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Evaluation of a workplace mental health screening tool using cross sectional surveys

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Evaluation of a workplace mental health screening tool using cross sectional surveys

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Psychology, public health, mental health, occupational health practice, health screening

ABSTRACT**Objectives**

The Brief Health Check (BHC) is a health screener used by the Get Healthy at Work program, which identifies workers with chronic disease risk and provides them with advice and referrals to support services. The BHC was revised to include mental health to provide a holistic approach to workplace health. This study aimed to evaluate the acceptability and appropriateness of the revised BHC by comparing the results around psychological distress and future risk with previous research, and a participant feedback survey

Method

Data collection took place between October 2018 and May 2019. The study used data that were collected as part of program delivery, as well as a participant feedback survey that was administered after the health check was completed.

Results

BHCs were completed by n = 912 workers, out of which, n = 238 completed the feedback survey. The mean Distress Questionnaire 5 score was 10.5, and 10% of participants met the threshold for 'high' future risk. The feedback survey revealed that the majority of participants found the mental health advice to be useful, agreed with their mental health distress and risk ratings, and intended on using the referred services.

Conclusion

The findings around mental health risk were comparable to previous findings in employed samples. The inclusion of mental health assessments, advice and referral pathways into the BHC was found to be acceptable and the subsequent referrals were appropriate, indicating that this approach could be scaled up and implemented to help address worker's mental ill-health

25 **Strengths and Limitations of the Study**

- 26 • The study used cross sectional surveys to compare the results around mental health risk with
27 previous studies, as well as explore participant feedback about the revised health check.
- 28 • This is the first health screener in Australia to include both current psychological distress and
29 future mental health risk
- 30 • The study did not employ a longitudinal design, and future research could follow up with
31 employees to assess the impact of the health check
- 32 • The study did not ask about demographics in the participant feedback survey, so it is uncertain
33 how the participant feedback survey sample compared to the larger sample which completed the
34 BHCs.

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2
3 41 Mental health issues are very prevalent in the Australian population, with one in five adults (aged 18-
4 42 85) having experienced mental disorders within the last 12 months, and 45.5% of the total population
5 43 having experienced a mental disorder at some point in their lifetime (1). Mental health issues in the
6 44 working population can be costly to employers in terms of lost productivity and turnover, as well as to
7 45 society at large in the form of health service use, where \$9.9 billion was spent on mental health
8 46 related services in Australia from 2017-18 (2–5). For individual workers, mental health issues can
9 47 impact negatively on workplace engagement as well as overall quality of life (6,7). In recent years,
10 48 governing bodies in Australia have implemented strategies to facilitate the promotion of mental
11 49 wellbeing in the workplace (8,9). One of the channels through which this strategy is implemented is
12 50 through existing workplace health programs, which have significant reach in the working population
13 51 and present opportunities for promoting mental wellbeing (e.g., the Mentally Healthy Workplaces
14 52 program from SafeWork NSW) (10).

15 53 Workplace health programs are health promotion and protection strategies implemented in the
16 54 workplace (11), with the goal of establishing organisational cultures that promote and provide healthy
17 55 lifestyle choices. Systematic reviews of such programs have found positive impacts on the health and
18 56 wellbeing of workers as well as the productivity of the organisation (12–14). In New South Wales
19 57 (NSW), the Get Healthy at Work program was launched in 2014, along with a Brief Health Check
20 58 (BHC) with the aim of reducing type 2 (T2) diabetes and cardiovascular disease risk amongst
21 59 workers. The supports workplaces to create health promoting structures and processes, along with a
22 60 Brief Health Check (BHC) designed to help individual workers to reduce their lifestyle risk factors
23 61 (i.e., waist circumference, diet, physical activity, and smoking). The BHC identifies workers with
24 62 high type 2 diabetes and cardiovascular risk, refers them to external support services, and offers
25 63 personalised advice (15).

26 64 In late 2018, the Get Healthy at Work program sought to include mental health into the BHC to
27 65 provide a holistic assessment for employee health and wellbeing. The BHC was expanded to include
28 66 mental health assessments, referral pathways to mental health support services, as well as personalised
29 67 mental health advice. Similar to the development of the original BHC (16), the development of the
30 68 mental health items followed a translational formative evaluation process (17), which began with

1
2
3 69 synthesising the evidence, consulting with practitioners/academics, as well as stakeholders. From this
4
5 70 process, program managers decided to use the Distress Questionnaire 5 (DQ5), which is a short
6
7 71 assessment of current psychological distress (18).
8

9
10 72
11 73 The BHC also sought to prevent future incidence of psychological distress in participating workers.
12
13 74 Therefore, the revised BHC includes a risk algorithm developed by Morris and Glozier (an
14
15 75 unpublished internal report) to identify participants who are at risk of experiencing mental health
16
17 76 issues within the next 12 months.

