). An example item was “how often have you felt  
54  
55 175 worn out?”. General health was measured with a single item (“*in general, would you say your health*  
56  
57 176 *is?*”) and scored on five-point scale ranging from *poor* (1) to *excellent* (5).  
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177

178 Work–family conflict and family–work conflict were measured using the 10-item scale developed by  
179 Netemeyer and colleagues<sup>25</sup>. Items were scored using a seven-point scale ranging from *strongly*  
180 *disagree* (1) to *strongly agree* (7). An example item for work–family conflict was “*the demands of my*  
181 *work interfere with my home and family life*”. An example item for family–work conflict was “*I have*  
182 *to put off doing things at work because of demands on my time at home*”.

183

184 Psychosocial hazards were measured using 33 items drawn primarily from COPSOQ<sup>24</sup>. Quantitative  
185 demands, influence at work, sense of community at work, social support from supervisor, and social  
186 support from colleagues were scored on a five-point scale ranging from *never/hardly ever* (1) to  
187 *always* (5). An example item was “*I get behind in my work*”. Predictability, role clarity, role conflicts,  
188 quality of leadership, recognition, organisation justice, insecurity over employment, insecurity over  
189 working conditions, and vertical trust were scored on a five-point scale ranging from *to a very small*  
190 *extent* (1) to *a very large extent* (5). An example item was “*work is distributed fairly*”.

191

192 Overall job satisfaction was measured using a single item from COPSOQ (“*how pleased are you with*  
193 *your job overall, everything taken into consideration?*”) that was scored on a five-point Likert scale  
194 from *very unsatisfied* (1) to *very satisfied* (5).

195

196 Eight items compared work-related factors whilst working at home during the COVID-19 pandemic  
197 with work before the pandemic. An example item was “*I can get help and feedback from my work*  
198 *colleagues, if needed*”. These items were scored on a five-point scale from *much less than before* (1)  
199 *to much more than before* (5).

200

201 Musculoskeletal discomfort/pain frequency and severity ratings were recorded separately for five  
202 body regions (neck/shoulders, hands/fingers, arms, middle to lower back, and hips/bottom/legs and

1  
2  
3 203 feet) using a measure with evidence of validity in a number of different industry sectors<sup>26</sup>. Response  
4  
5 204 options for pain/discomfort frequency ranged from *never* (1) to *almost always* (5). Severity, if  
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7 205 applicable, was scored using a three-point scale from *mild* (1) to *severe* (3).  
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10 206

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12 207 Technology support and productivity were measured using a scale developed specifically for this  
13  
14 208 study. Examples of items to measure technology support and productivity respectively were "*I can*  
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16 209 *get good help and support from work if I have technology (hardware or software) problems*" and  
17  
18 210 "*the software I use when working at home enables me to work effectively*". Technology complexity  
19  
20 211 was measured using two items based on the Technostress Creators Scale<sup>27</sup>. Items were scored on a  
21  
22 212 five-point scale from *strongly disagree* (1) to *strongly agree* (5).  
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26 213

#### 27 214 **Focus groups**

28  
29 215 Seven focus groups were scheduled with participants, based on the following characteristics:  
30  
31 216 managers (2 groups), women with dependent children at home (1 group), those living alone (1  
32  
33 217 group), residents of Western Australia & Queensland states (1 group), and general population (but  
34  
35 218 excluding managers) (2 groups). Age and gender were considered to ensure a balance of participants  
36  
37 219 was attained. Residents of Western Australia and Queensland states excluded from other focus  
38  
39 220 groups, and grouped together in separate group, as they had a very different experience of the  
40  
41 221 COVID pandemic compared to the rest of the Australian states. Due to the widespread geographic  
42  
43 222 distribution of participants, and the COVID-19 pandemic, focus groups were held online using the  
44  
45 223 Zoom meeting platform.  
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#### 51 225 **Data analysis**

#### 52 226 **Survey**

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55 227 COPSQ variables were combined into domains per COPSQ III guidelines<sup>24</sup>. Cronbach's alpha was  
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57 228 computed for these domains as well as WFC and FWC, except when the score was derived from two  
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229 items; Spearman-Brown providing a better estimate of reliability in such cases. Comparisons  
 230 between respondents who self-identified as male and those who self-identified as female,  
 231 depending on the type of variable, were conducted using Chi-squared analysis or the Mann-Whitney  
 232 test of difference. Analysis was carried out in R version 4.0.3.

233

### 234 **Focus Groups**

235 A schedule of questions was developed using data from the survey and a recent review undertaken  
 236 by the research team (11) which covered the following: workplace support (e.g., 'how supportive are  
 237 your supervisor(s) and/or co-workers?'), performance indicators (e.g., 'did your job role change?'),  
 238 technical support (e.g., 'how was the technical support that you received?'), future (e.g., 'what  
 239 would be your ideal work arrangements?'). Focus groups were recorded, and all recordings were  
 240 transcribed. Transcriptions were analysed using an inductive thematic analysis approach. All authors  
 241 independently analysed three transcripts to identify coding categories, then convened to develop  
 242 the coding categories into a broader framework which was used to code the remaining four  
 243 transcripts. Themes were then constructed from the coding framework. Results from the focus  
 244 groups will be reported in a separate paper.

245

## 246 **RESULTS**

247 In total, 964 questionnaire responses were received, of which 83.7% of respondents resided in  
 248 Victoria (Table 1). The majority of respondents were female (n= 728, 75.5%) with 230 male and six  
 249 respondents who identified as 'other'. Women participants were slightly younger than the males  
 250 and disproportionally worked of 'Education and Training' field.

251 **Table 1: Description of the population**

	All (N = 964)	Male (N = 230)	Female (N = 728)	p-value <sup>a</sup>
<b>Age</b>				0.004
18-35 years	209 (26.49%)	40 (21.28%)	165 (27.73%)	
36-55 years	450 (57.03%)	103 (54.79%)	346 (58.15%)	
56 years and over	130 (16.48%)	45 (23.94%)	84 (14.12%)	

<b>State</b>				0.712
Victoria	807 (83.71%)	190 (82.61%)	611 (83.93%)	
Other	157 (16.29%)	40 (17.39%)	117 (16.07%)	
<b>Industry</b>				<0.001
Education and Training	321 (33.30%)	66 (28.70%)	254 (34.89%)	
Financial and Insurance Services	49 (5.08%)	10 (4.35%)	39 (5.36%)	
Healthcare & Social Assistance	138 (14.32%)	18 (7.83%)	119 (16.35%)	
Information, Media & Telecommunications	45 (4.67%)	16 (6.96%)	29 (3.98%)	
Professional, Scientific, and Technical Services	207 (21.47%)	51 (22.17%)	154 (21.15%)	
Public Administration and Safety	98 (10.17%)	28 (12.17%)	70 (9.62%)	
Transport, Postal & Warehousing	32 (3.32%)	11 (4.78%)	20 (2.75%)	
Other	74 (7.68%)	30 (13.04%)	43 (5.91%)	
<b>Sector</b>				0.0783
Public sector	524 (54.36%)	118 (51.30%)	403 (55.36%)	
Private sector	288 (29.88%)	80 (34.78%)	207 (28.43%)	
Not for profit sector	119 (12.34%)	21 (9.13%)	96 (13.19%)	
Self employed	33 (3.42%)	11 (4.78%)	22 (3.02%)	
<b>Role</b>				*
Manager	157 (16.29%)	47 (20.43%)	109 (14.97%)	
Professional	587 (60.89%)	154 (66.96%)	429 (58.93%)	
Clerical or Administrative Workers	198 (20.54%)	21 (9.13%)	176 (24.18%)	
Community and Personal Service Worker	10 (1.04%)	1 (0.43%)	9 (1.24%)	
Sales Worker	9 (0.93%)	4 (1.74%)	5 (0.69%)	
Technician, Trade, Machinery Operators & Drivers	3 (0.31%)	3 (1.30%)	0 (0.00%)	
<b>Business Size</b>				0.996
Sole Trader	29 (3.01%)	7 (3.04%)	22 (3.02%)	
Small Business	74 (7.68%)	18 (7.83%)	55 (7.55%)	
Medium business	95 (9.85%)	22 (9.57%)	73 (10.03%)	
Large business	766 (79.46%)	183 (79.57%)	578 (79.40%)	
<b>Domestic Arrangements</b>				0.402
Single person household	123 (12.76%)	24 (10.43%)	99 (13.60%)	
Adults only	418 (43.36%)	99 (43.04%)	315 (43.27%)	
Dependents	423 (43.88%)	107 (46.52%)	314 (43.13%)	
<b>Number of Children</b>				0.579
None	622 (64.52%)	140 (60.87%)	476 (65.38%)	
1	119 (12.34%)	29 (12.61%)	90 (12.36%)	
2	181 (18.78%)	50 (21.74%)	131 (17.99%)	
3 or more	42 (4.36%)	11 (4.78%)	31 (4.26%)	
<b>Child's Life stage<sup>b</sup></b>				
Pre-school	94 (27.49%)	35 (38.89%)	59 (23.41%)	<0.001
Grades Prep-2	90 (26.32%)	20 (22.22%)	70 (27.78%)	<0.001
Grades 3-6	111 (32.46%)	35 (38.89%)	76 (30.16%)	<0.001
Grades 7-10	104 (30.41%)	31 (34.44%)	73 (28.97%)	<0.001
Grades 11-12	56 (16.37%)	14 (15.56%)	42 (16.67%)	<0.001
<b>Satisfaction with division of household responsibilities</b>				
Household Tasks	962; 4.03 ± 1.38	229; 4.18 ± 1.21	727; 3.98 ± 1.43	0.119

a. Chi-squared or Mann-Whitney test of difference between male and female. \*Chi-square not presented due to small expected values.

b. Multiple answer: percentages may not equal 100%

256 Almost all respondents worked from home for an increased number of days during the COVID-19  
 257 pandemic (Table 2). Approximately seventy percent of the population worked five or more days  
 258 from home, with only 60.3% having a dedicated workstation in a private room without interruptions.

259 A disproportionate number of women worked in spaces with frequent interruptions ( $\chi^2 = 13.19$ ;  
260  $p=0.001$ ).

261 **Table 2: Work situation**

	All (N = 964)	Male (N = 230)	Female (N = 728)	p-value <sup>a</sup>
<b>Number of days worked from home during COVID-19</b>				0.002
2 days	52 (5.51%)	10 (4.48%)	41 (5.73%)	
3 days	98 (10.38%)	13 (5.83%)	85 (11.89%)	
4 days	118 (12.50%)	18 (8.07%)	99 (13.85%)	
5 or more	676 (71.61%)	182 (81.61%)	490 (68.53%)	
<b>Change in days WFH pre to during pandemic</b>				*
Decreased	6 (0.64%)	1 (0.45%)	5 (0.70%)	
Stayed the Same	61 (6.46%)	10 (4.48%)	51 (7.13%)	
Increased	877 (92.90%)	212 (95.07%)	659 (92.17%)	
Mean change	944; 3.82 ± 1.53	223; 4.02 ± 1.44	715; 3.76 ± 1.56	0.010
<b>Months worked from home</b>	944; 6.34 ± 1.65	223; 6.58 ± 1.69	715; 6.26 ± 1.64	0.006
<b>Average hours worked</b>				*
Full time	684 (71.62%)	190 (83.70%)	491 (68.01%)	
26-34 hrs	137 (14.35%)	20 (8.81%)	115 (15.93%)	
21-25 hrs	74 (7.75%)	9 (3.96%)	65 (9.00%)	
15-20 hrs	45 (4.71%)	6 (2.64%)	38 (5.26%)	
14 hrs or less	15 (1.57%)	2 (0.88%)	13 (1.80%)	
<b>WFH Preferred Days</b>				0.094
None	47 (5.96%)	6 (3.19%)	40 (6.72%)	
1	75 (9.51%)	25 (13.30%)	50 (8.40%)	
2	227 (28.77%)	50 (26.60%)	176 (29.58%)	
3	239 (30.29%)	57 (30.32%)	179 (30.08%)	
4	91 (11.53%)	18 (9.57%)	72 (12.10%)	
Every day	110 (13.94%)	32 (17.02%)	78 (13.11%)	
<b>Workstation Location</b>				0.001
Work Wherever	139 (14.74%)	28 (12.56%)	111 (15.55%)	
Separate Room	569 (60.34%)	157 (70.40%)	408 (57.14%)	
Separate Room w/ interruptions	235 (24.92%)	38 (17.04%)	195 (27.31%)	
<b>Workstation Comfort (compared to pre-pandemic)</b>				0.186
Decreased	486 (51.54%)	100 (44.84%)	382 (53.50%)	
Stayed the Same	284 (30.12%)	79 (35.43%)	204 (28.57%)	
Increased	173 (18.35%)	44 (19.73%)	128 (17.93%)	
<b>Typical work at home</b>				
Sitting (% of time)	77.60 ± 24.80	77.36 ± 22.99	77.72 ± 25.28	0.168
Standing (% of time)	10.01 ± 13.73	9.85 ± 11.37	9.96 ± 14.06	0.302
Walking (% of time)	6.88 ± 7.80	7.63 ± 7.29	6.67 ± 7.97	0.037
Heavy Labour (% of time)	0.43 ± 3.57	0.37 ± 1.65	0.45 ± 4.00	0.224
<b>Technology</b>				
Technology support	794; 3.85 ± 0.82	190; 3.79 ± 0.82	598; 3.88 ± 0.81	0.130
Productivity	791; 4.23 ± 0.83	188; 4.15 ± 0.77	597; 4.26 ± 0.85	0.009
Technology complexity	789; 2.49 ± 1.02	188; 2.50 ± 1.01	595; 2.50 ± 1.02	0.955
<b>Job Satisfaction</b>				0.010
Very Unsatisfied	23 (2.83%)	11 (5.64%)	12 (1.96%)	
Unsatisfied	68 (8.35%)	14 (7.18%)	53 (8.65%)	
Neither	126 (15.48%)	25 (12.82%)	101 (16.48%)	
Satisfied	394 (48.40%)	106 (54.36%)	284 (46.33%)	
Very Satisfied	203 (24.94%)	39 (20.00%)	163 (26.59%)	
Mean (sd)	814; 3.84 ± 0.98	195; 3.76 ± 1.03	613; 3.87 ± 0.97	0.273

262 a. Chi-squared or Mann-Whitney test of difference between male and female.

263 Workstation technology was generally supplied by the employer; however, a substantial number of  
 264 respondents reported providing their own separate keyboard (30.1%) and screen (35.4%; see Table  
 265 3). The use of sit/stand desks was rare with just 5.4% of respondents reporting the use of these at  
 266 home. Almost all respondents were provided with the necessary software to perform their work by  
 267 their employer.

268 **Table 3: Workstation Technology**

Workstation Technology	Employer provided (n=793)	Employee provided (n=793)
Laptop	570 (71.88%)	177 (22.32%)
Desktop	109 (13.75%)	97 (12.23%)
Separate keyboard	334 (42.12%)	239 (30.14%)
Mouse	406 (51.20%)	315 (39.72%)
Phone	208 (26.23%)	339 (42.75%)
Tablet	63 (7.94%)	119 (15.01%)
Separate screen	287 (36.19%)	281 (35.44%)
Desk (including sit/stand)	10 (1.26%)	33 (4.16%)
Chair	25 (3.15%)	17 (2.14%)
Headset	11 (1.39%)	13 (1.64%)
Printer	7 (0.88%)	17 (2.14%)
Other	16 (2.02%)	26 (3.28%)

269  
 270 Males reported experiencing higher levels of FWC and lower levels of job recognition than females.  
 271 Females reported higher levels of job insecurity (Table 4) than males. Most respondents reported  
 272 their health as 'good' or 'very good' (Table 5). On all measures of stress (burnout, general stress,  
 273 somatic and cognitive) females were more negatively impacted than males. Over 70% of  
 274 respondents reported experiencing some form of pain or discomfort towards the end of their  
 275 working day. However, females reported higher levels of neck/shoulder and lower limb (hips,  
 276 bottom, legs, or feet) pain than males.

277 **Table 4: Psychosocial work environment**

	Cronbach alpha	All (N = 964)	Male (N = 230)	Female (N = 728)	p-value <sup>a</sup>
<b>Work Family Conflict (max score = 7)</b>					
WFC	0.954	871; 3.69 ± 1.66	208; 3.69 ± 1.57	657; 3.69 ± 1.70	0.964
FWC	0.952	869; 2.99 ± 1.57	208; 3.16 ± 1.52	655; 2.94 ± 1.59	0.031
<b>COPSOQ (max score = 5)</b>					



Quantitative Demands	0.824	860; 2.49 ± 0.83	207; 2.54 ± 0.88	647; 2.48 ± 0.82	0.413
Influence at work	0.863	859; 3.15 ± 0.93	207; 3.23 ± 0.87	646; 3.13 ± 0.96	0.137
Predictability	0.804 <sup>b</sup>	834; 3.29 ± 0.94	201; 3.37 ± 0.89	627; 3.26 ± 0.96	0.171
Recognition	0.881 <sup>b</sup>	791; 3.91 ± 1.05	189; 3.75 ± 1.03	596; 3.96 ± 1.06	<b>0.004</b>
Role Clarity	0.905	834; 3.78 ± 0.85	201; 3.76 ± 0.80	627; 3.78 ± 0.87	0.494
Role Conflict	0.725 <sup>b</sup>	834; 2.49 ± 1.00	201; 2.58 ± 0.95	627; 2.46 ± 1.01	0.076
Quality of Leadership	0.864 <sup>b</sup>	719; 3.45 ± 1.17	174; 3.36 ± 1.15	540; 3.49 ± 1.17	0.149
Social Support from Supervisor	0.914 <sup>b</sup>	814; 4.11 ± 1.06	191; 4.06 ± 1.08	617; 4.13 ± 1.06	0.321
Social Support from Colleagues	0.895 <sup>b</sup>	825; 4.19 ± 0.90	196; 4.15 ± 0.81	624; 4.20 ± 0.93	0.106
Sense of Community at Work	0.803 <sup>b</sup>	831; 4.06 ± 0.86	200; 4.00 ± 0.89	625; 4.08 ± 0.85	0.220
Job Insecurity	0.829 <sup>b</sup>	736; 2.96 ± 1.34	177; 2.78 ± 1.40	553; 3.01 ± 1.33	<b>0.043</b>
Insecurity over Working Conditions	0.683 <sup>b</sup>	616; 2.09 ± 1.13	148; 2.01 ± 0.98	464; 2.12 ± 1.17	0.708
Vertical trust	0.899	779; 3.63 ± 1.02	182; 3.58 ± 1.03	591; 3.65 ± 1.02	0.447
Organizational Justice	0.738 <sup>b</sup>	617; 3.49 ± 0.94	153; 3.40 ± 0.94	459; 3.52 ± 0.94	0.180

a. Chi-squared or Mann-Whitney test of difference between male and female. <sup>b</sup> Two item scale, Spearman-Brown reported instead of Cronbach's alpha.