18
19
20 77 Based on advice from the clinical advisory panel, the revised BHC refers participants with high
21
22 78 current distress (according to the DQ5 score) to the MindSpot free online supported mental health
23
24 79 clinic (19), as well as to a general practitioner. Those found to have moderate current distress are
25
26 80 referred to myCompass (20), an online mental health program that is self-guided. Both myCompass
27
28 81 and MindSpot (21,22,23) have demonstrated efficacy in improving mental health outcomes.

29
30 82 Participants with high future risk scores are given advice to help manage their mental wellbeing.

31
32 83 Further, because of the importance of positive lifestyle modification in promoting mental wellbeing
33
34 84 (24–26), the BHC offers personalised advice around how individuals could improve their mental
35
36 85 wellbeing by modifying their lifestyle through improved diet and physical activity.

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38
39 86 Following the translational formative evaluation process (17), the current study aims to evaluate the
40
41 87 revised BHC within workplaces to assess whether it can be scaled up for state-wide delivery and
42
43 88 identify ways in which the tool can be improved. The key implementation research questions to be
44
45 89 examined were: (i) Comparability: How do the findings around current psychological distress and
46
47 90 high mental health risk in the applied setting compare with previous research? (ii) Acceptability: Do
48
49 91 workers find the new mental health questions easy to understand? Do participants agree with the
50
51 92 results they received? Is there any potential harm in using these assessments? Do participants agree
52
53 93 with the risk ratings they received? (iii) Uptake and engagement: What is the uptake of referrals
54
55 94 made? Do participants intend on using the services to which they were referred? Do participants find
56
57 95 the personalised mental health advice useful?

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59
60 **METHOD**

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2
3 97 The study used BHC cross sectional survey data that was collected as part of regular program delivery
4
5 98 to determine the comparability of results and uptake of referral pathways. A cross sectional feedback
6
7 99 survey was administered after completing the BHC. The feedback survey was included to help answer
8
9 100 the research questions around acceptability, uptake of referrals and engagement with advice.

101 **Sample**

102 The revised BHC was first administered within two NSW government organisations that consented to
103 using the revised BHC: the Department of Education, and icare NSW (a government insurance and
104 workers compensation unit). Data collection for the current study ran from October 2017 to May
105 2018. The worksites for both organisations were in metro and regional/rural areas. Each participating
106 organisation promoted the BHC at each worksite, and participants who completed the BHC were
107 asked to complete the feedback survey immediately after completing the BHC. The participant
108 feedback survey was administered at worksites that allowed the participant feedback survey to be
109 administered (i.e., 13 of the 35 worksites that were involved in the pilot). The study made use of all
110 BHC data that was collected during the study period, as well as all participants who consented to
111 provide feedback via the survey. The BHC sample was large enough to detect small effect sizes
112 (Cohens's $d = .2$ at 80% power) when comparing samples on the DQ5.

113 **Participant involvement**

114 Participants were not involved in the design, conduct, reporting or dissemination for this project.

115 **Measures**

116 **DQ5**

117 The DQ5 has greater sensitivity than other widely used measures (i.e., Kessler 6 and 10) for
118 identifying individuals currently at risk for specific anxiety disorders. The development of the DQ
119 was described in detail in the paper by Batterham et al. (18). The BHC uses the cut-points defined by
120 Batterham et al. (18) to classify participants into different levels of current distress. That is,
121 participants with DQ5 scores equal to or greater than 11 were identified as having 'moderate' current
122 distress, where a participant is likely to meet the criteria for a wide range of disorders, and those with
123 DQ5 scores equal to or greater than 14 were identified as having 'high' current distress, where a

1
2
3 124 participant is likely to meet the criteria for specific disorders with a lower rate of false positives
4
5 125 compared to participants who are classified as having 'moderate' distress.
6
7 126 Future risk tool
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9 127 The future risk tool used in the BHC was adapted from Fernandez et al. (27) by Morris and Glozier,
10
11 128 which is the first mental health risk algorithm to be created for the working population in Australia.
12
13 129 Fernandez et al. (27) outline a process for developing a future risk tool. For future risk scores, the
14
15 130 revised BHC uses thresholds defined by Morris and Glozier, in which participants who exceed the
16
17 131 algorithm's threshold for high risk are expected to have a 28% chance of experiencing psychological
18
19 132 distress in the next 12 months. Participants who exceed the threshold for moderate risk are expected to
20
21 133 have a 22% chance of experiencing psychological distress in the next 12 months.
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23
24
25

26 135 **Analysis**

- 27
28 136 i) Comparability: The results around current distress and prevalence of future risk categories in
29
30 137 the BHC were compared to previous research. The BHC sample was weighted for age and
31
32 138 gender before the results were compared to previous data, which examined findings at the
33
34 139 population level. The weight values were based on the 2016 Australian Census filtered for
35
36 140 individuals who were employed (28). A two-sample t-test was used to compare the mean
37
38 141 DQ5 score from the current study with the results from Batterham et al. (18), and the
39
40 142 prevalence of future risk was compared to the models that informed the development of the
41
42 143 future risk tool by descriptive statistics.
43
44 144 ii) Acceptability: The feedback survey asked participants whether the questions were difficult to
45
46 145 understand, and whether participants felt uncomfortable about answering any of the mental
47
48 146 health questions. Both were examined using 'Yes/No' questions followed by open-ended
49
50 147 questions to identify the items that were difficult or made participants feel uncomfortable.
51
52 148 These questions aimed to assess any potential issues with comprehension and harm associated
53
54 149 with the revised BHC.
55
56 150 iii) Uptake and engagement: The uptake of the referred services was recorded in the BHC
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58 151 questionnaire, where participants have 'accepted' referrals if they agreed to be referred during
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3 152 the BHC session by the health professional, or indicated that they will register for the service
4
5 153 after the BHC. Referral outcomes were stratified by current help seeking behaviour (i.e.,
6
7 154 whether participants are currently seeing a mental health professional), as well as
8
9 155 demographic characteristics to assess the rate of uptake in those who are not receiving help,
10
11 156 and a range of population groups. Uptake of the referred services was also examined through
12
13 157 the participant feedback survey, which asked participants whether they intend on using the
14
15 158 service to which they were referred in the BHC (examined using multiple choice
16
17 159 'Yes/No/Intend to use at a later time'). The feedback survey also asked participants whether
18
19 160 they found the mental health advice useful on a five-point scale. The authors do not have
20
21 161 visibility of the number of participants who access their referred service after the BHCs were
22
23 162 conducted.

24
25
26 163 Participants who did not complete the DQ5 or future risk questionnaires were excluded from the
27
28 164 analyses. Participants who did not answer a question in the feedback survey were removed from the
29
30 165 analysis of that question.

31 166 **Brief Health Check**

32
33
34 167 The revised BHC was administered face-to-face within participating worksites by trained health
35
36 168 professionals, such as accredited dietitians or exercise physiologists. Participants completed a
37
38 169 questionnaire related to diet, physical activity, demographic characteristics, and physical and mental
39
40 170 health risk profiles, distress (DQ5), and health related behaviours. The BHC questionnaires were
41
42 171 completed on paper (n = 198) or equivalent digital forms (n = 714). Once the risk scores were
43
44 172 calculated, the health practitioners provided feedback about the risk scores, and provided appropriate
45
46 173 referrals and advice depending on the risk profile of the participant. Health professionals then
47
48 174 recorded whether participants accepted referrals. A single BHC session took around 20 minutes to
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50 175 complete.

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54 177 **Participant feedback survey**

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57 178 Between one to three interviewers were present at each of the 13 worksites participating in the
58
59 179 feedback survey. Once participants completed the BHC, they were asked to participate in a survey

1
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3 180 administered by the trained interviewers, who were blinded to the results from the BHC. The surveys
4
5 181 included seven questions that were administered verbally and responses were collected on paper
6
7 182 forms. The survey took no longer than 10 minutes to complete. The questions were a combination of
8
9 183 closed and open-ended responses that were developed for this study. The open-ended responses about
10
11 184 difficulties understanding questions and feeling uncomfortable about answering questions were
12
13 185 analysed by two co-authors (JX and VM) using closed-coding to identify the specific BHC questions
14
15 186 referenced in participant feedback. Open-ended responses around participant feedback, agreement
16
17 187 with current distress and future risk ratings, and intention to use services were analysed using open
18
19 188 coding. The authors coded the responses independently, and then met to reach a consensus on the
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21 189 assignment of the codes.
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191 **Ethics**