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281 **Table 5: Health and wellbeing**

	All (N = 964)	Male (N = 230)	Female (N = 728)	p-value <sup>a</sup>
<b>Self-Perceived Health</b>				0.275
Poor	29 (3.24%)	7 (3.32%)	22 (3.24%)	
Fair	200 (22.32%)	42 (19.91%)	155 (22.83%)	
Good	358 (39.96%)	95 (45.02%)	262 (38.59%)	
Very good	237 (26.45%)	56 (26.54%)	179 (26.36%)	
Excellent	72 (8.04%)	11 (5.21%)	61 (8.98%)	
Mean (SD)	896; 3.14 ± 0.96	211; 3.10 ± 0.89	679; 3.15 ± 0.98	0.655
<b>Stress (max score = 5)</b>				
Burnout	900; 3.13 ± 0.89	212; 2.85 ± 0.85	682; 3.21 ± 0.89	<0.001
Stress	899; 2.87 ± 0.92	212; 2.66 ± 0.88	681; 2.94 ± 0.92	<0.001
Somatic Stress	900; 1.98 ± 0.81	212; 1.68 ± 0.72	682; 2.07 ± 0.82	<0.001
Cognitive Stress	900; 2.61 ± 0.90	212; 2.38 ± 0.81	682; 2.67 ± 0.91	<0.001
<b>Pain and Discomfort (range 1-12)</b>				
Neck or Shoulders	553; 4.34 ± 2.92	99; 3.51 ± 2.84	448; 4.50 ± 2.90	<0.001
Hands or Fingers	318; 2.59 ± 2.30	53; 2.55 ± 2.13	262; 2.60 ± 2.35	0.737
Arms	254; 2.28 ± 2.10	47; 2.00 ± 1.69	202; 2.35 ± 2.20	0.241
Middle to Lower Back	521; 3.81 ± 2.97	99; 3.70 ± 2.92	417; 3.83 ± 2.96	0.600
Hips, Bottom, Legs, or Feet	432; 3.41 ± 2.83	75; 2.80 ± 2.42	352; 3.54 ± 2.90	0.027

a. Chi-squared or Mann-Whitney test of difference between male and female.

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3 283 All respondents who identified their gender as 'other' were younger professionals with low levels of  
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5 284 work–family conflict. However, these six individuals reported low levels of social support from their  
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7 285 supervisor and colleagues and had a below average sense of community at work. None reported  
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9 286 their health as 'excellent', and all reported pain and discomfort in their neck or shoulders towards  
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11 287 the end of their working day (data not included in tables due to low numbers).  
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## 16 289 **DISCUSSION**

18 290 The overall aim of this paper was to describe the EWAH study and baseline characteristics of the  
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20 291 study population. The COVID-19 pandemic resulted in a rapid transition to working at home to  
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22 292 suppress virus transmission. This EWAH study will provide insights into the experiences and health  
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24 293 impacts on participants who were working at home during the pandemic, and their experience of  
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26 294 work during follow up periods. A range of workplace physical and psychosocial exposures were  
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28 295 measured, along with stress and musculoskeletal pain. From the baseline data, gendered differences  
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30 296 were identified in relation to several factors including FWC, job recognition and job insecurity, stress  
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32 297 and musculoskeletal pain; these will be explored in greater detail in this paper.  
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38 299 Males reported higher levels of FWC than females. At the time of this phase of data collection, the  
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40 300 country was in various stages of lockdown with schools and childcare centres closed in some areas  
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42 301 (Victoria). Therefore, many people with dependents were WAH while also supervising children.  
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44 302 Whilst this situation is unusual, the dual responsibilities of managing work and childcare are more  
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46 303 commonly undertaken by females<sup>28</sup>, which may shield males from potential conflict between non-  
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48 304 work demands and work activities. In the current study, females were more likely to work part time  
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50 305 compared to the males which may enable greater flexibility for managing the family to work  
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52 306 interface, than their male partners<sup>29</sup>. This change in working arrangements may mean that males  
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54 307 are not 'shielded' from the dual responsibilities and are more exposed to potential conflict between  
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56 308 non-work demands and work activities, thus reporting higher FWC than females.  
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5 310 The lower scores for males compared to females for job recognition are interesting. The unique  
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7 311 situation of WAH during the period of data collection required adaptation to new ways of working.  
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10 312 In many cases, people worked very long hours, sometimes with reduced salary and extra  
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12 313 responsibilities as managers learned how to effectively supervise remote teams with very  
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14 314 different circumstances to their usual modes of operation <sup>30</sup>. These multiple interacting factors may  
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16 315 have influenced males' perceptions of how they were being recognised for their work.  
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21 317 Females reported more concerns about job insecurity in comparison to males. One plausible  
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23 318 explanation is the type of work in which the females in the sample were engaged. A third of the  
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25 319 females in the study were employed in the education and training sector. This sector has been  
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27 320 seriously impacted by the pandemic, with high numbers of job losses in the University sector as a  
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29 321 result of border closures which have prevented the intake of international students <sup>2</sup> and worldwide  
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31 322 women have experienced more job losses compared to men <sup>31</sup>.  
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36 324 In addition, stress and musculoskeletal pain were significantly higher for females in comparison to  
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38 325 males. A range of possible explanations exist. Previous literature on musculoskeletal pain has  
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40 326 reported higher pain levels particularly in females in the neck and shoulder regions, so this finding is  
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42 327 not surprising <sup>32</sup>. In the current situation, more females reported not having a dedicated workstation  
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44 328 and so were using whatever location was available to them, a practice likely to be associated with  
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46 329 increased pain. An emerging body of work relating to the impact of COVID-19 on females supports  
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48 330 the unequal workload burden for females <sup>5</sup> and as such reports of increased stress are not surprising  
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50 331 which is associated with increased musculoskeletal pain <sup>33</sup>.  
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55 333 Future research in the EWAH study will explore many of the relationships outlined in greater detail  
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57 334 and include the results from focus groups. In addition, a second wave of data will be collected in  
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3 335 April/May 2021. The second wave will enable longitudinal analysis of the impacts of the WAH  
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5 336 environment on individuals' physical and mental health. An additional benefit is the second wave of  
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7 337 data collection will enable investigation of individuals' working patterns as the COVID-19 pandemic  
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9 338 situation in Australia stabilises and the vaccination program is underway.  
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14 340 A key strength of the study is the use of a range of validated measurement tools to examine the  
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16 341 environmental exposures for workers whilst WAH during the COVID-19 pandemic. The baseline data  
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18 342 was collected during a period of sustained lockdown in one of the states (Victoria) which provides  
19  
20 343 some unique insights into the experiences of people WAH. However, several limitations must be  
21  
22 344 acknowledged. The population sample has a higher proportion of respondents based in Victoria, the  
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24 345 southern state of Australia which experienced longer periods of lockdown and more severe  
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26 346 restrictions, so the impacts on this group are likely to differ from those elsewhere in Australia. The  
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28 347 use of a convenience sample is also a limitation. Another potential limitation that should be noted  
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30 348 was that recruitment of females was higher than males; however, this is consistent with emerging  
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32 349 research in COVID-19 studies.  
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## 37 351 **CONCLUSION**

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39 352 This paper presents a profile of individuals working at home during the COVID-19 pandemic. Little  
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41 353 guidance is available to support employers and employees in creating optimal environments for  
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43 354 working at home in such unusual circumstances. Gendered differences were identified in the current  
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45 355 study which require further scrutiny to ensure that appropriate support can be provided. It is likely  
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47 356 that working from home for at least some of the week will continue as a result of changes to work  
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49 357 practices which occurred during the pandemic, and more recently as individuals and organisations  
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51 358 adjust to the new and often uncertain experience of "Covid-normal". Therefore, research evidence is  
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53 359 required to examine the psychosocial and physical hazards impacting individuals' physical and  
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3 360 mental health whilst working at home to assist organisations to be responsive, ensuring they are  
4  
5 361 able to minimise any unintended health consequences due to WAH.  
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11  
12 364 We would like to thank the questionnaire and focus group participants for taking the time to share  
13  
14 365 their WAH experience.  
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19 367 **COMPETING INTERESTS**

20  
21 368 None declared.  
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24  
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26  
27 371 This work was supported by Medibank and Optus.  
28  
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32 373 **DATA AVAILABILITY STATEMENT**

33  
34 374 Data are available on reasonable request. The La Trobe University Human Ethics Committee imposes  
35  
36 375 restrictions on the data.  
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41 377 **AUTHOR CONTRIBUTIONS**

42  
43 378 JO & NK coordinated recruitment of participants. KL conducted statistical analysis and all authors  
44  
45 379 analysed data. JO and NK drafted the first version of the article with input from MG, RS, KL and VW.  
46  
47 380 All authors agreed to the final version prior to submission.  
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52 382 **REFERENCES**

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# BMJ Open

## Working from home in Australia during the COVID-19 pandemic: Baseline results for the Employees Working From Home (EWFH) study.

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3 1 **Working from home in Australia during the COVID-19 pandemic: Baseline results for the**  
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5 2 **Employees Working From Home (EWFH) study.**  
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3 19 **ABSTRACT**

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5 20 **Objectives:** To investigate the impacts, on mental and physical health, of a mandatory shift to  
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7 21 working from home during the COVID-19 pandemic.

8  
9 22 **Design:** Cross sectional, online survey.

10  
11 23 **Setting:** Online survey was conducted from September 2020 – November 2020 in the general  
12  
13 24 population.

14  
15 25 **Participants:** Australian residents working from home for at least two days a week at some time in  
16  
17 26 2020 during the COVID-19 pandemic.

18  
19 27 **Main outcome measures:** demographics, caring responsibilities, working from home arrangements,  
20  
21 28 work-related technology, work–family interface, psychosocial and physical working conditions, and  
22  
23 29 reported stress and musculoskeletal pain.

24  
25 30 **Results:** 924 Australians responded to the online questionnaire. Respondents were mostly women  
26  
27 31 (75.5%) based in Victoria (83.7%) and employed in the education and training and healthcare  
28  
29 32 sectors. Approximately 70% of respondents worked five or more days from home, with only 60%  
30  
31 33 having a dedicated workstation in an uninterrupted space. Over 70% of all respondents reported  
32  
33 34 experiencing musculoskeletal pain or discomfort. Gendered differences were observed; men  
34  
35 35 reported higher levels of family to work conflict, and lower levels of recognition for their work,  
36  
37 36 compared to women. For women, stress and musculoskeletal pain levels were higher than men and  
38  
39 37 they also reported more concerns about their job security than men.

40  
41 38 **Conclusions:** Preliminary evidence from the current study revealed that working from home appears  
42  
43 39 to impact employees' physical and mental health, and that this impact is gendered. This knowledge  
44  
45 40 can assist employers to develop protocols and policies to optimise working from home conditions  
46  
47 41 and reduce potential negative physical and mental health impacts on their employees.

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49 42 **Article Summary:**

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51 43 ***Strengths and limitations of this study***

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3 44 • A key strength of the study is the use of a range of validated measurement tools to examine  
4  
5 45 the environmental exposures for workers whilst working from home during the COVID-19  
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7 46 pandemic.  
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9  
10 47 • The baseline data was collected during a period of sustained lockdown in one of the states  
11  
12 48 (Victoria) which provides some unique insights into the experiences of people working from  
13  
14 49 home under those conditions.  
15  
16 50 • The population sample has a higher proportion of respondents based in Victoria, the  
17  
18 51 southern state of mainland Australia which experienced longer periods of lockdown and  
19  
20 52 more severe restrictions compared to other states, so the impacts on this group are likely to  
21  
22 53 differ from those elsewhere in Australia.  
23  
24 54 • The use of a convenience sample is a limitation and recruitment of females was higher than  
25  
26 55 males; however, this is consistent with emerging research in COVID-19 studies  
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31  
32 57 Key words: COVID 19, mental health, risk management  
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## 36 37 59 INTRODUCTION

38  
39 60 The current global pandemic caused by COVID-19 has resulted in an unprecedented situation with  
40  
41 61 wide ranging health <sup>1</sup> and economic impacts <sup>2,3</sup> which differ markedly by gender <sup>4,5</sup>. The unexpected  
42  
43 62 and rapid global impact necessitated immediate actions and a key public health measure has been  
44  
45 63 the shift to employees' working from home (WFH) where possible <sup>6</sup>. Whilst WFH is often offered to  
46  
47 64 employees as a flexible work benefit to improve the integration between work and other life  
48  
49 65 activities, it is less commonly undertaken in a full-time capacity or mandatory capacity <sup>7,8</sup>. In  
50  
51 66 response to the public health restrictions to reduce the transmission of COVID-19, organisations  
52  
53 67 rapidly transitioned to WFH without a clear understanding of the impact of ongoing WFH on mental  
54  
55 68 and physical health <sup>9</sup>.  
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71 In March 2020, Australians experienced their first lockdown due to COVID 19. All people who were  
72 able to work from home were required to do so. By May, many restrictions were lifted, but the  
73 requirement to maintain WFH, where possible, was retained. Since then, lockdowns have been  
74 ongoing, particularly for residents of Victoria. WFH will continue to be an important part of the  
75 COVID 19 mitigation strategy and, as such, it is important that policies and procedures to support  
76 sustainable practices are utilised. This will require data from impacted populations to ensure these  
77 meet the needs of employers and employees to optimise working conditions. Prior to the pandemic,  
78 data suggests that approximately one-third of the Australian working population were undertaking  
79 some hours of work from home<sup>10</sup>. In comparison, during the pandemic (June 2021) 57% of employed  
80 people in Victoria were working from home more than once a week<sup>11</sup>, suggesting that working from  
81 home was a new experience for many people, and for most it was not through choice, but  
82 mandated.

83

84 A recent rapid review identified WFH as a complex occupational health issue, necessitating  
85 organisations utilise a systems-based approach, taking into account the organisational, job and  
86 individual aspects of work <sup>12</sup>. This approach is a distinct departure from more conventional  
87 workplace assessment strategies which commonly focus on the physical aspects of a person's work  
88 and fail to address the psychosocial conditions. The review identified a need for policies to be  
89 implemented around work-home boundary management, role clarification, clear performance  
90 indicators, appropriate technical support, facilitation of co-worker networking, and training for  
91 managers. There appears to be a high likelihood that WFH will remain a central aspect of future  
92 working conditions well beyond the current COVID 19 pandemic <sup>13</sup>; as such, the overarching  
93 objective of the Employees Working from Home (EWFH) study was to explore the relationships  
94 between a broad range of workplace characteristics and the impact on employees' health and  
95 wellbeing.

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5 97 More specifically, workplace conditions—physical and psychosocial—have been associated with a  
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7 98 range of negative health outcomes which include musculoskeletal and stress-related mental health  
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9 99 disorders<sup>12 14 15</sup>. Employers are required to undertake activities to support the protection of all  
10  
11 100 workers and reduce injury risk; early identification of adverse working conditions, regardless of  
12  
13 101 where the work is being undertaken, will enable targeted strategies to address potential risks<sup>16 17</sup>.

14  
15 102 Such workplace assessment activities are traditionally undertaken by occupational health  
16  
17 103 professionals, ergonomists or health and safety representatives at the organisation, but the rapid  
18  
19 104 shift to working from home meant that many of the usual work environment assessments were  
20  
21 105 bypassed in order to comply with governmental public health responses<sup>9</sup>.

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27 107 Working from home can have positive and negative impacts on the work–family interface; where  
28  
29 108 the traditional boundary settings between work and home are challenged<sup>18 19</sup>; with potential for  
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31 109 increased role conflict<sup>20</sup> or spill over between the two domains. One example of negative spill over  
32  
33 110 includes work–family conflict (WFC), in which conflict arises when the general demands of, time  
34  
35 111 devoted to, and strain caused by the job interfere with family (non-work) life<sup>21</sup>. High levels of WFC  
36  
37 112 are associated with negative impacts on physical and mental health, low job satisfaction, and  
38  
39 113 heightened intentions to leave the workplace<sup>22-24</sup>. In the other direction, family–work conflict (FWC)  
40  
41 114 arises when the general demands of, time devoted to, and strain created by the family interfere with  
42  
43 115 performing work-related responsibilities<sup>21</sup>. As such, the multiple role transitions required when WFH  
44  
45 116 may reduce WFC but may increase FWC<sup>19 20</sup> and impact employee productivity. Boundary theory<sup>25</sup>,  
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47 117 which underpins much of the work–family interface research area, proposes that individuals  
48  
49 118 maintain psychological, physical and/or behavioural boundaries around their different life roles,  
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51 119 such as their work and home roles. However, the COVID 19 pandemic has raised challenges with  
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53 120 boundary management due to mandated WFH for prolonged periods of time. The rapid change to  
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55 121 WFH during the COVID 19 pandemic required transitions for employees, to support the greater  
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3 122 public health need, without careful consideration of boundary setting. Prior to the current  
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5 123 pandemic, research identified that employees WFH adjust their approach to managing the work–  
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7 124 family interface depending on the number of days they are based at home <sup>7</sup>.  
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9  
10 125 A further impact of the pandemic was the increased burden of care-related duties, due to school and  
11  
12 126 childcare centre closures. Whilst evidence suggests that men increased their role in care-related  
13  
14 127 duties, women continued to take on a disproportionate share of the unpaid work<sup>26 27</sup>. Prior to the  
15  
16 128 pandemic, women also assumed a greater role in household duties but without the additional  
17  
18 129 burden of WFH and balancing these often-competing demands<sup>28</sup>. Already, data suggests negative  
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20 130 impacts of the pandemic on women’s working lives at far greater levels than their male  
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22 131 counterparts<sup>29 30</sup>, along with greater dissatisfaction of the balance between paid and unpaid work.  
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28 133 The overall aim of this paper is to describe the baseline survey results of the EWFH study. The  
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30 134 objectives of the EWFH study are to examine 1) The impacts of psychosocial and physical hazards,  
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32 135 related to WFH, on mental and physical health, and 2) To investigate differences in health outcomes  
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34 136 between employees and identify patterns of gendered differences.  
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## 39 138 **METHOD**

### 40 41 139 **Study design**

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43 140 The EWFH study utilised a sequential mixed methods approach which included 1) a cross sectional  
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45 141 study (survey) and 2) a descriptive qualitative study (focus groups) <sup>31</sup>. The purpose of the cross-  
46  
47 142 sectional study was to explore the physical and psychosocial impacts of WFH. Using focus groups,  
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49 143 the descriptive qualitative study aimed to provide a more nuanced and in depth understanding of  
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51 144 WFH based on the findings from the cross-sectional study.  
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### 55 56 57 146 **Study population**

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3 147 A convenience sample of participants from across Australia was recruited. Eligible participants were  
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5 148 recruited through an advertisement distributed via the Facebook paid service. In addition, the  
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7 149 advertisement was circulated through professional and personal networks of the research team,  
8  
9 150 LinkedIn, and the La Trobe University Facebook page. The advertisement directed people to an  
10  
11 151 online questionnaire that contained screening questions to determine eligibility and only eligible  
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13 152 respondents were able to proceed and complete the questionnaire. The following inclusion criteria  
14  
15 153 were used to determine eligibility: being 18 years of age or older, working from home at least 2 days  
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17 154 per week during the period following declaration of the COVID-19 pandemic in Australia, currently  
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19 155 living in Australia. Recruitment of questionnaire respondents occurred from September – November  
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21 156 2020. Respondents were offered the opportunity to go into a prize draw to win a gift voucher, if they  
22  
23 157 completed the questionnaire.  
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30 159 At the completion of the anonymous questionnaire, participants were invited to indicate their  
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32 160 interest in being part of a focus group and if they were willing to undertake a follow up  
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34 161 questionnaire six months post baseline. If responding “yes”, they were required to provide some  
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36 162 identifiable data (i.e., email address or phone contact) so they could be contacted. Interested  
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38 163 participants were emailed a booking link to register for a focus group. Upon registration, participants  
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40 164 were sent a zoom link for the focus group. When the focus group had reached the maximum  
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42 165 number of registrations (each focus group had a maximum of six participants), any additional  
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44 166 interested participants were automatically placed on a waiting list. All focus group participants were  
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46 167 provided with a gift voucher to compensate for their time commitment.  
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### 51 168 **Ethics statement**