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28 192 Ethical approval for the analysis of routine program data and participant feedback was obtained from
29
30 193 South Western Sydney Local Health District Human Ethics Committee (Ref: ETH12061). The ethics
31
32 194 approval covered the routine analysis of program data (BHCs) and the participant feedback survey,
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34 195 for which verbal consent was obtained from participants.
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197 **RESULTS**

198 **Profile of worksites**

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43 199 A total of 35 worksites participated in the study and 13 worksites allowed participant feedback
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45 200 surveys to be administered. The total number of completed BHCs was $n = 912$, and a total of $n = 238$
46
47 201 participants completed the feedback survey. The authors did not have visibility of the number of
48
49 202 employees within each organisation that were invited to complete the BHC. Based on an estimate of
50
51 203 the number of employees across the worksites ($n = 7,200$), and the assumption that all employees at
52
53 204 each worksite were invited, a conservative estimate of the response rate for the BHC (with $n = 912$
54
55 205 completes) is 12.7%. A breakdown of completed BHCs, number of surveys within organisations and
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57 206 the location of the worksite is presented in Table 1. The urban/rural/remoteness of the worksite was
58
59 207 based on postcode, using the Accessibility and Remoteness Index of Australia (29).
60

208

[TABLE 1 ABOUT HERE]

210 **Comparability**

211 The characteristics of participants, including the current distress results and prevalence of future risk
212 categories are presented in Table 2. Two participants did not complete the DQ5 and were excluded
213 from the analyses. Future risk scores were only calculated for participants who did not have a high
214 level of current distress (i.e., those with DQ5 scores < 14). In the current study, the weighted mean
215 DQ5 score was 10.5 (SD = 4.2). This was significantly higher than the weighted mean scores from the
216 study by Batterham et al (18) (mean DQ5 score = 9.28, SD = 4.08), via an independent samples t-test:
217 $t(4083) = 7.8, p < .001$, and the difference was small in terms of effect size (Cohen's $d = 0.29$). For
218 the prevalence of future risk in the weighted sample, 9.6% of participants met the threshold to be in
219 the 'high' future risk category, in which 28% of participants are expected to experience psychological
220 distress within 12 months. This is consistent with the population proportion that was expected to meet
221 this threshold according to the future risk algorithm (10% or 90th percentile).

222

[TABLE 2 ABOUT HERE]

224

225 **Acceptability**

226 Mental health questions

227 The participant feedback survey revealed that 17.2% (n = 41) of respondents found the mental health
228 questions difficult to understand. Participants reported that they found one (13.4%, n = 32) or two
229 (2.5%, n = 6) questions difficult, and the remainder reported that their difficulties were due to general
230 comprehension or recall (1.2%, n = 3). The responses were back-coded to identify the specific
231 questions that were difficult to understand, which showed that 10.9% (n = 26) of participants found
232 the future risk questions to be difficult, and 6.7% (n = 16) of participants found the DQ5 questions to
233 be difficult. Of the participants who found the future risk questions to be difficult, themes emerged
234 regarding whether the question around 'satisfaction with your health' referred to mental or physical
235 health, and whether the question 'Have you had mental health problems in the past 2 years' referred to

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3 236 mental health issues that were diagnosed or included all mental health problems. Most of the
4
5 237 participants who had trouble understanding the DQ5, linked their difficulties to the question ‘I found
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7 238 social settings upsetting’ and whether ‘social settings’ referred to all social settings or just those in the
8
9 239 workplace. Many participants who had trouble with DQ5 or the future risk questions also reported
10
11 240 that the health professionals conducting the BHC offered useful prompts which helped them answer
12
13 241 these questions. A small proportion (7.6%, n = 18) reported that they felt uncomfortable about
14
15 242 answering one or more of the mental health questions. When probed further about the specific
16
17 243 questions they had concerns about, most of these participants indicated that they felt uncomfortable
18
19 244 about talking about mental health in general (n = 12, 5%), while 1.3% (n = 3) linked their response to
20
21 245 the DQ5, and 2.1% (n = 5) linked their response to the future risk questions.
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23
24 246