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54 169 Ethics approval was obtained through La Trobe University Human Ethics Research Committee,  
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56 170 approval number HEC20388. All study participants were provided with written information about  
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58 171 the study. All participants provided informed consent prior to participation.  
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3 172 **Patient and public involvement**  
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5 173 Participants were not involved in the design or implementation of this study.  
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8 174 **Data collection**

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10 175 **Survey**

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12 176 The online questionnaire was developed using internationally validated tools where possible.  
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14 177 Demographic data, including age, gender, nature of employment, the general experience of working  
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16 178 from home, satisfaction with the division of caring and/or household duties, and the provision and  
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18 179 comfort of workstation equipment, was collected. Other questionnaire constructs included:  
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20 180 sedentary behaviour, wellbeing and general health, WFC, FWC, work-related psychosocial hazards,  
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22 181 job satisfaction, comparison of work whilst working from home during the COVID-19 pandemic with  
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24 182 their work situation before the pandemic, musculoskeletal discomfort/pain, and the use of work-  
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26 183 related technology.  
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32 185 Sedentary behaviour was measured using the Occupational Sitting and Physical Activity  
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34 186 Questionnaire<sup>32</sup> to obtain subjective measures of time spent on various types of activities, i.e.,  
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36 187 sitting, standing, walking and physically demanding work.  
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41 189 Wellbeing and general health were measured using items from the Copenhagen Psychosocial  
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43 190 Questionnaire (COPSOQ)<sup>33</sup>. Wellbeing was measured with 13 items scored on a five-point Likert  
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45 191 scale ranging from *not at all* (1) to *all the time* (5). An example item was “how often have you felt  
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47 192 worn out?”. General health was measured with a single item (“*in general, would you say your health*  
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49 193 *is?*”) and scored on five-point scale ranging from *poor* (1) to *excellent* (5).  
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54 195 Work–family conflict and FWC were measured using the 10-item scale developed by Netemeyer and  
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56 196 colleagues<sup>21</sup>. Items were scored using a seven-point scale ranging from *strongly disagree* (1) to  
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58 197 *strongly agree* (7). An example item for work–family conflict was “*the demands of my work interfere*  
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3 198 *with my home and family life*". An example item for family–work conflict was "*I have to put off doing*  
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5 199 *things at work because of demands on my time at home*".  
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10 201 Psychosocial hazards were measured using 33 items drawn primarily from COPSQ<sup>33</sup>. Quantitative  
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12 202 demands, influence at work, sense of community at work, social support from supervisor, and social  
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14 203 support from colleagues were scored on a five-point scale ranging from *never/hardly ever* (1) to  
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16 204 *always* (5). An example item was "*I get behind in my work*". Predictability, role clarity, role conflicts,  
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18 205 quality of leadership, recognition, organisation justice, insecurity over employment, insecurity over  
19  
20 206 working conditions, and vertical trust were scored on a five-point scale ranging from *to a very small*  
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22 207 *extent* (1) *to a very large extent* (5). An example item was "*work is distributed fairly*".  
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28 209 Overall job satisfaction was measured using a single item from COPSQ ("*how pleased are you with*  
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30 210 *your job overall, everything taken into consideration?*") that was scored on a five-point Likert scale  
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32 211 from *very unsatisfied* (1) to *very satisfied* (5).  
33

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36 213 Eight items compared work-related factors whilst working from home during the COVID-19  
37  
38 214 pandemic with work before the pandemic. An example item was "*I can get help and feedback from*  
39  
40 215 *my work colleagues, if needed*". These items were scored on a five-point scale from *much less than*  
41  
42 216 *before* (1) to *much more than before* (5).  
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48 218 Musculoskeletal discomfort/pain frequency and severity ratings were recorded separately for five  
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50 219 body regions (neck/shoulders, hands/fingers, arms, middle to lower back, and hips/bottom/legs and  
51  
52 220 feet) using a measure with evidence of validity in a number of different industry sectors<sup>34</sup>. Response  
53  
54 221 options for pain/discomfort frequency ranged from *never* (1) to *almost always* (5). Severity, if  
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56 222 applicable, was scored using a three-point scale from *mild* (1) to *severe* (3).  
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3 224 Technology support and productivity were measured using a scale developed specifically for this  
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5 225 study. Examples of items to measure technology support and productivity respectively were “I can  
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7 226 get good help and support from work if I have technology (hardware or software) problems” and  
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9 227 “the software I use when working at home enables me to work effectively”. Technology complexity  
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11 228 was measured using two items based on the Technostress Creators Scale <sup>35</sup> Items were scored on a  
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14 229 five-point scale from *strongly disagree* (1) to *strongly agree* (5).  
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19 231 Change in days WFH pre to during pandemic was determined by taking respondents answer to  
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21 232 “Before the start of the COVID-19 pandemic, how many days per week did you usually work from  
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23 233 home?” – with allowed responses from 0 to 5 days – from their answer to “When you are working  
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25 234 from home during the COVID-19 pandemic, how many days per week do you usually work from  
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27 235 home?” - with allowed responses from 2 to 5 days. The generated variable theoretically runs from -3  
28  
29 236 to +5 with -3 indicating a decrease from 5 days WFH prior to COVID-19 to 2 days WFH during COVID-  
30  
31 237 19 and +5 indicating an increase from no days WFH prior to COVID-19 to 5 days WFH during COVID-  
32  
33 238 19. Given the incredibly low numbers of decreasing WFH, the variable was collapsed into  
34  
35 239 “Decreased” (negative value), “Stayed the Same” (0), and “Increased” (positive value).  
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#### 40 41 241 **Focus groups**

42  
43 242 Seven focus groups were scheduled with participants, based on the following characteristics:  
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45 243 managers (2 groups), women with dependent children at home (1 group), those living alone (1  
46  
47 244 group), residents of Western Australia & Queensland states (1 group), and general population (but  
48  
49 245 excluding managers; 2 groups). Residents of Western Australia and Queensland states were  
50  
51 246 excluded from other focus groups, and grouped together in a separate group, as they had a very  
52  
53 247 different experience of the COVID pandemic compared to the rest of the Australian states. Due to  
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55 248 the widespread geographic distribution of participants, and the COVID-19 pandemic, focus groups  
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57 249 were held online using the Zoom meeting platform.  
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45 251 **Data analysis**6 252 **Survey**

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10 253 COPSOQ variables were combined into domains per COPSOQ III guidelines<sup>33</sup>. Cronbach's alpha was  
11  
12 254 computed for these domains as well as WFC and FWC, except when the score was derived from two  
13  
14 255 items; Spearman-Brown providing a better estimate of reliability in such cases. To adequately  
15  
16 256 describe the respondents of the EWFH survey, all valid responses were used. Variable sample sizes  
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18 257 between items are therefore expected. Sample size or frequency are presented.  
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20  
21 258 Comparisons between respondents who self-identified as male and those who self-identified as  
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23 259 female, depending on the type of variable, were conducted using Chi-squared analysis or the Mann-  
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25 260 Whitney test of difference. Analysis was carried out in R version 4.0.3.

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31 263 **Focus Groups**

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33 264 A schedule of questions was developed using data from the survey and a recent review undertaken  
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35 265 by the research team<sup>12</sup> which covered the following: workplace support (e.g., 'how supportive are  
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37 266 your supervisor(s) and/or co-workers?'), performance indicators (e.g., 'did your job role change?'),  
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39 267 technical support (e.g., 'how was the technical support that you received?'), future (e.g., 'what  
40  
41 268 would be your ideal work arrangements?'). Focus groups were recorded, and all recordings were  
42  
43 269 transcribed. Transcriptions were analysed using an inductive thematic analysis approach. All authors  
44  
45 270 independently analysed three transcripts to identify coding categories, then convened to develop  
46  
47 271 the coding categories into a broader framework which was used to code the remaining four  
48  
49 272 transcripts. Themes were then constructed from the coding framework. Results from the focus  
50  
51 273 groups will be reported elsewhere.

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58 275 **RESULTS**59  
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276 In total, 964 questionnaire responses were received, of which 83.7% of respondents resided in  
 277 Victoria (Table 1). The majority of respondents were female (n = 728, 75.5%) with 230 male and six  
 278 respondents who identified as 'other'. Women participants were slightly younger than the males  
 279 and disproportionately worked in the 'Education and Training' field.

280 **Table 1: Description of the population**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Age</b>				0.004
18-35 years	209 (26.49%)	40 (21.28%)	165 (27.73%)	
36-55 years	450 (57.03%)	103 (54.79%)	346 (58.15%)	
56 years and over	130 (16.48%)	45 (23.94%)	84 (14.12%)	
<b>State</b>				0.712
Victoria	807 (83.71%)	190 (82.61%)	611 (83.93%)	
Other	157 (16.29%)	40 (17.39%)	117 (16.07%)	
<b>Industry</b>				<0.001
Education and Training	321 (33.30%)	66 (28.70%)	254 (34.89%)	
Financial and Insurance Services	49 (5.08%)	10 (4.35%)	39 (5.36%)	
Healthcare & Social Assistance	138 (14.32%)	18 (7.83%)	119 (16.35%)	
Information, Media & Telecommunications	45 (4.67%)	16 (6.96%)	29 (3.98%)	
Professional, Scientific, and Technical Services	207 (21.47%)	51 (22.17%)	154 (21.15%)	
Public Administration and Safety	98 (10.17%)	28 (12.17%)	70 (9.62%)	
Transport, Postal & Warehousing	32 (3.32%)	11 (4.78%)	20 (2.75%)	
Other	74 (7.68%)	30 (13.04%)	43 (5.91%)	
<b>Sector</b>				0.0783
Public sector	524 (54.36%)	118 (51.30%)	403 (55.36%)	
Private sector	288 (29.88%)	80 (34.78%)	207 (28.43%)	
Not for profit sector	119 (12.34%)	21 (9.13%)	96 (13.19%)	
Self employed	33 (3.42%)	11 (4.78%)	22 (3.02%)	
<b>Role</b>				*
Manager	157 (16.29%)	47 (20.43%)	109 (14.97%)	
Professional	587 (60.89%)	154 (66.96%)	429 (58.93%)	
Clerical or Administrative Workers	198 (20.54%)	21 (9.13%)	176 (24.18%)	
Community and Personal Service Worker	10 (1.04%)	1 (0.43%)	9 (1.24%)	
Sales Worker	9 (0.93%)	4 (1.74%)	5 (0.69%)	
Technician, Trade, Machinery Operators & Drivers	3 (0.31%)	3 (1.30%)	0 (0.00%)	
<b>Business Size</b>				0.996
Sole Trader	29 (3.01%)	7 (3.04%)	22 (3.02%)	
Small Business	74 (7.68%)	18 (7.83%)	55 (7.55%)	
Medium business	95 (9.85%)	22 (9.57%)	73 (10.03%)	
Large business	766 (79.46%)	183 (79.57%)	578 (79.40%)	
<b>Domestic Arrangements</b>				0.402
Single person household	123 (12.76%)	24 (10.43%)	99 (13.60%)	
Adults only	418 (43.36%)	99 (43.04%)	315 (43.27%)	
Dependents	423 (43.88%)	107 (46.52%)	314 (43.13%)	
<b>Number of Children</b>				0.579
None	622 (64.52%)	140 (60.87%)	476 (65.38%)	
1	119 (12.34%)	29 (12.61%)	90 (12.36%)	
2	181 (18.78%)	50 (21.74%)	131 (17.99%)	
3 or more	42 (4.36%)	11 (4.78%)	31 (4.26%)	
<b>Child's Life stage <sup>b</sup></b>				
Pre-school	94 (27.49%)	35 (38.89%)	59 (23.41%)	<0.001
Grades Prep-2	90 (26.32%)	20 (22.22%)	70 (27.78%)	<0.001
Grades 3-6	111 (32.46%)	35 (38.89%)	76 (30.16%)	<0.001

Grades 7-10	104 (30.41%)	31 (34.44%)	73 (28.97%)	<0.001
Grades 11-12	56 (16.37%)	14 (15.56%)	42 (16.67%)	<0.001

**Satisfaction with division of household responsibilities**

Household Tasks	962; 4.03 ± 1.38	229; 4.18 ± 1.21	727; 3.98 ± 1.43	0.119†
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- a. Chi-squared or (†)Mann-Whitney test of difference between male and female. \*Chi-square not presented due to small expected values.
- b. Multiple answer: percentages may not equal 100%

Almost all respondents worked from home for an increased number of days during the COVID-19 pandemic (Table 2). Approximately 70% of the population worked five or more days from home, with only 60.3% having a dedicated workstation in a private room without interruptions. A disproportionate number of women worked in spaces with frequent interruptions ( $\chi^2 = 13.19$ ;  $p=0.001$ ).

**Table 2: Work situation**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Number of days worked from home during COVID-19</b>				0.002
2 days	52 (5.51%)	10 (4.48%)	41 (5.73%)	
3 days	98 (10.38%)	13 (5.83%)	85 (11.89%)	
4 days	118 (12.50%)	18 (8.07%)	99 (13.85%)	
5 or more	676 (71.61%)	182 (81.61%)	490 (68.53%)	
<b>Change in days WFH pre to during pandemic</b>				*
Decreased	6 (0.64%)	1 (0.45%)	5 (0.70%)	
Stayed the Same	61 (6.46%)	10 (4.48%)	51 (7.13%)	
Increased	877 (92.90%)	212 (95.07%)	659 (92.17%)	
Mean change	944; 3.82 ± 1.53	223; 4.02 ± 1.44	715; 3.76 ± 1.56	0.010
<b>Months worked from home</b>	944; 6.34 ± 1.65	223; 6.58 ± 1.69	715; 6.26 ± 1.64	0.006†
<b>Average hours worked</b>				*
Full time	684 (71.62%)	190 (83.70%)	491 (68.01%)	
26-34 hrs	137 (14.35%)	20 (8.81%)	115 (15.93%)	
21-25 hrs	74 (7.75%)	9 (3.96%)	65 (9.00%)	
15-20 hrs	45 (4.71%)	6 (2.64%)	38 (5.26%)	
14 hrs or less	15 (1.57%)	2 (0.88%)	13 (1.80%)	
<b>WFH Preferred Days</b>				0.094
None	47 (5.96%)	6 (3.19%)	40 (6.72%)	
1	75 (9.51%)	25 (13.30%)	50 (8.40%)	
2	227 (28.77%)	50 (26.60%)	176 (29.58%)	
3	239 (30.29%)	57 (30.32%)	179 (30.08%)	
4	91 (11.53%)	18 (9.57%)	72 (12.10%)	
Every day	110 (13.94%)	32 (17.02%)	78 (13.11%)	
<b>Workstation Location</b>				0.001
Work Wherever	139 (14.74%)	28 (12.56%)	111 (15.55%)	
Separate Room	569 (60.34%)	157 (70.40%)	408 (57.14%)	
Separate Room w/ interruptions	235 (24.92%)	38 (17.04%)	195 (27.31%)	
<b>Workstation Comfort (compared to pre-pandemic)</b>				0.186
Decreased	486 (51.54%)	100 (44.84%)	382 (53.50%)	
Stayed the Same	284 (30.12%)	79 (35.43%)	204 (28.57%)	
Increased	173 (18.35%)	44 (19.73%)	128 (17.93%)	

<b>Typical work from home</b>				
Sitting (% of time)	77.60 ± 24.80	77.36 ± 22.99	77.72 ± 25.28	0.168 <sup>†</sup>
Standing (% of time)	10.01 ± 13.73	9.85 ± 11.37	9.96 ± 14.06	0.302 <sup>†</sup>
Walking (% of time)	6.88 ± 7.80	7.63 ± 7.29	6.67 ± 7.97	0.037 <sup>†</sup>
Heavy Labour (% of time)	0.43 ± 3.57	0.37 ± 1.65	0.45 ± 4.00	0.224 <sup>†</sup>
<b>Technology</b>				
Technology support	794; 3.85 ± 0.82	190; 3.79 ± 0.82	598; 3.88 ± 0.81	0.130 <sup>†</sup>
Productivity	791; 4.23 ± 0.83	188; 4.15 ± 0.77	597; 4.26 ± 0.85	0.009 <sup>†</sup>
Technology complexity	789; 2.49 ± 1.02	188; 2.50 ± 1.01	595; 2.50 ± 1.02	0.955 <sup>†</sup>
<b>Job Satisfaction</b>				
Very Unsatisfied	23 (2.83%)	11 (5.64%)	12 (1.96%)	
Unsatisfied	68 (8.35%)	14 (7.18%)	53 (8.65%)	
Neither	126 (15.48%)	25 (12.82%)	101 (16.48%)	
Satisfied	394 (48.40%)	106 (54.36%)	284 (46.33%)	
Very Satisfied	203 (24.94%)	39 (20.00%)	163 (26.59%)	
Mean (sd)	814; 3.84 ± 0.98	195; 3.76 ± 1.03	613; 3.87 ± 0.97	0.273 <sup>†</sup>

291 a. Chi-squared or (+)Mann-Whitney test of difference between male and female.

292 Workstation technology was generally supplied by the employer; however, a substantial number of  
293 respondents reported providing their own separate keyboard (30.1%) and screen (35.4%; Table 3).

294 The use of sit/stand desks was rare with just 5.4% of respondents reporting the use of these at  
295 home. Almost all respondents were provided with the necessary software to perform their work by  
296 their employer.

297 **Table 3: Workstation Technology**

Workstation Technology	Employer provided (n=793)	Employee provided (n=793)
Laptop	570 (71.88%)	177 (22.32%)
Desktop	109 (13.75%)	97 (12.23%)
Separate keyboard	334 (42.12%)	239 (30.14%)
Mouse	406 (51.20%)	315 (39.72%)
Phone	208 (26.23%)	339 (42.75%)
Tablet	63 (7.94%)	119 (15.01%)
Separate screen	287 (36.19%)	281 (35.44%)
Desk (including sit/stand)	10 (1.26%)	33 (4.16%)
Chair	25 (3.15%)	17 (2.14%)
Headset	11 (1.39%)	13 (1.64%)
Printer	7 (0.88%)	17 (2.14%)
Other	16 (2.02%)	26 (3.28%)

298  
299 Males reported experiencing higher levels of FWC and lower levels of job recognition than females.

300 Females reported higher levels of job insecurity (Table 4) than males. Most respondents reported  
301 their health as 'good' or 'very good' (Table 5). On all measures of stress (burnout, general stress,

302 somatic and cognitive) females were more negatively impacted than males. Over 70% of

303 respondents reported experiencing some form of pain or discomfort towards the end of their

304 working day. However, females reported higher levels of neck/shoulder and lower limb (hips,  
305 bottom, legs, or feet) pain than males.

306 **Table 4: Psychosocial work environment**

	Cronbach alpha	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Work–Family/Family– Work Conflict (max score = 7)</b>					
WFC	0.954	871; 3.69 ± 1.66	208; 3.69 ± 1.57	657; 3.69 ± 1.70	0.964†
FWC	0.952	869; 2.99 ± 1.57	208; 3.16 ± 1.52	655; 2.94 ± 1.59	0.031†
<b>COPSOQ (max score = 5)</b>					
Quantitative Demands	0.824	860; 2.49 ± 0.83	207; 2.54 ± 0.88	647; 2.48 ± 0.82	0.413†
Influence at work	0.863	859; 3.15 ± 0.93	207; 3.23 ± 0.87	646; 3.13 ± 0.96	0.137†
Predictability	0.804 <sup>b</sup>	834; 3.29 ± 0.94	201; 3.37 ± 0.89	627; 3.26 ± 0.96	0.171†
Recognition	0.881 <sup>b</sup>	791; 3.91 ± 1.05	189; 3.75 ± 1.03	596; 3.96 ± 1.06	<b>0.004†</b>
Role Clarity	0.905	834; 3.78 ± 0.85	201; 3.76 ± 0.80	627; 3.78 ± 0.87	0.494†
Role Conflict	0.725 <sup>b</sup>	834; 2.49 ± 1.00	201; 2.58 ± 0.95	627; 2.46 ± 1.01	0.076†
Quality of Leadership	0.864 <sup>b</sup>	719; 3.45 ± 1.17	174; 3.36 ± 1.15	540; 3.49 ± 1.17	0.149†
Social Support from Supervisor	0.914 <sup>b</sup>	814; 4.11 ± 1.06	191; 4.06 ± 1.08	617; 4.13 ± 1.06	0.321†
Social Support from Colleagues	0.895 <sup>b</sup>	825; 4.19 ± 0.90	196; 4.15 ± 0.81	624; 4.20 ± 0.93	0.106†
Sense of Community at Work	0.803 <sup>b</sup>	831; 4.06 ± 0.86	200; 4.00 ± 0.89	625; 4.08 ± 0.85	0.220†
Job Insecurity	0.829 <sup>b</sup>	736; 2.96 ± 1.34	177; 2.78 ± 1.40	553; 3.01 ± 1.33	<b>0.043†</b>
Insecurity over Working Conditions	0.683 <sup>b</sup>	616; 2.09 ± 1.13	148; 2.01 ± 0.98	464; 2.12 ± 1.17	0.708†
Vertical trust	0.899	779; 3.63 ± 1.02	182; 3.58 ± 1.03	591; 3.65 ± 1.02	0.447†
Organizational Justice	0.738 <sup>b</sup>	617; 3.49 ± 0.94	153; 3.40 ± 0.94	459; 3.52 ± 0.94	0.180†

307 a. Chi-squared or (+)Mann-Whitney test of difference between male and female. <sup>b</sup> Two item scale,  
308 Spearman-Brown reported instead of Cronbach's alpha.  
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310 **Table 5: Health and wellbeing**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Self-Perceived Health</b>				0.275
Poor	29 (3.24%)	7 (3.32%)	22 (3.24%)	
Fair	200 (22.32%)	42 (19.91%)	155 (22.83%)	



Good	358 (39.96%)	95 (45.02%)	262 (38.59%)	
Very good	237 (26.45%)	56 (26.54%)	179 (26.36%)	
Excellent	72 (8.04%)	11 (5.21%)	61 (8.98%)	
Mean (SD)	896; 3.14 ± 0.96	211; 3.10 ± 0.89	679; 3.15 ± 0.98	0.655 <sup>+</sup>
<b>Stress (max score = 5)</b>				
Burnout	900; 3.13 ± 0.89	212; 2.85 ± 0.85	682; 3.21 ± 0.89	<0.001 <sup>+</sup>
Stress	899; 2.87 ± 0.92	212; 2.66 ± 0.88	681; 2.94 ± 0.92	<0.001 <sup>+</sup>
Somatic Stress	900; 1.98 ± 0.81	212; 1.68 ± 0.72	682; 2.07 ± 0.82	<0.001 <sup>+</sup>
Cognitive Stress	900; 2.61 ± 0.90	212; 2.38 ± 0.81	682; 2.67 ± 0.91	<0.001 <sup>+</sup>
<b>Pain and Discomfort (range 1-12)</b>				
Neck or Shoulders	553; 4.34 ± 2.92	99; 3.51 ± 2.84	448; 4.50 ± 2.90	<0.001 <sup>+</sup>
Hands or Fingers	318; 2.59 ± 2.30	53; 2.55 ± 2.13	262; 2.60 ± 2.35	0.737 <sup>+</sup>
Arms	254; 2.28 ± 2.10	47; 2.00 ± 1.69	202; 2.35 ± 2.20	0.241 <sup>+</sup>
Middle to Lower Back	521; 3.81 ± 2.97	99; 3.70 ± 2.92	417; 3.83 ± 2.96	0.600 <sup>+</sup>
Hips, Bottom, Legs, or Feet	432; 3.41 ± 2.83	75; 2.80 ± 2.42	352; 3.54 ± 2.90	0.027 <sup>+</sup>

a. Chi-squared or (+)Mann-Whitney test of difference between male and female.

All respondents who identified their gender as 'other' were younger professionals with low levels of WFC. However, these six individuals reported low levels of social support from their supervisor and colleagues and had a below average sense of community at work. None reported their health as 'excellent', and all reported pain and discomfort in their neck or shoulders towards the end of their working day (data not included in tables due to low numbers).

## DISCUSSION

The overall aim of this paper was to describe the EWFH study and baseline characteristics of the study population. The COVID-19 pandemic resulted in a rapid transition to working from home to suppress virus transmission. This EWFH study will provide insights into the experiences and health impacts on participants who were working from home during the pandemic, and their experience of work during follow up periods. A range of workplace physical and psychosocial exposures were measured, along with stress and musculoskeletal pain. From the baseline data, gendered differences were identified in relation to several factors including FWC, job recognition and job insecurity, stress and musculoskeletal pain; these will be explored in greater detail in this paper.

Males reported higher levels of FWC than females. At the time of this phase of data collection, the country was in various stages of lockdown with schools and childcare centres closed in some areas

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3 330 (Victoria). Therefore, many people with dependants were WFH while also supervising children.  
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5 331 Whilst this situation is unusual, the dual responsibilities of managing work and childcare are more  
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7 332 commonly undertaken by females<sup>29</sup>, which may shield males from potential conflict between non-  
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10 333 work demands and work activities<sup>36</sup>. In the current study, females were more likely to work part  
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12 334 time compared to the males which may enable greater flexibility for managing the family- to-work  
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14 335 interface, than their male partners<sup>37</sup>. This change in working arrangements may mean that males  
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16 336 are not 'shielded' from the dual responsibilities women have typically undertaken, and are more  
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18 337 exposed to potential conflict between non-work demands and work activities, thus reporting higher  
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21 338 FWC than females.  
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25 340 The lower scores for males compared to females for job recognition are interesting. The unique  
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27 341 situation of WFH during the period of data collection required adaptation to new ways of working. In  
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29 342 many cases, people worked very long hours, sometimes with reduced salary and extra  
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31 343 responsibilities as managers learned how to effectively supervise remote teams with very different  
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33 344 circumstances to their usual modes of operation<sup>38</sup>. These multiple interacting factors may have  
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35 345 influenced males' perceptions of how they were being recognised for their work.  
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41 347 Females reported more concerns about job insecurity in comparison to males. One plausible  
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43 348 explanation is the type of work in which the females in the sample were engaged. A third of the  
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45 349 females in the study were employed in the education and training sector. This sector has been  
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47 350 seriously impacted by the pandemic, with high numbers of job losses in the University sector as a  
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49 351 result of border closures which have prevented the intake of international students<sup>2</sup> and worldwide  
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51 352 women have experienced more job losses compared to men<sup>39</sup>.  
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56 354 In addition, stress and musculoskeletal pain were significantly higher for females in comparison to  
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58 355 males. A range of possible explanations exist. Previous literature on musculoskeletal pain has  
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3 356 reported higher pain levels particularly in females in the neck and shoulder regions, so this finding is  
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5 357 not surprising<sup>40</sup>. In the current situation, more females reported not having a dedicated workstation  
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7 358 and so were using whatever location was available to them, a practice likely to be associated with  
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10 359 increased pain. An emerging body of work relating to the impact of COVID-19 on females supports  
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12 360 the unequal workload burden for females<sup>5</sup> and as such, reports of increased stress are not  
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14 361 surprising which is associated with increased musculoskeletal pain<sup>41</sup>.

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19 363 Future research in the EWFH study will explore many of the relationships outlined in greater detail  
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21 364 and include the results from focus groups. In addition, a second wave of data will be collected in  
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23 365 April/May 2021. The second wave will enable longitudinal analysis of the impacts of the WFH  
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25 366 environment on individuals' physical and mental health. An additional benefit is the second wave of  
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27 367 data collection will enable investigation of individuals' working patterns as the COVID-19 pandemic  
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29 368 situation in Australia stabilises and the national vaccination program is underway.

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35 370 A key strength of the study is the use of a range of validated measurement tools to examine the  
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37 371 environmental exposures for workers whilst WFH during the COVID-19 pandemic. The baseline data  
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39 372 was collected during a period of sustained lockdown in one of the states (Victoria) which provides  
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41 373 some unique insights into the experiences of people WFH. However, several limitations must be  
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43 374 acknowledged. The population sample has a higher proportion of respondents based in Victoria, a  
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45 375 southern mainland state of Australia. Victoria experienced longer period of lockdown and more  
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47 376 severe restrictions compared to the rest of Australia. This, along with a convenience sample, is likely  
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49 377 to lead to a higher proportion of Victorian participants and may impact the generalisability of  
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51 378 findings to other Australian states or other populations more broadly. Another potential limitation  
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53 379 that should be noted was that recruitment of females was higher than males; however, this is  
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55 380 consistent with emerging research in COVID-19 studies.

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3 382 **CONCLUSION**  
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5 383 This paper presents a profile of individuals working from home during the COVID-19 pandemic. Little  
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7 384 guidance is available to support employers and employees in creating optimal environments for  
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9 385 working from home in such unusual circumstances. Gendered differences were identified in the  
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11 386 current study which require further scrutiny to ensure that appropriate support can be provided. It is  
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13 387 likely that working from home for at least some of the week will continue for at least the  
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15 388 foreseeable future, as a result of changes to work practices which occurred during the pandemic,  
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17 389 and more recently as individuals and organisations adjust to the new and often uncertain experience  
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19 390 of “COVID-normal”. Therefore, research evidence is required to examine the psychosocial and  
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21 391 physical hazards impacting individuals’ physical and mental health, whilst working from home, to  
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23 392 assist organisations to be responsive, ensuring they are able to minimise any unintended health  
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25 393 consequences due to WFH.  
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32 395 **ACKNOWLEDGEMENTS**  
33

34 396 We would like to thank the questionnaire and focus group participants for taking the time to share  
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36 397 their WFH experience.  
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41 399 **COMPETING INTERESTS**  
42

43 400 None declared.  
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54 405 **DATA AVAILABILITY STATEMENT**  
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57 406 Data are available on reasonable request. The La Trobe University Human Ethics Committee imposes  
58  
59 407 restrictions on the data.  
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408

409 **AUTHOR CONTRIBUTIONS**

410 JO &amp; NK coordinated recruitment of participants. KL conducted statistical analysis and all authors

411 analysed data. JO and NK drafted the first version of the article with input from MG, RS, KL and VW.

412 All authors agreed to the final version prior to submission.

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# BMJ Open

## Working from home in Australia during the COVID-19 pandemic: Baseline results for the Employees Working From Home (EWFH) study.

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3 1 **Working from home in Australia during the COVID-19 pandemic: Baseline results for the**  
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5 2 **Employees Working From Home (EWFH) study.**  
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3 20 **ABSTRACT**  
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5 21 **Objectives:** To investigate the impacts, on mental and physical health, of a mandatory shift to  
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7 22 working from home during the COVID-19 pandemic.  
8

9  
10 23 **Design:** Cross sectional, online survey.  
11

12 24 **Setting:** Online survey was conducted from September 2020 – November 2020 in the general  
13  
14 25 population.  
15

16 26 **Participants:** Australian residents working from home for at least two days a week at some time in  
17  
18 27 2020 during the COVID-19 pandemic.  
19

20 28 **Main outcome measures:** demographics, caring responsibilities, working from home arrangements,  
21  
22 29 work-related technology, work–family interface, psychosocial and physical working conditions, and  
23  
24 30 reported stress and musculoskeletal pain.  
25  
26

27 31 **Results:** 924 Australians responded to the online questionnaire. Respondents were mostly women  
28  
29 32 (75.5%) based in Victoria (83.7%) and employed in the education and training and healthcare  
30  
31 33 sectors. Approximately 70% of respondents worked five or more days from home, with only 60%  
32  
33 34 having a dedicated workstation in an uninterrupted space. Over 70% of all respondents reported  
34  
35 35 experiencing musculoskeletal pain or discomfort. Gendered differences were observed; men  
36  
37 36 reported higher levels of family to work conflict, and lower levels of recognition for their work,  
38  
39 37 compared to women. For women, stress and musculoskeletal pain levels were higher than men and  
40  
41 38 they also reported more concerns about their job security than men.  
42  
43

44 39 **Conclusions:** Preliminary evidence from the current study suggests that working from home may  
45  
46 40 impact employees' physical and mental health, and that this impact is likely to be gendered.  
47

48 41 Although further analysis is required, this data provides insights into further research opportunities  
49  
50 42 needed to assist employers in optimising working from home conditions and reduce the potential  
51  
52 43 negative physical and mental health impacts on their employees.  
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55 44 **Article Summary:**  
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57

58 45 ***Strengths and limitations of this study***  
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3 46 • A key strength of the study is the use of a range of validated measurement tools to examine  
4  
5 47 the environmental exposures for workers whilst working from home during the COVID-19  
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7 48 pandemic.  
8  
9  
10 49 • The baseline data was collected during a period of sustained lockdown in one of the states  
11  
12 50 (Victoria) which provides unique insights into the experiences of people working from home  
13  
14 51 under those conditions.  
15  
16 52 • The population sample has a higher proportion of respondents based in Victoria, the  
17  
18 53 southern state of mainland Australia which experienced the longest period of lockdown in  
19  
20 54 the world so the impacts on this group are likely to differ from those elsewhere in Australia  
21  
22 55 and beyond.  
23  
24 56 • The use of a convenience sample is a limitation and recruitment of females was higher than  
25  
26 57 males; however, this is consistent with emerging research in COVID-19 studies  
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32 59 Key words: COVID 19, mental health, risk management  
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## 37 61 INTRODUCTION

38  
39 62 The current global pandemic caused by COVID-19 has resulted in an unprecedented situation with  
40  
41 63 wide ranging health <sup>1</sup> and economic impacts <sup>2,3</sup> which differ markedly by gender <sup>4,5</sup>. The unexpected  
42  
43 64 and rapid global impact necessitated immediate actions and a key public health measure has been  
44  
45 65 the shift to employees' working from home (WFH) where possible <sup>6</sup>. Whilst WFH is often offered to  
46  
47 66 employees as a flexible work benefit to improve the integration between work and other life  
48  
49 67 activities, it is less commonly undertaken in a full-time capacity or mandatory capacity <sup>7,8</sup>. In  
50  
51 68 response to the public health restrictions to reduce the transmission of COVID-19, organisations  
52  
53 69 rapidly transitioned to WFH without a clear understanding of the impact of ongoing WFH on mental  
54  
55 70 and physical health <sup>9</sup>.  
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73 In March 2020, Australians experienced their first lockdown due to COVID 19. All people who were  
74 able to work from home were required to do so. By May, many restrictions were lifted, but the  
75 requirement to maintain WFH, where possible, was retained. Since then, lockdowns have been  
76 ongoing, particularly for residents of Victoria. WFH will continue to be an important part of the  
77 COVID 19 mitigation strategy and, as such, it is important that policies and procedures to support  
78 sustainable practices are utilised. This will require data from impacted populations to ensure these  
79 meet the needs of employers and employees to optimise working conditions. Prior to the pandemic,  
80 data suggests that approximately one-third of the Australian working population were undertaking  
81 some hours of work from home<sup>10</sup>. In comparison, during the pandemic (June 2021) 57% of employed  
82 people in Victoria were working from home more than once a week<sup>11</sup>, suggesting that working from  
83 home was a new experience for many people, and for most it was not through choice, but  
84 mandated.

85

86 A recent rapid review identified WFH as a complex occupational health issue, necessitating  
87 organisations utilise a systems-based approach, taking into account the organisational, job and  
88 individual aspects of work <sup>12</sup>. This approach is a distinct departure from more conventional  
89 workplace assessment strategies which commonly focus on the physical aspects of a person's work  
90 and fail to address the psychosocial conditions. The review identified a need for policies to be  
91 implemented around work-home boundary management, role clarification, clear performance  
92 indicators, appropriate technical support, facilitation of co-worker networking, and training for  
93 managers. There appears to be a high likelihood that WFH will remain a central aspect of future  
94 working conditions well beyond the current COVID 19 pandemic <sup>13</sup>; as such, the overarching  
95 objective of the Employees Working from Home (EWFH) study was to explore the relationships  
96 between a broad range of workplace characteristics and the impact on employees' health and  
97 wellbeing.

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5 99 More specifically, workplace conditions—physical and psychosocial—have been associated with a  
6  
7 100 range of negative health outcomes which include musculoskeletal and stress-related mental health  
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9 101 disorders<sup>12 14 15</sup>. Employers are required to undertake activities to support the protection of all  
10  
11 102 workers and reduce injury risk; early identification of adverse working conditions, regardless of  
12  
13 103 where the work is being undertaken, will enable targeted strategies to address potential risks<sup>16 17</sup>.  
14  
15 104 Such workplace assessment activities are traditionally undertaken by occupational health  
16  
17 105 professionals, ergonomists or health and safety representatives at the organisation, but the rapid  
18  
19 106 shift to working from home meant that many of the usual work environment assessments were  
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21 107 bypassed in order to comply with governmental public health responses<sup>9</sup>.  
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25 109 Working from home can have positive and negative impacts on the work–family interface; where  
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27 110 the traditional boundary settings between work and home are challenged<sup>18 19</sup>; with potential for  
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29 111 increased role conflict<sup>20</sup> or spill over between the two domains. One example of negative spill over  
30  
31 112 includes work–family conflict (WFC), in which conflict arises when the general demands of, time  
32  
33 113 devoted to, and strain caused by the job interfere with family (non-work) life<sup>21</sup>. High levels of WFC  
34  
35 114 are associated with negative impacts on physical and mental health, low job satisfaction, and  
36  
37 115 heightened intentions to leave the workplace<sup>22-24</sup>. In the other direction, family–work conflict (FWC)  
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39 116 arises when the general demands of, time devoted to, and strain created by the family interfere with  
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41 117 performing work-related responsibilities<sup>21</sup>. As such, the multiple role transitions required when WFH  
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43 118 may reduce WFC but may increase FWC<sup>19 20</sup> and impact employee productivity. Boundary theory<sup>25</sup>,  
44  
45 119 which underpins much of the work–family interface research area, proposes that individuals  
46  
47 120 maintain psychological, physical and/or behavioural boundaries around their different life roles,  
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49 121 such as their work and home roles. However, the COVID 19 pandemic has raised challenges with  
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51 122 boundary management due to mandated WFH for prolonged periods of time. The rapid change to  
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53 123 WFH during the COVID 19 pandemic required transitions for employees, to support the greater  
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3 124 public health need, without careful consideration of boundary setting. Prior to the current  
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5 125 pandemic, research identified that employees WFH adjust their approach to managing the work–  
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7 126 family interface depending on the number of days they are based at home <sup>7</sup>.  
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10 127 A further impact of the pandemic was the increased burden of care-related duties, due to school and  
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12 128 childcare centre closures. Whilst evidence suggests that men increased their role in care-related  
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14 129 duties, women continued to take on a disproportionate share of the unpaid work<sup>26 27</sup>. Prior to the  
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16 130 pandemic, women also assumed a greater role in household duties but without the additional  
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18 131 burden of WFH and balancing these often-competing demands<sup>28</sup>. Already, data suggests negative  
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20 132 impacts of the pandemic on women’s working lives at far greater levels than their male  
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23 133 counterparts<sup>29 30</sup>, along with greater dissatisfaction of the balance between paid and unpaid work.  
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28 135 The overall aim of this paper is to describe the baseline survey results of the EWFH study. The  
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30 136 objectives of the EWFH study are to examine 1) The impacts of psychosocial and physical hazards,  
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32 137 related to WFH, on mental and physical health, and 2) To investigate differences in health outcomes  
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34 138 between employees and identify patterns of gendered differences.  
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## 39 140 **METHOD**

### 41 141 **Study design**

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43 142 The EWFH study utilised a sequential mixed methods approach which included 1) a cross sectional  
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45 143 study (survey) and 2) a descriptive qualitative study (focus groups) <sup>31</sup>. The purpose of the cross-  
46  
47 144 sectional study was to explore the physical and psychosocial impacts of WFH. Using focus groups,  
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49 145 the descriptive qualitative study aimed to provide a more nuanced and in depth understanding of  
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52 146 WFH based on the findings from the cross-sectional study.  
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### 57 148 **Study population**

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3 149 A convenience sample of participants from across Australia was recruited. Eligible participants were  
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5 150 recruited through an advertisement distributed via the Facebook paid service. In addition, the  
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7 151 advertisement was circulated through professional and personal networks of the research team,  
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9 152 LinkedIn, and the La Trobe University Facebook page. The advertisement directed people to an  
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11 153 online questionnaire that contained screening questions to determine eligibility and only eligible  
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13 154 respondents were able to proceed and complete the questionnaire. The following inclusion criteria  
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15 155 were used to determine eligibility: being 18 years of age or older, working from home at least 2 days  
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17 156 per week during the period following declaration of the COVID-19 pandemic in Australia, currently  
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19 157 living in Australia. Recruitment of questionnaire respondents occurred from September – November  
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21 158 2020. Respondents were offered the opportunity to go into a prize draw to win a gift voucher, if they  
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23 159 completed the questionnaire.  
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30 161 At the completion of the anonymous questionnaire, participants were invited to indicate their  
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32 162 interest in being part of a focus group and if they were willing to undertake a follow up  
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34 163 questionnaire six months post baseline. If responding “yes”, they were required to provide some  
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36 164 identifiable data (i.e., email address or phone contact) so they could be contacted. Interested  
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38 165 participants were emailed a booking link to register for a focus group. Upon registration, participants  
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40 166 were sent a zoom link for the focus group. When the focus group had reached the maximum  
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42 167 number of registrations (each focus group had a maximum of six participants), any additional  
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44 168 interested participants were automatically placed on a waiting list. All focus group participants were  
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46 169 provided with a gift voucher to compensate for their time commitment.  
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## 51 170 **Ethics statement**

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54 171 Ethics approval was obtained through La Trobe University Human Ethics Research Committee,  
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56 172 approval number HEC20388. All study participants were provided with written information about  
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58 173 the study. All participants provided informed consent prior to participation.  
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3 174 **Patient and public involvement**  
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5 175 Participants were not involved in the design or implementation of this study.  
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7 176 **Data collection**  
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10 177 **Survey**  
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12 178 The online questionnaire was developed using internationally validated tools where possible.  
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14 179 Demographic data, including age, gender, nature of employment, the general experience of working  
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16 180 from home, satisfaction with the division of caring and/or household duties, and the provision and  
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18 181 comfort of workstation equipment, was collected. Other questionnaire constructs included:  
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20 182 sedentary behaviour, wellbeing and general health, WFC, FWC, work-related psychosocial hazards,  
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22 183 job satisfaction, comparison of work whilst working from home during the COVID-19 pandemic with  
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24 184 their work situation before the pandemic, musculoskeletal discomfort/pain, and the use of work-  
25  
26 185 related technology.  
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32 187 Sedentary behaviour was measured using the Occupational Sitting and Physical Activity  
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34 188 Questionnaire<sup>32</sup> to obtain subjective measures of time spent on various types of activities, i.e.,  
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36 189 sitting, standing, walking and physically demanding work.  
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41 191 Wellbeing and general health were measured using items from the Copenhagen Psychosocial  
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43 192 Questionnaire (COPSOQ)<sup>33</sup>. Wellbeing was measured with 13 items scored on a five-point Likert  
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45 193 scale ranging from *not at all* (1) to *all the time* (5). An example item was “how often have you felt  
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47 194 worn out?”. General health was measured with a single item (“*in general, would you say your health*  
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49 195 *is?*”) and scored on five-point scale ranging from *poor* (1) to *excellent* (5).  
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54 197 Work–family conflict and FWC were measured using the 10-item scale developed by Netemeyer and  
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56 198 colleagues<sup>21</sup>. Items were scored using a seven-point scale ranging from *strongly disagree* (1) to  
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58 199 *strongly agree* (7). An example item for work–family conflict was “*the demands of my work interfere*  
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3 200 *with my home and family life*". An example item for family–work conflict was "*I have to put off doing*  
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5 201 *things at work because of demands on my time at home*".  
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10 203 Psychosocial hazards were measured using 33 items drawn primarily from COPSQ<sup>33</sup>. Quantitative  
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12 204 demands, influence at work, sense of community at work, social support from supervisor, and social  
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14 205 support from colleagues were scored on a five-point scale ranging from *never/hardly ever* (1) to  
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16 206 *always* (5). An example item was "*I get behind in my work*". Predictability, role clarity, role conflicts,  
17  
18 207 quality of leadership, recognition, organisation justice, insecurity over employment, insecurity over  
19  
20 208 working conditions, and vertical trust were scored on a five-point scale ranging from *to a very small*  
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22 209 *extent* (1) *to a very large extent* (5). An example item was "*work is distributed fairly*".  
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28 211 Overall job satisfaction was measured using a single item from COPSQ ("*how pleased are you with*  
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30 212 *your job overall, everything taken into consideration?*") that was scored on a five-point Likert scale  
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32 213 from *very unsatisfied* (1) to *very satisfied* (5).  
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36 215 Eight items compared work-related factors whilst working from home during the COVID-19  
37  
38 216 pandemic with work before the pandemic. An example item was "*I can get help and feedback from*  
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40 217 *my work colleagues, if needed*". These items were scored on a five-point scale from *much less than*  
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42 218 *before* (1) to *much more than before* (5).  
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48 220 Musculoskeletal discomfort/pain frequency and severity ratings were recorded separately for five  
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50 221 body regions (neck/shoulders, hands/fingers, arms, middle to lower back, and hips/bottom/legs and  
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52 222 feet) using a measure with evidence of validity in a number of different industry sectors<sup>34</sup>. Response  
53  
54 223 options for pain/discomfort frequency ranged from *never* (1) to *almost always* (5). Severity, if  
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56 224 applicable, was scored using a three-point scale from *mild* (1) to *severe* (3).  
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3 226 Technology support and productivity were measured using a scale developed specifically for this  
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5 227 study. Examples of items to measure technology support and productivity respectively were “I can  
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7 228 get good help and support from work if I have technology (hardware or software) problems” and  
8  
9 229 “the software I use when working at home enables me to work effectively”. Technology complexity  
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11 230 was measured using two items based on the Technostress Creators Scale <sup>35</sup> Items were scored on a  
12  
13 231 five-point scale from *strongly disagree* (1) to *strongly agree* (5).  
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19 233 Change in days WFH pre to during pandemic was determined by taking respondents answer to  
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21 234 “Before the start of the COVID-19 pandemic, how many days per week did you usually work from  
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23 235 home?” – with allowed responses from 0 to 5 days – from their answer to “When you are working  
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25 236 from home during the COVID-19 pandemic, how many days per week do you usually work from  
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27 237 home?” - with allowed responses from 2 to 5 days. The generated variable theoretically runs from -3  
28  
29 238 to +5 with -3 indicating a decrease from 5 days WFH prior to COVID-19 to 2 days WFH during COVID-  
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31 239 19 and +5 indicating an increase from no days WFH prior to COVID-19 to 5 days WFH during COVID-  
32  
33 240 19. Given the incredibly low numbers of decreasing WFH, the variable was collapsed into  
34  
35 241 “Decreased” (negative value), “Stayed the Same” (0), and “Increased” (positive value).  
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#### 41 243 **Focus groups**

42  
43 244 Seven focus groups were scheduled with participants, based on the following characteristics:  
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45 245 managers (2 groups), women with dependent children at home (1 group), those living alone (1  
46  
47 246 group), residents of Western Australia & Queensland states (1 group), and general population (but  
48  
49 247 excluding managers; 2 groups). Residents of Western Australia and Queensland states were  
50  
51 248 excluded from other focus groups, and grouped together in a separate group, as they had a very  
52  
53 249 different experience of the COVID pandemic compared to the rest of the Australian states. Due to  
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55 250 the widespread geographic distribution of participants, and the COVID-19 pandemic, focus groups  
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57 251 were held online using the Zoom meeting platform.  
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45 253 **Data analysis**6  
7 254 **Survey**

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10 255 COPSOQ variables were combined into domains per COPSOQ III guidelines<sup>33</sup>. Cronbach's alpha was  
11  
12 256 computed for these domains as well as WFC and FWC, except when the score was derived from two  
13  
14 257 items; Spearman-Brown providing a better estimate of reliability in such cases. To adequately  
15  
16 258 describe the respondents of the EWFH survey, all valid responses were used. Variable sample sizes  
17  
18 259 between items are therefore expected. Sample size or frequency are presented.

20  
21 260 Comparisons between respondents who self-identified as male and those who self-identified as  
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23 261 female, depending on the type of variable, were conducted using Chi-squared analysis or the Mann-  
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25 262 Whitney test of difference. Analysis was carried out in R version 4.0.3.

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31 265 **Focus Groups**

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33 266 A schedule of questions was developed using data from the survey and a recent review undertaken  
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35 267 by the research team<sup>12</sup> which covered the following: workplace support (e.g., 'how supportive are  
36  
37 268 your supervisor(s) and/or co-workers?'), performance indicators (e.g., 'did your job role change?'),  
38  
39 269 technical support (e.g., 'how was the technical support that you received?'), future (e.g., 'what  
40  
41 270 would be your ideal work arrangements?'). Focus groups were recorded, and all recordings were  
42  
43 271 transcribed. Transcriptions were analysed using an inductive thematic analysis approach. All authors  
44  
45 272 independently analysed three transcripts to identify coding categories, then convened to develop  
46  
47 273 the coding categories into a broader framework which was used to code the remaining four  
48  
49 274 transcripts. Themes were then constructed from the coding framework. Results from the focus  
50  
51 275 groups will be reported elsewhere.

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58 277 **RESULTS**59  
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278 In total, 964 questionnaire responses were received, of which 83.7% of respondents resided in  
 279 Victoria (Table 1). The majority of respondents were female (n = 728, 75.5%) with 230 male and six  
 280 respondents who identified as 'other'. Women participants were slightly younger than the males  
 281 and disproportionately worked in the 'Education and Training' field.

282 **Table 1: Description of the population**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Age</b>				0.004
18-35 years	209 (26.49%)	40 (21.28%)	165 (27.73%)	
36-55 years	450 (57.03%)	103 (54.79%)	346 (58.15%)	
56 years and over	130 (16.48%)	45 (23.94%)	84 (14.12%)	
<b>State</b>				0.712
Victoria	807 (83.71%)	190 (82.61%)	611 (83.93%)	
Other	157 (16.29%)	40 (17.39%)	117 (16.07%)	
<b>Industry</b>				<0.001
Education and Training	321 (33.30%)	66 (28.70%)	254 (34.89%)	
Financial and Insurance Services	49 (5.08%)	10 (4.35%)	39 (5.36%)	
Healthcare & Social Assistance	138 (14.32%)	18 (7.83%)	119 (16.35%)	
Information, Media & Telecommunications	45 (4.67%)	16 (6.96%)	29 (3.98%)	
Professional, Scientific, and Technical Services	207 (21.47%)	51 (22.17%)	154 (21.15%)	
Public Administration and Safety	98 (10.17%)	28 (12.17%)	70 (9.62%)	
Transport, Postal & Warehousing	32 (3.32%)	11 (4.78%)	20 (2.75%)	
Other	74 (7.68%)	30 (13.04%)	43 (5.91%)	
<b>Sector</b>				0.0783
Public sector	524 (54.36%)	118 (51.30%)	403 (55.36%)	
Private sector	288 (29.88%)	80 (34.78%)	207 (28.43%)	
Not for profit sector	119 (12.34%)	21 (9.13%)	96 (13.19%)	
Self employed	33 (3.42%)	11 (4.78%)	22 (3.02%)	
<b>Role</b>				*
Manager	157 (16.29%)	47 (20.43%)	109 (14.97%)	
Professional	587 (60.89%)	154 (66.96%)	429 (58.93%)	
Clerical or Administrative Workers	198 (20.54%)	21 (9.13%)	176 (24.18%)	
Community and Personal Service Worker	10 (1.04%)	1 (0.43%)	9 (1.24%)	
Sales Worker	9 (0.93%)	4 (1.74%)	5 (0.69%)	
Technician, Trade, Machinery Operators & Drivers	3 (0.31%)	3 (1.30%)	0 (0.00%)	
<b>Business Size</b>				0.996
Sole Trader	29 (3.01%)	7 (3.04%)	22 (3.02%)	
Small Business	74 (7.68%)	18 (7.83%)	55 (7.55%)	
Medium business	95 (9.85%)	22 (9.57%)	73 (10.03%)	
Large business	766 (79.46%)	183 (79.57%)	578 (79.40%)	
<b>Domestic Arrangements</b>				0.402
Single person household	123 (12.76%)	24 (10.43%)	99 (13.60%)	
Adults only	418 (43.36%)	99 (43.04%)	315 (43.27%)	
Dependents	423 (43.88%)	107 (46.52%)	314 (43.13%)	
<b>Number of Children</b>				0.579
None	622 (64.52%)	140 (60.87%)	476 (65.38%)	
1	119 (12.34%)	29 (12.61%)	90 (12.36%)	
2	181 (18.78%)	50 (21.74%)	131 (17.99%)	
3 or more	42 (4.36%)	11 (4.78%)	31 (4.26%)	
<b>Child's Life stage <sup>b</sup></b>				
Pre-school	94 (27.49%)	35 (38.89%)	59 (23.41%)	<0.001
Grades Prep-2	90 (26.32%)	20 (22.22%)	70 (27.78%)	<0.001
Grades 3-6	111 (32.46%)	35 (38.89%)	76 (30.16%)	<0.001

Grades 7-10	104 (30.41%)	31 (34.44%)	73 (28.97%)	<0.001
Grades 11-12	56 (16.37%)	14 (15.56%)	42 (16.67%)	<0.001

**Satisfaction with division of household responsibilities**

Household Tasks	962; 4.03 ± 1.38	229; 4.18 ± 1.21	727; 3.98 ± 1.43	0.119†
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- a. Chi-squared or (†)Mann-Whitney test of difference between male and female. \*Chi-square not presented due to small expected values.
- b. Multiple answer: percentages may not equal 100%

Almost all respondents worked from home for an increased number of days during the COVID-19 pandemic (Table 2). Approximately 70% of the population worked five or more days from home, with only 60.3% having a dedicated workstation in a private room without interruptions. A disproportionate number of women worked in spaces with frequent interruptions ( $\chi^2 = 13.19$ ;  $p=0.001$ ).

**Table 2: Work situation**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Number of days worked from home during COVID-19</b>				0.002
2 days	52 (5.51%)	10 (4.48%)	41 (5.73%)	
3 days	98 (10.38%)	13 (5.83%)	85 (11.89%)	
4 days	118 (12.50%)	18 (8.07%)	99 (13.85%)	
5 or more	676 (71.61%)	182 (81.61%)	490 (68.53%)	
<b>Change in days WFH pre to during pandemic</b>				*
Decreased	6 (0.64%)	1 (0.45%)	5 (0.70%)	
Stayed the Same	61 (6.46%)	10 (4.48%)	51 (7.13%)	
Increased	877 (92.90%)	212 (95.07%)	659 (92.17%)	
Mean change	944; 3.82 ± 1.53	223; 4.02 ± 1.44	715; 3.76 ± 1.56	0.010
<b>Months worked from home</b>	944; 6.34 ± 1.65	223; 6.58 ± 1.69	715; 6.26 ± 1.64	0.006†
<b>Average hours worked</b>				*
Full time	684 (71.62%)	190 (83.70%)	491 (68.01%)	
26-34 hrs	137 (14.35%)	20 (8.81%)	115 (15.93%)	
21-25 hrs	74 (7.75%)	9 (3.96%)	65 (9.00%)	
15-20 hrs	45 (4.71%)	6 (2.64%)	38 (5.26%)	
14 hrs or less	15 (1.57%)	2 (0.88%)	13 (1.80%)	
<b>WFH Preferred Days</b>				0.094
None	47 (5.96%)	6 (3.19%)	40 (6.72%)	
1	75 (9.51%)	25 (13.30%)	50 (8.40%)	
2	227 (28.77%)	50 (26.60%)	176 (29.58%)	
3	239 (30.29%)	57 (30.32%)	179 (30.08%)	
4	91 (11.53%)	18 (9.57%)	72 (12.10%)	
Every day	110 (13.94%)	32 (17.02%)	78 (13.11%)	
<b>Workstation Location</b>				0.001
Work Wherever	139 (14.74%)	28 (12.56%)	111 (15.55%)	
Separate Room	569 (60.34%)	157 (70.40%)	408 (57.14%)	
Separate Room w/ interruptions	235 (24.92%)	38 (17.04%)	195 (27.31%)	
<b>Workstation Comfort (compared to pre-pandemic)</b>				0.186
Decreased	486 (51.54%)	100 (44.84%)	382 (53.50%)	
Stayed the Same	284 (30.12%)	79 (35.43%)	204 (28.57%)	
Increased	173 (18.35%)	44 (19.73%)	128 (17.93%)	

**Typical work from home**

Sitting (% of time)	77.60 ± 24.80	77.36 ± 22.99	77.72 ± 25.28	0.168 <sup>†</sup>
Standing (% of time)	10.01 ± 13.73	9.85 ± 11.37	9.96 ± 14.06	0.302 <sup>†</sup>
Walking (% of time)	6.88 ± 7.80	7.63 ± 7.29	6.67 ± 7.97	0.037 <sup>†</sup>
Heavy Labour (% of time)	0.43 ± 3.57	0.37 ± 1.65	0.45 ± 4.00	0.224 <sup>†</sup>

**Technology**

Technology support	794; 3.85 ± 0.82	190; 3.79 ± 0.82	598; 3.88 ± 0.81	0.130 <sup>†</sup>
Productivity	791; 4.23 ± 0.83	188; 4.15 ± 0.77	597; 4.26 ± 0.85	0.009 <sup>†</sup>
Technology complexity	789; 2.49 ± 1.02	188; 2.50 ± 1.01	595; 2.50 ± 1.02	0.955 <sup>†</sup>

**Job Satisfaction**

Very Unsatisfied	23 (2.83%)	11 (5.64%)	12 (1.96%)	
Unsatisfied	68 (8.35%)	14 (7.18%)	53 (8.65%)	
Neither	126 (15.48%)	25 (12.82%)	101 (16.48%)	
Satisfied	394 (48.40%)	106 (54.36%)	284 (46.33%)	
Very Satisfied	203 (24.94%)	39 (20.00%)	163 (26.59%)	
Mean (sd)	814; 3.84 ± 0.98	195; 3.76 ± 1.03	613; 3.87 ± 0.97	0.273 <sup>†</sup>

293 a. Chi-squared or (+)Mann-Whitney test of difference between male and female.

294 Workstation technology was generally supplied by the employer; however, a substantial number of  
295 respondents reported providing their own separate keyboard (30.1%) and screen (35.4%; Table 3).

296 The use of sit/stand desks was rare with just 5.4% of respondents reporting the use of these at  
297 home. Almost all respondents were provided with the necessary software to perform their work by  
298 their employer.

299 **Table 3: Workstation Technology**

Workstation Technology	Employer provided (n=793)	Employee provided (n=793)
Laptop	570 (71.88%)	177 (22.32%)
Desktop	109 (13.75%)	97 (12.23%)
Separate keyboard	334 (42.12%)	239 (30.14%)
Mouse	406 (51.20%)	315 (39.72%)
Phone	208 (26.23%)	339 (42.75%)
Tablet	63 (7.94%)	119 (15.01%)
Separate screen	287 (36.19%)	281 (35.44%)
Desk (including sit/stand)	10 (1.26%)	33 (4.16%)
Chair	25 (3.15%)	17 (2.14%)
Headset	11 (1.39%)	13 (1.64%)
Printer	7 (0.88%)	17 (2.14%)
Other	16 (2.02%)	26 (3.28%)

300

301 Males reported experiencing higher levels of FWC and lower levels of job recognition than females.

302 Females reported higher levels of job insecurity (Table 4) than males. Most respondents reported  
303 their health as 'good' or 'very good' (Table 5). On all measures of stress (burnout, general stress,

304 somatic and cognitive) females were more negatively impacted than males. Over 70% of

305 respondents reported experiencing some form of pain or discomfort towards the end of their

306 working day. However, females reported higher levels of neck/shoulder and lower limb (hips,  
307 bottom, legs, or feet) pain than males.

308 **Table 4: Psychosocial work environment**

	Cronbach alpha	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Work–Family/Family– Work Conflict (max score = 7)</b>					
WFC	0.954	871; 3.69 ± 1.66	208; 3.69 ± 1.57	657; 3.69 ± 1.70	0.964†
FWC	0.952	869; 2.99 ± 1.57	208; 3.16 ± 1.52	655; 2.94 ± 1.59	0.031†
<b>COPSOQ (max score = 5)</b>					
Quantitative Demands	0.824	860; 2.49 ± 0.83	207; 2.54 ± 0.88	647; 2.48 ± 0.82	0.413†
Influence at work	0.863	859; 3.15 ± 0.93	207; 3.23 ± 0.87	646; 3.13 ± 0.96	0.137†
Predictability	0.804 <sup>b</sup>	834; 3.29 ± 0.94	201; 3.37 ± 0.89	627; 3.26 ± 0.96	0.171†
Recognition	0.881 <sup>b</sup>	791; 3.91 ± 1.05	189; 3.75 ± 1.03	596; 3.96 ± 1.06	<b>0.004†</b>
Role Clarity	0.905	834; 3.78 ± 0.85	201; 3.76 ± 0.80	627; 3.78 ± 0.87	0.494†
Role Conflict	0.725 <sup>b</sup>	834; 2.49 ± 1.00	201; 2.58 ± 0.95	627; 2.46 ± 1.01	0.076†
Quality of Leadership	0.864 <sup>b</sup>	719; 3.45 ± 1.17	174; 3.36 ± 1.15	540; 3.49 ± 1.17	0.149†
Social Support from Supervisor	0.914 <sup>b</sup>	814; 4.11 ± 1.06	191; 4.06 ± 1.08	617; 4.13 ± 1.06	0.321†
Social Support from Colleagues	0.895 <sup>b</sup>	825; 4.19 ± 0.90	196; 4.15 ± 0.81	624; 4.20 ± 0.93	0.106†
Sense of Community at Work	0.803 <sup>b</sup>	831; 4.06 ± 0.86	200; 4.00 ± 0.89	625; 4.08 ± 0.85	0.220†
Job Insecurity	0.829 <sup>b</sup>	736; 2.96 ± 1.34	177; 2.78 ± 1.40	553; 3.01 ± 1.33	<b>0.043†</b>
Insecurity over Working Conditions	0.683 <sup>b</sup>	616; 2.09 ± 1.13	148; 2.01 ± 0.98	464; 2.12 ± 1.17	0.708†
Vertical trust	0.899	779; 3.63 ± 1.02	182; 3.58 ± 1.03	591; 3.65 ± 1.02	0.447†
Organizational Justice	0.738 <sup>b</sup>	617; 3.49 ± 0.94	153; 3.40 ± 0.94	459; 3.52 ± 0.94	0.180†

309 a. Chi-squared or (†)Mann-Whitney test of difference between male and female. <sup>b</sup> Two item scale,  
310 Spearman-Brown reported instead of Cronbach's alpha.  
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312 **Table 5: Health and wellbeing**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Self-Perceived Health</b>				0.275
Poor	29 (3.24%)	7 (3.32%)	22 (3.24%)	
Fair	200 (22.32%)	42 (19.91%)	155 (22.83%)	



Good	358 (39.96%)	95 (45.02%)	262 (38.59%)	
Very good	237 (26.45%)	56 (26.54%)	179 (26.36%)	
Excellent	72 (8.04%)	11 (5.21%)	61 (8.98%)	
Mean (SD)	896; 3.14 ± 0.96	211; 3.10 ± 0.89	679; 3.15 ± 0.98	0.655 <sup>+</sup>
<b>Stress (max score = 5)</b>				
Burnout	900; 3.13 ± 0.89	212; 2.85 ± 0.85	682; 3.21 ± 0.89	<0.001 <sup>+</sup>
Stress	899; 2.87 ± 0.92	212; 2.66 ± 0.88	681; 2.94 ± 0.92	<0.001 <sup>+</sup>
Somatic Stress	900; 1.98 ± 0.81	212; 1.68 ± 0.72	682; 2.07 ± 0.82	<0.001 <sup>+</sup>
Cognitive Stress	900; 2.61 ± 0.90	212; 2.38 ± 0.81	682; 2.67 ± 0.91	<0.001 <sup>+</sup>
<b>Pain and Discomfort (range 1-12)</b>				
Neck or Shoulders	553; 4.34 ± 2.92	99; 3.51 ± 2.84	448; 4.50 ± 2.90	<0.001 <sup>+</sup>
Hands or Fingers	318; 2.59 ± 2.30	53; 2.55 ± 2.13	262; 2.60 ± 2.35	0.737 <sup>+</sup>
Arms	254; 2.28 ± 2.10	47; 2.00 ± 1.69	202; 2.35 ± 2.20	0.241 <sup>+</sup>
Middle to Lower Back	521; 3.81 ± 2.97	99; 3.70 ± 2.92	417; 3.83 ± 2.96	0.600 <sup>+</sup>
Hips, Bottom, Legs, or Feet	432; 3.41 ± 2.83	75; 2.80 ± 2.42	352; 3.54 ± 2.90	0.027 <sup>+</sup>

313 a. Chi-squared or (+)Mann-Whitney test of difference between male and female.

314 All respondents who identified their gender as 'other' were younger professionals with low levels of  
 315 WFC. However, these six individuals reported low levels of social support from their supervisor and  
 316 colleagues and had a below average sense of community at work. None reported their health as  
 317 'excellent', and all reported pain and discomfort in their neck or shoulders towards the end of their  
 318 working day (data not included in tables due to low numbers).

## 320 DISCUSSION

321 The overall aim of this paper was to describe the EWFH study and baseline characteristics of the  
 322 study population. The COVID-19 pandemic resulted in a rapid transition to working from home to  
 323 suppress virus transmission. This EWFH study will provide insights into the experiences and health  
 324 impacts on participants who were working from home during the pandemic, and their experience of  
 325 work during follow up periods. A range of workplace physical and psychosocial exposures were  
 326 measured, along with stress and musculoskeletal pain. From the baseline data, gendered differences  
 327 were identified in relation to several factors including FWC, job recognition and job insecurity, stress  
 328 and musculoskeletal pain; these will be explored in greater detail in this paper.

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 330 Males reported higher levels of FWC than females. At the time of this phase of data collection, the  
 331 country was in various stages of lockdown with schools and childcare centres closed in some areas

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3 332 (Victoria). Therefore, many people with dependants were WFH while also supervising children.  
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5 333 Whilst this situation is unusual, the dual responsibilities of managing work and childcare are more  
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7 334 commonly undertaken by females<sup>29</sup>, which may shield males from potential conflict between non-  
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10 335 work demands and work activities<sup>36</sup>. In the current study, females were more likely to work part  
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12 336 time compared to the males which may enable greater flexibility for managing the family- to-work  
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14 337 interface, than their male partners<sup>37</sup>. This change in working arrangements may mean that males  
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16 338 are not 'shielded' from the dual responsibilities women have typically undertaken, and are more  
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18 339 exposed to potential conflict between non-work demands and work activities, thus reporting higher  
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21 340 FWC than females.  
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25 342 The lower scores for males compared to females for job recognition are interesting. The unique  
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27 343 situation of WFH during the period of data collection required adaptation to new ways of working. In  
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29 344 many cases, people worked very long hours, sometimes with reduced salary and extra  
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31 345 responsibilities as managers learned how to effectively supervise remote teams with very different  
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33 346 circumstances to their usual modes of operation<sup>38</sup>. These multiple interacting factors may have  
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35 347 influenced males' perceptions of how they were being recognised for their work.  
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41 349 Females reported more concerns about job insecurity in comparison to males. One plausible  
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43 350 explanation is the type of work in which the females in the sample were engaged. A third of the  
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45 351 females in the study were employed in the education and training sector. This sector has been  
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47 352 seriously impacted by the pandemic, with high numbers of job losses in the University sector as a  
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49 353 result of border closures which have prevented the intake of international students<sup>2</sup> and worldwide  
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51 354 women have experienced more job losses compared to men<sup>39</sup>.  
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57 356 In addition, stress and musculoskeletal pain were significantly higher for females in comparison to  
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59 357 males. A range of possible explanations exist. Previous literature on musculoskeletal pain has  
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3 358 reported higher pain levels particularly in females in the neck and shoulder regions, so this finding is  
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5 359 not surprising<sup>40</sup>. In the current situation, more females reported not having a dedicated workstation  
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7 360 and so were using whatever location was available to them, a practice likely to be associated with  
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9 361 increased pain. An emerging body of work relating to the impact of COVID-19 on females supports  
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11 362 the unequal workload burden for females<sup>5</sup> and as such, reports of increased stress are not  
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14 363 surprising which is associated with increased musculoskeletal pain<sup>41</sup>.

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18 365 Future research in the EWFH study will explore many of the relationships outlined in greater detail  
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20 366 and include the results from focus groups. In addition, a second wave of data will be collected in  
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23 367 April/May 2021. The second wave will enable longitudinal analysis of the impacts of the WFH  
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25 368 environment on individuals' physical and mental health. An additional benefit is the second wave of  
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27 369 data collection will enable investigation of individuals' working patterns as the COVID-19 pandemic  
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29 370 situation in Australia stabilises and the national vaccination program is underway.

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34 372 A key strength of the study is the use of a range of validated measurement tools to examine the  
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36 373 environmental exposures for workers whilst WFH during the COVID-19 pandemic. The baseline data  
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38 374 was collected during a period of sustained lockdown in one of the states (Victoria) of mainland  
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40 375 Australia. Since the collection of this baseline data the capital of this state (Melbourne) has  
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42 376 experienced the longest period of lockdowns in the world. The population sample has a higher  
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44 377 proportion of respondents based in Victoria and this may impact the generalisability of findings to  
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46 378 other Australian states or other populations more broadly but will provide unique insights into the  
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48 379 impact of sustained WFH. Another potential limitation was that recruitment of females was higher  
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50 380 than males; however, this is consistent with emerging research in COVID-19 studies. The analysis  
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52 381 presented in this baseline paper, does not allow for causality to be inferred and a range of  
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54 382 cofounders need to be considered in future longitudinal analysis.

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3 384 **CONCLUSION**  
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5 385 This paper presents a profile of individuals working from home during the COVID-19 pandemic. Little  
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7 386 guidance is available to support employers and employees in creating optimal environments for  
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10 387 working from home in such unusual circumstances. Gendered differences were identified in the  
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12 388 current study which require further scrutiny to ensure that appropriate support can be provided. It is  
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14 389 likely that working from home for at least some of the week will continue for at least the  
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16 390 foreseeable future, as a result of changes to work practices which occurred during the pandemic,  
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18 391 and more recently as individuals and organisations adjust to the new and often uncertain experience  
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20 392 of “COVID-normal”. Therefore, research evidence is required to examine the psychosocial and  
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22 393 physical hazards impacting individuals’ physical and mental health, whilst working from home, to  
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24 394 assist organisations to be responsive, ensuring they are able to minimise any unintended health  
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26 395 consequences due to WFH.  
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32 397 **ACKNOWLEDGEMENTS**  
33

34 398 We would like to thank the questionnaire and focus group participants for taking the time to share  
35  
36 399 their WFH experience.  
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41 401 **COMPETING INTERESTS**  
42

43 402 None declared.  
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50 405 This work was supported by Medibank and Optus, grant number [N/A].  
51

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54 407 **DATA AVAILABILITY STATEMENT**  
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57 408 Data are available on reasonable request. The La Trobe University Human Ethics Committee imposes  
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59 409 restrictions on the data.  
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5 411 **AUTHOR CONTRIBUTIONS**6  
7 412 JO & NK coordinated recruitment of participants. KL conducted statistical analysis and all authors8  
9 413 analysed data. JO and NK drafted the first version of the article with input from MG, RS, KL and VW.10  
11 414 All authors agreed to the final version prior to submission.12  
13 41514  
15 416 **REFERENCES**16  
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# BMJ Open

## Working from home in Australia during the COVID-19 pandemic: Cross-sectional results from the Employees Working From Home (EWFH) study.

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3 1 **Working from home in Australia during the COVID-19 pandemic: Cross-sectional results from the**  
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5 2 **Employees Working From Home (EWFH) study.**  
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3 20 **ABSTRACT**  
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5 21 **Objectives:** To investigate the impacts, on mental and physical health, of a mandatory shift to  
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7 22 working from home during the COVID-19 pandemic.  
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10 23 **Design:** Cross sectional, online survey.  
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12 24 **Setting:** Online survey was conducted from September 2020 – November 2020 in the general  
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14 25 population.  
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16 26 **Participants:** Australian residents working from home for at least two days a week at some time in  
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18 27 2020 during the COVID-19 pandemic.  
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20 28 **Main outcome measures:** demographics, caring responsibilities, working from home arrangements,  
21  
22 29 work-related technology, work–family interface, psychosocial and physical working conditions, and  
23  
24 30 reported stress and musculoskeletal pain.  
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26

27 31 **Results:** 924 Australians responded to the online questionnaire. Respondents were mostly women  
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29 32 (75.5%) based in Victoria (83.7%) and employed in the education and training and healthcare  
30  
31 33 sectors. Approximately 70% of respondents worked five or more days from home, with only 60%  
32  
33 34 having a dedicated workstation in an uninterrupted space. Over 70% of all respondents reported  
34  
35 35 experiencing musculoskeletal pain or discomfort. Gendered differences were observed; men  
36  
37 36 reported higher levels of family to work conflict ( $3.16 \pm 1.52$  to  $2.94 \pm 1.59$ ,  $p=0.031$ ), and lower  
38  
39 37 levels of recognition for their work ( $3.75 \pm 1.03$  to  $3.96 \pm 1.06$ ,  $p= 0.004$ ), compared to women. For  
40  
41 38 women, stress ( $2.94 \pm 0.92$  to  $2.66 \pm 0.88$ ,  $p<0.001$ ) and neck/shoulder pain ( $4.50 \pm 2.90$  to  $3.51 \pm$   
42  
43 39  $2.84$ ,  $p<.001$ ) were higher than men and they also reported more concerns about their job security  
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45 40 than men ( $3.01 \pm 1.33$  to  $2.78 \pm 1.40$ ,  $p=0.043$ ).  
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48 41 **Conclusions:** Preliminary evidence from the current study suggests that working from home may  
49  
50 42 impact employees' physical and mental health, and that this impact is likely to be gendered.  
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52 43 Although further analysis is required, this data provides insights into further research opportunities  
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54 44 needed to assist employers in optimising working from home conditions and reduce the potential  
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56 45 negative physical and mental health impacts on their employees.  
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3 **46 Article Summary:**  
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5 **47 *Strengths and limitations of this study***  
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- 7  
8 • A key strength of the study is the use of a range of validated measurement tools to examine  
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10 49 the environmental exposures for workers whilst working from home during the COVID-19  
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12 50 pandemic.  
13  
14 51 • The baseline data was collected during a period of sustained lockdown in one of the states  
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16 52 (Victoria) which provides unique insights into the experiences of people working from home  
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18 53 under those conditions.  
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20 54 • The population sample has a higher proportion of respondents based in Victoria, the  
21  
22 55 southern state of mainland Australia which experienced the longest period of lockdown in  
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24 56 the world so the impacts on this group are likely to differ from those elsewhere in Australia  
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26 57 and beyond.  
27  
28 58 • The use of a convenience sample is a limitation and recruitment of females was higher than  
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30 59 males; however, this is consistent with emerging research in COVID-19 studies  
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37 61 Key words: COVID 19, mental health, risk management  
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41 **63 INTRODUCTION**  
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43  
44 64 The current global pandemic caused by COVID-19 has resulted in an unprecedented situation with  
45  
46 65 wide ranging health <sup>1</sup> and economic impacts <sup>2,3</sup> which differ markedly by gender <sup>4,5</sup>. The unexpected  
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48 66 and rapid global impact necessitated immediate actions and a key public health measure has been  
49  
50 67 the shift to employees' working from home (WFH) where possible <sup>6</sup>. Whilst WFH is often offered to  
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52 68 employees as a flexible work benefit to improve the integration between work and other life  
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54 69 activities, it is less commonly undertaken in a full-time capacity or mandatory capacity <sup>7,8</sup>. In  
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57 70 response to the public health restrictions to reduce the transmission of COVID-19, organisations  
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3 71 rapidly transitioned to WFH without a clear understanding of the impact of ongoing WFH on mental  
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5 72 and physical health <sup>9</sup>.

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10 74 In March 2020, Australians experienced their first lockdown due to COVID 19. All people who were  
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12 75 able to work from home were required to do so. By May, many restrictions were lifted, but the  
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14 76 requirement to maintain WFH, where possible, was retained. Since then, lockdowns have been  
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16 77 ongoing, particularly for residents of Victoria. WFH will continue to be an important part of the  
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18 78 COVID 19 mitigation strategy and, as such, it is important that policies and procedures to support  
19  
20 79 sustainable practices are utilised. This will require data from impacted populations to ensure these  
21  
22 80 meet the needs of employers and employees to optimise working conditions. Prior to the pandemic,  
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24 81 data suggests that approximately one-third of the Australian working population were undertaking  
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26 82 some hours of work from home<sup>10</sup>. In comparison, during the pandemic (June 2021) 57% of employed  
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28 83 people in Victoria were working from home more than once a week<sup>11</sup>, suggesting that working from  
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30 84 home was a new experience for many people, and for most it was not through choice, but  
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32 85 mandated.  
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39 87 A recent rapid review identified WFH as a complex occupational health issue, necessitating  
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41 88 organisations utilise a systems-based approach, taking into account the organisational, job and  
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43 89 individual aspects of work <sup>12</sup>. This approach is a distinct departure from more conventional  
44  
45 90 workplace assessment strategies which commonly focus on the physical aspects of a person's work  
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47 91 and fail to address the psychosocial conditions. The review identified a need for policies to be  
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49 92 implemented around work-home boundary management, role clarification, clear performance  
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51 93 indicators, appropriate technical support, facilitation of co-worker networking, and training for  
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53 94 managers. There appears to be a high likelihood that WFH will remain a central aspect of future  
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55 95 working conditions well beyond the current COVID 19 pandemic <sup>13</sup>; as such, the overarching  
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57 96 objective of the Employees Working from Home (EWFH) study was to explore the relationships  
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3 97 between a broad range of workplace characteristics and the impact on employees' health and  
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5 98 wellbeing.  
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10 100 More specifically, workplace conditions—physical and psychosocial—have been associated with a  
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12 101 range of negative health outcomes which include musculoskeletal and stress-related mental health  
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14 102 disorders<sup>12 14 15</sup>. Employers are required to undertake activities to support the protection of all  
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16 103 workers and reduce injury risk; early identification of adverse working conditions, regardless of  
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18 104 where the work is being undertaken, will enable targeted strategies to address potential risks<sup>16 17</sup>.  
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21 105 Such workplace assessment activities are traditionally undertaken by occupational health  
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23 106 professionals, ergonomists or health and safety representatives at the organisation, but the rapid  
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25 107 shift to working from home meant that many of the usual work environment assessments were  
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27 108 bypassed in order to comply with governmental public health responses<sup>9</sup>.  
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32 110 Working from home can have positive and negative impacts on the work–family interface; where  
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34 111 the traditional boundary settings between work and home are challenged<sup>18 19</sup>; with potential for  
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36 112 increased role conflict<sup>20</sup> or spill over between the two domains. One example of negative spill over  
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38 113 includes work–family conflict (WFC), in which conflict arises when the general demands of, time  
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40 114 devoted to, and strain caused by the job interfere with family (non-work) life<sup>21</sup>. High levels of WFC  
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42 115 are associated with negative impacts on physical and mental health, low job satisfaction, and  
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44 116 heightened intentions to leave the workplace<sup>22-24</sup>. In the other direction, family–work conflict (FWC)  
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46 117 arises when the general demands of, time devoted to, and strain created by the family interfere with  
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48 118 performing work-related responsibilities<sup>21</sup>. As such, the multiple role transitions required when WFH  
49  
50 119 may reduce WFC but may increase FWC<sup>19 20</sup> and impact employee productivity. Boundary theory<sup>25</sup>,  
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52 120 which underpins much of the–work family interface research area, proposes that individuals  
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54 121 maintain psychological, physical and/or behavioural boundaries around their different life roles,  
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56 122 such as their work and home roles. However, the COVID 19 pandemic has raised challenges with  
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3 123 boundary management due to mandated WFH for prolonged periods of time. The rapid change to  
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5 124 WFH during the COVID 19 pandemic required transitions for employees, to support the greater  
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7 125 public health need, without careful consideration of boundary setting. Prior to the current  
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10 126 pandemic, research identified that employees WFH adjust their approach to managing the work–  
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12 127 family interface depending on the number of days they are based at home <sup>7</sup>.  
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14 128 A further impact of the pandemic was the increased burden of care-related duties, due to school and  
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16 129 childcare centre closures. Whilst evidence suggests that men increased their role in care-related  
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18 130 duties, women continued to take on a disproportionate share of the unpaid work<sup>26 27</sup>. Prior to the  
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20 131 pandemic, women also assumed a greater role in household duties but without the additional  
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22 132 burden of WFH and balancing these often-competing demands<sup>28</sup>. Already, data suggests negative  
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24 133 impacts of the pandemic on women’s working lives at far greater levels than their male  
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26 134 counterparts<sup>29 30</sup>, along with greater dissatisfaction of the balance between paid and unpaid work.  
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32 136 The overall objectives of the EWFH study itself are to examine 1) The impacts of psychosocial and  
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34 137 physical hazards, related to WFH, on mental and physical health, and 2) To investigate differences in  
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36 138 health outcomes between employees and identify patterns of gendered differences. The aim of this  
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38 139 paper is to describe the measures used, the characteristics of the sample population engaged in  
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40 140 the EWFH study, and the baseline survey results to identify relationships for further  
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42 141 investigation. The cross-sectional data provides the baseline for a longitudinal study.  
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## 143 **METHOD**

### 144 **Study design**

145 The EWFH study utilised a sequential mixed methods approach which included 1) a cross sectional  
146 study (survey) and 2) a descriptive qualitative study (focus groups) <sup>31</sup>. The purpose of the cross-  
147 sectional study was to explore the physical and psychosocial impacts of WFH. Using focus groups,

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3 148 the descriptive qualitative study aimed to provide a more nuanced and in depth understanding of  
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5 149 WFH based on the findings from the cross-sectional study.  
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### 151 **Study population**

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12 152 A convenience sample of participants from across Australia was recruited. Eligible participants were  
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14 153 recruited through an advertisement distributed via the Facebook paid service. In addition, the  
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16 154 advertisement was circulated through professional and personal networks of the research team,  
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18 155 LinkedIn, and the La Trobe University Facebook page. The advertisement directed people to an  
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20 156 online questionnaire that contained screening questions to determine eligibility and only eligible  
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22 157 respondents were able to proceed and complete the questionnaire. The following inclusion criteria  
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24 158 were used to determine eligibility: being 18 years of age or older, working from home at least 2 days  
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26 159 per week during the period following declaration of the COVID-19 pandemic in Australia, currently  
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28 160 living in Australia. Recruitment of questionnaire respondents occurred from September – November  
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30 161 2020. Respondents were offered the opportunity to go into a prize draw to win a gift voucher, if they  
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32 162 completed the questionnaire.  
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39 164 At the completion of the anonymous questionnaire, participants were invited to indicate their  
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41 165 interest in being part of a focus group and if they were willing to undertake a follow up  
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43 166 questionnaire six months post baseline. If responding “yes”, they were required to provide some  
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45 167 identifiable data (i.e., email address or phone contact) so they could be contacted. Interested  
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47 168 participants were emailed a booking link to register for a focus group. Upon registration, participants  
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49 169 were sent a zoom link for the focus group. When the focus group had reached the maximum  
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51 170 number of registrations (each focus group had a maximum of six participants), any additional  
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53 171 interested participants were automatically placed on a waiting list. All focus group participants were  
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55 172 provided with a gift voucher to compensate for their time commitment.  
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3 173 **Ethics statement**  
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6 174 Ethics approval was obtained through La Trobe University Human Ethics Research Committee,  
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8 175 approval number HEC20388. All study participants were provided with written information about  
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10 176 the study. All participants provided informed consent prior to participation.  
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14 177 **Patient and public involvement**  
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16 178 Participants were not involved in the design or implementation of this study.  
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18 179 **Data collection**

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21 180 **Survey**  
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23 181 The online questionnaire was developed using internationally validated tools where possible.  
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25 182 Demographic data, including age, gender, nature of employment, the general experience of working  
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27 183 from home, satisfaction with the division of caring and/or household duties, patterns of WFH and  
28  
29 184 the provision and comfort of workstation equipment along with location of work, was collected.  
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31 185 Other questionnaire constructs included: sedentary behaviour, wellbeing and general health WFC,  
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33 186 FWC, work-related psychosocial hazards, job satisfaction, musculoskeletal discomfort/pain, and the  
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35 187 use of work-related technology.  
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41 189 *Work hours* were calculated based on the item “When you are (or were) working at home during the  
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43 190 COVID-19 pandemic, what are / were your usual working hours (average per week)?” Answers of or  
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45 191 above 35 hours per week were considered full-time.  
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50 193 *Division of household/caring roles* was asked as “How satisfied are you with the way household tasks  
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52 194 are divided between you and others in your household?” and How satisfied are you with the way  
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54 195 childcare and/or caring duties are divided between you and others in your household? This item was  
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56 196 scored on a five-point Likert scale ranging from very dissatisfied (1) to very satisfied (5)<sup>32</sup>.  
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59 197 *Patterns of WFH* were determined by taking respondents answer to “Before the start of the COVID-  
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3 198 19 pandemic, how many days per week did you usually work from home?" – with allowed responses  
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5 199 from 0 to 5 days – from their answer to "When you are working from home during the COVID-19  
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7 200 pandemic, how many days per week do you usually work from home?" - with allowed responses  
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10 201 from 2 to 5 days.

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14 203 *Workstation location* was addressed through the following "When you are working at home, where  
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16 204 do you usually work?". Three response options were offered: Wherever - "I just find a place  
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18 205 somewhere that's free, such as on the kitchen table or other place"; Separate – "I have my own  
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20 206 place in a separate room by myself"; and Interruptions – "I have my own place but in a room that  
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22 207 can be busy with other people".

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27 209 *Workstation comfort* was assessed through the question, "How comfortable is your home  
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29 210 workstation (where you usually work at home) compared to your usual workstation before the  
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31 211 COVID- 19 pandemic", with 5 response categories from much less comfortable to much more  
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33 212 comfortable.

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38 214 *Technology and equipment* was measured through the provision of a list of equipment, laptop,  
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40 215 desktop, phone/tablet and other with yes/no responses. A question asked about the use of a  
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42 216 separate mouse/keyboard with a laptop, response categories were "yes, both a keyboard and  
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44 217 mouse". " yes, a mouse but not a keyboard", "yes, a keyboard but not a mouse", "no". A question  
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46 218 asked, "do you use a separate screen with your laptop, with yes/no response.

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51 220 *Sedentary behaviour* was measured using the Occupational Sitting and Physical Activity  
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53 221 Questionnaire<sup>33</sup> to obtain subjective measures of time spent on various types of activities, i.e.,  
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55 222 sitting, standing, walking and physically demanding work.

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3 223 *Wellbeing and general health* were measured using items from the Copenhagen Psychosocial  
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5 224 Questionnaire (COPSOQ)<sup>34</sup>. Wellbeing was measured with 13 Items scored on a five-point Likert  
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7 225 scale ranging from *not at all* (1) to *all the time* (5). An example item was “how often have you felt  
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9 226 worn out?”. General health was measured with a single item (“*in general, would you say your health*  
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11 227 *is?*”) and scored on five-point scale ranging from *poor* (1) to *excellent* (5).  
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16 229 *Work–family conflict and family-work conflict* were measured using the 10-item scale developed by  
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18 230 Netemeyer and colleagues<sup>21</sup>. Items were scored using a seven-point scale ranging from *strongly*  
19  
20 231 *disagree* (1) to *strongly agree* (7). An example item for work–family conflict was “*the demands of my*  
21  
22 232 *work interfere with my home and family life*”. An example item for family–work conflict was “*I have*  
23  
24 233 *to put off doing things at work because of demands on my time at home*”.  
25  
26  
27

28 234  
29  
30 235 *Psychosocial hazards* were measured using 33 items drawn primarily from COPSOQ<sup>34</sup>. Quantitative  
31  
32 236 demands, influence at work, sense of community at work, social support from supervisor, and social  
33  
34 237 support from colleagues were scored on a five-point scale ranging from *never/hardly ever* (1) to  
35  
36 238 *always* (5). An example item was “*I get behind in my work*”. Predictability, role clarity, role conflicts,  
37  
38 239 quality of leadership, recognition, organisation justice, insecurity over employment, insecurity over  
39  
40 240 working conditions, and vertical trust were scored on a five-point scale ranging from *to a very small*  
41  
42 241 *extent* (1) to *a very large extent* (5). An example item was “*work is distributed fairly*”.  
43  
44  
45

46 242  
47  
48 243 Overall *job satisfaction* was measured using a single item from COPSOQ (“*how pleased are you with*  
49  
50 244 *your job overall, everything taken into consideration?*”) that was scored on a five-point Likert scale  
51  
52 245 from *very unsatisfied* (1) to *very satisfied* (5).  
53  
54

55 246  
56  
57 247 Eight items compared work-related factors whilst working from home during the COVID-19  
58  
59 248 pandemic with work before the pandemic. An example item was “*I can get help and feedback from*  
60

1  
2  
3 249 *my work colleagues, if needed*". These items were scored on a five-point scale from *much less than*  
4  
5 250 *before* (1) to *much more than before* (5).

6  
7 251

8  
9 252 *Musculoskeletal discomfort/pain* frequency and severity ratings were recorded separately for five  
10  
11 253 body regions (neck/shoulders, hands/fingers, arms, middle to lower back, and hips/bottom/legs and  
12  
13 254 feet) using a measure with evidence of validity in a number of different industry sectors<sup>35</sup>. Response  
14  
15 255 options for pain/discomfort frequency ranged from *never* (1) to *almost always* (5). Severity, if  
16  
17 256 applicable, was scored using a three-point scale from *mild* (1) to *severe* (3).

18  
19 257

20  
21 258 *Technology support and productivity* were measured using a scale developed specifically for this  
22  
23 259 study. Examples of items to measure technology support and productivity respectively were "*I can*  
24  
25 260 *get good help and support from work if I have technology (hardware or software) problems*" and  
26  
27 261 "*the software I use when working at home enables me to work effectively*". Technology complexity  
28  
29 262 was measured using two items based on the Technostress Creators Scale<sup>36</sup>. Items were scored on a  
30  
31 263 five-point scale from *strongly disagree* (1) to *strongly agree* (5). Questions were asked about the  
32  
33 264 provision of hardware and software, sample question is, "Which of the following hardware has your  
34  
35 265 employer provided for you to use at home", with a list and responses to tick all that apply, including  
36  
37 266 an option for other.

38  
39 267

### 40 268 **Focus groups**

41  
42 269 Seven focus groups were scheduled with participants, based on the following characteristics:  
43  
44 270 managers (2 groups), women with dependent children at home (1 group), those living alone (1  
45  
46 271 group), residents of Western Australia & Queensland states (1 group), and general population (but  
47  
48 272 excluding managers; 2 groups). Residents of Western Australia and Queensland states were  
49  
50 273 excluded from other focus groups, and grouped together in a separate group, as they had a very  
51  
52 274 different experience of the COVID pandemic compared to the rest of the Australian states. Due to  
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3 275 the widespread geographic distribution of participants, and the COVID-19 pandemic, focus groups  
4  
5 276 were held online using the Zoom meeting platform.  
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8 277

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10 278 **Data analysis**

11  
12 279 **Survey**

13  
14 280 COPSOQ variables were combined into domains per COPSOQ III guidelines<sup>34</sup>. Cronbach's alpha was  
15  
16 281 computed for these domains as well as WFC and FWC, except when the score was derived from two  
17  
18 282 items; Spearman-Brown providing a better estimate of reliability in such cases. To adequately  
19  
20 283 describe the respondents of the EWFH survey, all valid responses were used. Variable sample sizes  
21  
22 284 between items are therefore expected. Sample size or frequency are presented.  
23  
24

25 285 Comparisons between respondents who self-identified as male and those who self-identified as  
26  
27 286 female, depending on the type of variable, were conducted using Chi-squared analysis or the Mann-  
28  
29 287 Whitney test of difference. Analysis was carried out in R version 4.0.3.  
30  
31

32 288

33 289

34  
35 290 **Focus Groups**

36  
37 291 A schedule of questions was developed using data from the survey and a recent review undertaken  
38  
39 292 by the research team<sup>12</sup> which covered the following: workplace support (e.g., 'how supportive are  
40  
41 293 your supervisor(s) and/or co-workers?'), performance indicators (e.g., 'did your job role change?'),  
42  
43 294 technical support (e.g., 'how was the technical support that you received?'), future (e.g., 'what  
44  
45 295 would be your ideal work arrangements?'). Focus groups were recorded, and all recordings were  
46  
47 296 transcribed. Transcriptions were analysed using an inductive thematic analysis approach. All authors  
48  
49 297 independently analysed three transcripts to identify coding categories, then convened to develop  
50  
51 298 the coding categories into a broader framework which was used to code the remaining four  
52  
53 299 transcripts. Themes were then constructed from the coding framework. Results from the focus  
54  
55 300 groups will be reported elsewhere.  
56  
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301

302 **RESULTS**

303 In total, 964 questionnaire responses were received, of which 83.7% of respondents resided in  
 304 Victoria (Table 1). The majority of respondents were female (n = 728, 75.5%) with 230 male and six  
 305 respondents who identified as 'other'. Women participants were slightly younger than the males  
 306 and disproportionately worked in the 'Education and Training' field.

307 **Table 1: Description of the population**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Age</b>				0.004
18-35 years	209 (26.49%)	40 (21.28%)	165 (27.73%)	
36-55 years	450 (57.03%)	103 (54.79%)	346 (58.15%)	
56 years and over	130 (16.48%)	45 (23.94%)	84 (14.12%)	
<b>State</b>				0.712
Victoria	807 (83.71%)	190 (82.61%)	611 (83.93%)	
Other	157 (16.29%)	40 (17.39%)	117 (16.07%)	
<b>Industry</b>				<0.001
Education and Training	321 (33.30%)	66 (28.70%)	254 (34.89%)	
Financial and Insurance Services	49 (5.08%)	10 (4.35%)	39 (5.36%)	
Healthcare & Social Assistance	138 (14.32%)	18 (7.83%)	119 (16.35%)	
Information, Media & Telecommunications	45 (4.67%)	16 (6.96%)	29 (3.98%)	
Professional, Scientific, and Technical Services	207 (21.47%)	51 (22.17%)	154 (21.15%)	
Public Administration and Safety	98 (10.17%)	28 (12.17%)	70 (9.62%)	
Transport, Postal & Warehousing	32 (3.32%)	11 (4.78%)	20 (2.75%)	
Other	74 (7.68%)	30 (13.04%)	43 (5.91%)	
<b>Sector</b>				0.0783
Public sector	524 (54.36%)	118 (51.30%)	403 (55.36%)	
Private sector	288 (29.88%)	80 (34.78%)	207 (28.43%)	
Not for profit sector	119 (12.34%)	21 (9.13%)	96 (13.19%)	
Self employed	33 (3.42%)	11 (4.78%)	22 (3.02%)	
<b>Role</b>				*
Manager	157 (16.29%)	47 (20.43%)	109 (14.97%)	
Professional	587 (60.89%)	154 (66.96%)	429 (58.93%)	
Clerical or Administrative Workers	198 (20.54%)	21 (9.13%)	176 (24.18%)	
Community and Personal Service Worker	10 (1.04%)	1 (0.43%)	9 (1.24%)	
Sales Worker	9 (0.93%)	4 (1.74%)	5 (0.69%)	
Technician, Trade, Machinery Operators & Drivers	3 (0.31%)	3 (1.30%)	0 (0.00%)	
<b>Business Size</b>				0.996
Sole Trader	29 (3.01%)	7 (3.04%)	22 (3.02%)	
Small Business	74 (7.68%)	18 (7.83%)	55 (7.55%)	
Medium business	95 (9.85%)	22 (9.57%)	73 (10.03%)	
Large business	766 (79.46%)	183 (79.57%)	578 (79.40%)	
<b>Domestic Arrangements</b>				0.402
Single person household	123 (12.76%)	24 (10.43%)	99 (13.60%)	
Adults only	418 (43.36%)	99 (43.04%)	315 (43.27%)	
Dependents	423 (43.88%)	107 (46.52%)	314 (43.13%)	
<b>Number of Children</b>				0.579
None	622 (64.52%)	140 (60.87%)	476 (65.38%)	
1	119 (12.34%)	29 (12.61%)	90 (12.36%)	
2	181 (18.78%)	50 (21.74%)	131 (17.99%)	

3 or more	42 (4.36%)	11 (4.78%)	31 (4.26%)	
<b>Child's Life stage<sup>b</sup></b>				
Pre-school	94 (27.49%)	35 (38.89%)	59 (23.41%)	<0.001
Grades Prep-2	90 (26.32%)	20 (22.22%)	70 (27.78%)	<0.001
Grades 3-6	111 (32.46%)	35 (38.89%)	76 (30.16%)	<0.001
Grades 7-10	104 (30.41%)	31 (34.44%)	73 (28.97%)	<0.001
Grades 11-12	56 (16.37%)	14 (15.56%)	42 (16.67%)	<0.001

**Satisfaction with division of household responsibilities**

Household Tasks	962; 4.03 ± 1.38	229; 4.18 ± 1.21	727; 3.98 ± 1.43	0.119 <sup>†</sup>
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a. Chi-squared or (†)Mann-Whitney test of difference between male and female. \*Chi-square not presented due to small expected values.

b. Multiple answer: percentages may not equal 100%

Almost all respondents worked from home for an increased number of days during the COVID-19 pandemic (Table 2). Approximately 70% of the population worked five or more days from home, with only 60.3% having a dedicated workstation in a private room without interruptions. A disproportionate number of women worked in spaces with frequent interruptions ( $\chi^2 = 13.19$ ;  $p=0.001$ ).

**Table 2: Work situation**

	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Number of days worked from home during COVID-19</b>				0.002
2 days	52 (5.51%)	10 (4.48%)	41 (5.73%)	
3 days	98 (10.38%)	13 (5.83%)	85 (11.89%)	
4 days	118 (12.50%)	18 (8.07%)	99 (13.85%)	
5 or more	676 (71.61%)	182 (81.61%)	490 (68.53%)	
<b>Change in days WFH pre to during pandemic</b>				*
Decreased	6 (0.64%)	1 (0.45%)	5 (0.70%)	
Stayed the Same	61 (6.46%)	10 (4.48%)	51 (7.13%)	
Increased	877 (92.90%)	212 (95.07%)	659 (92.17%)	
Mean change	944; 3.82 ± 1.53	223; 4.02 ± 1.44	715; 3.76 ± 1.56	0.010
<b>Months worked from home</b>	944; 6.34 ± 1.65	223; 6.58 ± 1.69	715; 6.26 ± 1.64	0.006 <sup>†</sup>
<b>Average hours worked</b>				*
Full time	684 (71.62%)	190 (83.70%)	491 (68.01%)	
26-34 hrs	137 (14.35%)	20 (8.81%)	115 (15.93%)	
21-25 hrs	74 (7.75%)	9 (3.96%)	65 (9.00%)	
15-20 hrs	45 (4.71%)	6 (2.64%)	38 (5.26%)	
14 hrs or less	15 (1.57%)	2 (0.88%)	13 (1.80%)	
<b>WFH Preferred Days</b>				0.094
None	47 (5.96%)	6 (3.19%)	40 (6.72%)	
1	75 (9.51%)	25 (13.30%)	50 (8.40%)	
2	227 (28.77%)	50 (26.60%)	176 (29.58%)	
3	239 (30.29%)	57 (30.32%)	179 (30.08%)	
4	91 (11.53%)	18 (9.57%)	72 (12.10%)	
Every day	110 (13.94%)	32 (17.02%)	78 (13.11%)	
<b>Workstation Location</b>				0.001
Work Wherever	139 (14.74%)	28 (12.56%)	111 (15.55%)	
Separate Room	569 (60.34%)	157 (70.40%)	408 (57.14%)	
Separate Room w/ interruptions	235 (24.92%)	38 (17.04%)	195 (27.31%)	

<b>Workstation Comfort (compared to pre-pandemic)</b>				0.186
Decreased	486 (51.54%)	100 (44.84%)	382 (53.50%)	
Stayed the Same	284 (30.12%)	79 (35.43%)	204 (28.57%)	
Increased	173 (18.35%)	44 (19.73%)	128 (17.93%)	
<b>Typical work from home</b>				
Sitting (% of time)	77.60 ± 24.80	77.36 ± 22.99	77.72 ± 25.28	0.168†
Standing (% of time)	10.01 ± 13.73	9.85 ± 11.37	9.96 ± 14.06	0.302†
Walking (% of time)	6.88 ± 7.80	7.63 ± 7.29	6.67 ± 7.97	0.037†
Heavy Labour (% of time)	0.43 ± 3.57	0.37 ± 1.65	0.45 ± 4.00	0.224†
<b>Technology</b>				
Technology support	794; 3.85 ± 0.82	190; 3.79 ± 0.82	598; 3.88 ± 0.81	0.130†
Productivity	791; 4.23 ± 0.83	188; 4.15 ± 0.77	597; 4.26 ± 0.85	0.009†
Technology complexity	789; 2.49 ± 1.02	188; 2.50 ± 1.01	595; 2.50 ± 1.02	0.955†
<b>Job Satisfaction</b>				0.010
Very Unsatisfied	23 (2.83%)	11 (5.64%)	12 (1.96%)	
Unsatisfied	68 (8.35%)	14 (7.18%)	53 (8.65%)	
Neither	126 (15.48%)	25 (12.82%)	101 (16.48%)	
Satisfied	394 (48.40%)	106 (54.36%)	284 (46.33%)	
Very Satisfied	203 (24.94%)	39 (20.00%)	163 (26.59%)	
Mean (sd)	814; 3.84 ± 0.98	195; 3.76 ± 1.03	613; 3.87 ± 0.97	0.273†

318 a. Chi-squared or (+)Mann-Whitney test of difference between male and female.

319 Workstation technology was generally supplied by the employer; however, a substantial number of  
 320 respondents reported providing their own separate keyboard (30.1%) and screen (35.4%; Table 3).  
 321 The use of sit/stand desks was rare with just 5.4% of respondents reporting the use of these at  
 322 home. Almost all respondents were provided with the necessary software to perform their work by  
 323 their employer.

324 **Table 3: Workstation Technology**

<b>Workstation Technology</b>	<b>Employer provided (n=793)</b>	<b>Employee provided (n=793)</b>
Laptop	570 (71.88%)	177 (22.32%)
Desktop	109 (13.75%)	97 (12.23%)
Separate keyboard	334 (42.12%)	239 (30.14%)
Mouse	406 (51.20%)	315 (39.72%)
Phone	208 (26.23%)	339 (42.75%)
Tablet	63 (7.94%)	119 (15.01%)
Separate screen	287 (36.19%)	281 (35.44%)
Desk (including sit/stand)	10 (1.26%)	33 (4.16%)
Chair	25 (3.15%)	17 (2.14%)
Headset	11 (1.39%)	13 (1.64%)
Printer	7 (0.88%)	17 (2.14%)
Other	16 (2.02%)	26 (3.28%)

325  
 326 Males reported experiencing higher levels of FWC and lower levels of job recognition than females.  
 327 Females reported higher levels of job insecurity (Table 4) than males. Most respondents reported  
 328 their health as 'good' or 'very good' (Table 5). On all measures of stress (burnout, general stress,



329 somatic and cognitive) females were more negatively impacted than males. Over 70% of  
 330 respondents reported experiencing some form of pain or discomfort towards the end of their  
 331 working day. However, females reported higher levels of neck/shoulder and lower limb (hips,  
 332 bottom, legs, or feet) pain than males.

333 **Table 4: Psychosocial work environment**

	Cronbach alpha	All (n = 964)	Male (n = 230)	Female (n = 728)	p-value <sup>a</sup>
<b>Work–Family/Family– Work Conflict (max score = 7)</b>					
WFC	0.954	871; 3.69 ± 1.66	208; 3.69 ± 1.57	657; 3.69 ± 1.70	0.964+
FWC	0.952	869; 2.99 ± 1.57	208; 3.16 ± 1.52	655; 2.94 ± 1.59	0.031+
<b>COPSOQ (max score = 5)</b>					
Quantitative Demands	0.824	860; 2.49 ± 0.83	207; 2.54 ± 0.88	647; 2.48 ± 0.82	0.413+
Influence at work	0.863	859; 3.15 ± 0.93	207; 3.23 ± 0.87	646; 3.13 ± 0.96	0.137+
Predictability	0.804 <sup>b</sup>	834; 3.29 ± 0.94	201; 3.37 ± 0.89	627; 3.26 ± 0.96	0.171+
Recognition	0.881 <sup>b</sup>	791; 3.91 ± 1.05	189; 3.75 ± 1.03	596; 3.96 ± 1.06	<b>0.004+</b>
Role Clarity	0.905	834; 3.78 ± 0.85	201; 3.76 ± 0.80	627; 3.78 ± 0.87	0.494+
Role Conflict	0.725 <sup>b</sup>	834; 2.49 ± 1.00	201; 2.58 ± 0.95	627; 2.46 ± 1.01	0.076+
Quality of Leadership	0.864 <sup>b</sup>	719; 3.45 ± 1.17	174; 3.36 ± 1.15	540; 3.49 ± 1.17	0.149+
Social Support from Supervisor	0.914 <sup>b</sup>	814; 4.11 ± 1.06	191; 4.06 ± 1.08	617; 4.13 ± 1.06	0.321+
Social Support from Colleagues	0.895 <sup>b</sup>	825; 4.19 ± 0.90	196; 4.15 ± 0.81	624; 4.20 ± 0.93	0.106+
Sense of Community at Work	0.803 <sup>b</sup>	831; 4.06 ± 0.86	200; 4.00 ± 0.89	625; 4.08 ± 0.85	0.220+
Job Insecurity	0.829 <sup>b</sup>	736; 2.96 ± 1.34	177; 2.78 ± 1.40	553; 3.01 ± 1.33	<b>0.043+</b>
Insecurity over Working Conditions	0.683 <sup>b</sup>	616; 2.09 ± 1.13	148; 2.01 ± 0.98	464; 2.12 ± 1.17	0.708+
Vertical trust	0.899	779; 3.63 ± 1.02	182; 3.58 ± 1.03	591; 3.65 ± 1.02	0.447+
Organizational Justice	0.738 <sup>b</sup>	617; 3.49 ± 0.94	153; 3.40 ± 0.94	459; 3.52 ± 0.94	0.180+

334 a. Chi-squared or (+)Mann-Whitney test of difference between male and female. <sup>b</sup> Two item scale,  
 335 Spearman-Brown reported instead of Cronbach's alpha.

336

337 **Table 5: Health and wellbeing**

	All	Male	Female	p-value <sup>a</sup>
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	(n = 964)	(n = 230)	(n = 728)	
<b>Self-Perceived Health</b>				0.275
Poor	29 (3.24%)	7 (3.32%)	22 (3.24%)	
Fair	200 (22.32%)	42 (19.91%)	155 (22.83%)	
Good	358 (39.96%)	95 (45.02%)	262 (38.59%)	
Very good	237 (26.45%)	56 (26.54%)	179 (26.36%)	
Excellent	72 (8.04%)	11 (5.21%)	61 (8.98%)	
Mean (SD)	896; 3.14 ± 0.96	211; 3.10 ± 0.89	679; 3.15 ± 0.98	0.655†
<b>Stress (max score = 5)</b>				
Burnout	900; 3.13 ± 0.89	212; 2.85 ± 0.85	682; 3.21 ± 0.89	<0.001†
Stress	899; 2.87 ± 0.92	212; 2.66 ± 0.88	681; 2.94 ± 0.92	<0.001†
Somatic Stress	900; 1.98 ± 0.81	212; 1.68 ± 0.72	682; 2.07 ± 0.82	<0.001†
Cognitive Stress	900; 2.61 ± 0.90	212; 2.38 ± 0.81	682; 2.67 ± 0.91	<0.001†
<b>Pain and Discomfort (range 1-12)</b>				
Neck or Shoulders	553; 4.34 ± 2.92	99; 3.51 ± 2.84	448; 4.50 ± 2.90	<0.001†
Hands or Fingers	318; 2.59 ± 2.30	53; 2.55 ± 2.13	262; 2.60 ± 2.35	0.737†
Arms	254; 2.28 ± 2.10	47; 2.00 ± 1.69	202; 2.35 ± 2.20	0.241†
Middle to Lower Back	521; 3.81 ± 2.97	99; 3.70 ± 2.92	417; 3.83 ± 2.96	0.600†
Hips, Bottom, Legs, or Feet	432; 3.41 ± 2.83	75; 2.80 ± 2.42	352; 3.54 ± 2.90	0.027†

338 a. Chi-squared or (†)Mann-Whitney test of difference between male and female.

339 All respondents who identified their gender as 'other' were younger professionals with low levels of  
 340 WFC. However, these six individuals reported low levels of social support from their supervisor and  
 341 colleagues and had a below average sense of community at work. None reported their health as  
 342 'excellent', and all reported pain and discomfort in their neck or shoulders towards the end of their  
 343 working day (data not included in tables due to low numbers).

## 345 DISCUSSION

346 The overall aim of this paper was to describe the EWFH study and baseline characteristics of the  
 347 study population. The COVID-19 pandemic resulted in a rapid transition to working from home to  
 348 suppress virus transmission. This EWFH study will provide insights into the experiences and health  
 349 impacts on participants who were working from home during the pandemic, and their experience of  
 350 work during follow up periods. A range of workplace physical and psychosocial exposures were  
 351 measured, along with stress and musculoskeletal pain. From the baseline data, gendered differences  
 352 were identified in relation to several factors including FWC, job recognition and job insecurity, stress  
 353 and musculoskeletal pain; these will be explored in greater detail in this paper.

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3 355 Males reported higher levels of FWC than females. At the time of this phase of data collection, the  
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5 356 country was in various stages of lockdown with schools and childcare centres closed in some areas  
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7 357 (Victoria). Therefore, many people with dependants were WFH while also supervising children.  
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10 358 Whilst this situation is unusual, the dual responsibilities of managing work and childcare are more  
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12 359 commonly undertaken by females <sup>29</sup>, which may shield males from potential conflict between non-  
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14 360 work demands and work activities <sup>37</sup>. In the current study, females were more likely to work part  
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16 361 time compared to the males which may enable greater flexibility for managing the family- to-work  
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18 362 interface, than their male partners <sup>38</sup>. This change in working arrangements may mean that males  
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20 363 are not 'shielded' from the dual responsibilities women have typically undertaken, and are more  
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22 364 exposed to potential conflict between non-work demands and work activities, thus reporting higher  
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24 365 FWC than females.  
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30 367 The lower scores for males compared to females for job recognition are interesting. The unique  
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32 368 situation of WFH during the period of data collection required adaptation to new ways of working. In  
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34 369 many cases, people worked very long hours, sometimes with reduced salary and extra  
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36 370 responsibilities as managers learned how to effectively supervise remote teams with very different  
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38 371 circumstances to their usual modes of operation <sup>39</sup>. These multiple interacting factors may have  
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40 372 influenced males' perceptions of how they were being recognised for their work.  
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45 374 Females reported more concerns about job insecurity in comparison to males. One plausible  
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47 375 explanation is the type of work in which the females in the sample were engaged. A third of the  
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49 376 females in the study were employed in the education and training sector. This sector has been  
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51 377 seriously impacted by the pandemic, with high numbers of job losses in the University sector as a  
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53 378 result of border closures which have prevented the intake of international students <sup>2</sup> and worldwide  
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55 379 women have experienced more job losses compared to men <sup>40</sup>.  
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3 381 In addition, stress and musculoskeletal pain were significantly higher for females in comparison to  
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5 382 males. A range of possible explanations exist. Previous literature on musculoskeletal pain has  
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7 383 reported higher pain levels particularly in females in the neck and shoulder regions, so this finding is  
8  
9 384 not surprising <sup>41</sup>. In the current situation, more females reported not having a dedicated workstation  
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11 385 and so were using whatever location was available to them, a practice likely to be associated with  
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13 386 increased pain. An emerging body of work relating to the impact of COVID-19 on females supports  
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15 387 the unequal workload burden for females <sup>5</sup> and as such, reports of increased stress are not  
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17 388 surprising which is associated with increased musculoskeletal pain <sup>42</sup>.  
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23 390 Future research in the EWFH study will explore many of the relationships outlined in greater detail  
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25 391 and include the results from focus groups. In addition, a second wave of data will be collected in  
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27 392 April/May 2021. The second wave will enable longitudinal analysis of the impacts of the WFH  
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29 393 environment on individuals' physical and mental health. An additional benefit is the second wave of  
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31 394 data collection will enable investigation of individuals' working patterns as the COVID-19 pandemic  
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33 395 situation in Australia stabilises and the national vaccination program is underway.  
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39 397 A key strength of the study is the use of a range of validated measurement tools to examine the  
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41 398 environmental exposures for workers whilst WFH during the COVID-19 pandemic. The baseline data  
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43 399 was collected during a period of sustained lockdown in one of the states (Victoria) of mainland  
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45 400 Australia. Since the collection of this baseline data the capital of this state (Melbourne) has  
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47 401 experienced the longest period of lockdowns in the world. The population sample has a higher  
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49 402 proportion of respondents based in Victoria and this may impact the generalisability of findings to  
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51 403 other Australian states or other populations more broadly but will provide unique insights into the  
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53 404 impact of sustained WFH. Another potential limitation was that recruitment of females was higher  
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55 405 than males; however, this is consistent with emerging research in COVID-19 studies. The analysis  
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3 406 presented in this baseline paper, does not allow for causality to be inferred and a range of  
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5 407 cofounders need to be considered in future longitudinal analysis.  
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10 409 **CONCLUSION**

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12 410 This paper presents a profile of individuals working from home during the COVID-19 pandemic. Little  
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14 411 guidance is available to support employers and employees in creating optimal environments for  
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16 412 working from home in such unusual circumstances. Gendered differences were identified in the  
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18 413 current study which require further scrutiny to ensure that appropriate support can be provided. It is  
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20 414 likely that working from home for at least some of the week will continue for at least the  
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22 415 foreseeable future, as a result of changes to work practices which occurred during the pandemic,  
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24 416 and more recently as individuals and organisations adjust to the new and often uncertain experience  
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26 417 of “COVID-normal”. Therefore, research evidence is required to examine the psychosocial and  
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28 418 physical hazards impacting individuals’ physical and mental health, whilst working from home, to  
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30 419 assist organisations to be responsive, ensuring they are able to minimise any unintended health  
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32 420 consequences due to WFH.  
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39 422 **ACKNOWLEDGEMENTS**

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41 423 We would like to thank the questionnaire and focus group participants for taking the time to share  
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43 424 their WFH experience.  
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48 426 **COMPETING INTERESTS**

49  
50 427 None declared.  
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55  
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3 432 **DATA AVAILABILITY STATEMENT**  
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5 433 Data are available on reasonable request. The La Trobe University Human Ethics Committee imposes  
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7 434 restrictions on the data.  
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12 436 **AUTHOR CONTRIBUTIONS**  
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14 437 JO & NK coordinated recruitment of participants. KL conducted statistical analysis and all authors

15  
16 438 analysed data. JO and NK drafted the first version of the article with input from MG, RS, KL and VW.

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18 439 All authors agreed to the final version prior to submission.  
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**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

Section/Topic	Item #	Recommendation	Reported on page #
<b>Title and abstract</b>	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-10
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	na
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	11
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	11
		(b) Describe any methods used to examine subgroups and interactions	11
		(c) Explain how missing data were addressed	11
		(d) If applicable, describe analytical methods taking account of sampling strategy	11
		(e) Describe any sensitivity analyses	na
<b>Results</b>			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	Na
		(c) Consider use of a flow diagram	na
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	12
		(b) Indicate number of participants with missing data for each variable of interest	15
Outcome data	15*	Report numbers of outcome events or summary measures	15
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	na
		(b) Report category boundaries when continuous variables were categorized	na
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	na
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	18
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).