26 247 Agreement with risk ratings

28 248 From the participant feedback surveys, only 5.9% (n = 14) of participants disagreed with their current
29
30 249 distress scores, and 8.0% (n = 19) disagreed with their future risk scores. Of the participants who
31
32 250 disagreed with their either their current or future mental health risk, there was a mix of those who
33
34 251 expected their scores to be higher (current: n = 1, 0.4%; future: n = 3, 1.3%) or lower (current: n = 4,
35
36 252 1.7%; future: n = 7, n = 2.9%) than what they received. For those who disagreed with their current
37
38 253 distress or future risk scores, some participants did not disagree with the rating per se but expressed
39
40 254 scepticism that the questions could provide an accurate assessment of their mental health state or
41
42 255 predict their future risk: *“Assessing risk for the future seems unrealistic - impossible to know what
43
44 256 will happen in the future. Not sure how the assessment/questions work”*.
45
46
47 257

49 258 **Uptake and engagement**

51 259 Uptake of referrals

53 260 The breakdown of participants who accepted referrals during the BHC session are presented in Table
54
55 261 3. Questions around whether participants were currently seeing a mental health professional were
56
57 262 introduced later in the pilot, and so the sample size for Table 3 is smaller than the total number of
58
59 263 completed BHCs. Of participants who had high current distress and were not currently receiving

1
2
3 264 support from a mental health professional, the majority (n = 95, 68.3%) accepted referrals to
4
5 265 MindSpot, and most participants accepted referrals to their GP for mental health support (n = 86,
6
7 266 61.9%). Referral outcomes were further examined by age, gender, and cultural background to assess
8
9 267 whether referral rates differ across population groups. For participants with high current distress, there
10
11 268 were no significant differences between any demographic groups in accepting referrals to MindSpot
12
13 269 or their GP (using χ^2 tests; p 's > .05). Females (n = 97, 65.1%) were significantly more likely than
14
15 270 males (n = 33, 49.3%) to accept a referral to myCompass ($\chi^2 = 4.2, p = .04$).
16
17 271 Based on the participant feedback surveys, the majority of participants indicated that they intended to
18
19 272 access the mental health services to which they were referred (myCompass n = 62, 76.5%; MindSpot
20
21 273 n = 31, 72.1%; n = 21, GP 72%). Some participants who indicated that they did not plan on accessing
22
23 274 MindSpot or myCompass suggested that they would prefer face-to-face mental health support: "*No,*
24
25 275 *not likely to go online...I would rather see someone face-to-face*". However, a number of participants
26
27 276 suggested that they might use these services in the future: "*I don't think I need [MindSpot] right now,*
28
29 277 *but it is good to know about it if I need to access it later*".
30
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34

35 279 [TABLE 3 ABOUT HERE]
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39 281 Advice

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41 282 Out of the participants who received mental health advice during the BHC, most reported that the
42
43 283 advice they received was useful (n = 89, 76.1% reported that the advice was 'Very useful'/'Fairly
44
45 284 useful'; n = 26, 22.2% reported that the advice was 'A little useful'/'Not useful at all'; and n = 2,
46
47 285 1.7% indicated that they 'Don't know'). When asked to provide further feedback about the advice
48
49 286 they received, some participants suggested that the advice helped them learn more about their mental
50
51 287 wellbeing: "*I knew much of the information on physical health, but mental health was all new to me.*
52
53 288 *Surprised about the links between physical health and mental health...I didn't previously ever even*
54
55 289 *consider my mental health*". Participants who suggested that the advice confirmed what they already
56
57 290 know, saw this as a useful instance of reinforcing their understanding of healthy lifestyle behaviours:
58
59 291 "*[I] already know about own mental and physical states, but was good to get confirmation and*
60

1
2
3 292 *reminder*". Participants who felt that the advice was 'A little useful' / 'Not useful' indicated that the
4
5 293 advice was not specific enough: "I am [already] conscious of my physical and mental health, the
6
7 294 *check-up was very broad*".
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9 295

11 296 **DISCUSSION**

13 297 The findings from the current study suggests that the revised BHC is appropriate for assessing both
14
15 298 current and future mental health risk in the workplace context. The mean DQ5 score from the current
16
17 299 study is higher than that from Batterham et al., which is consistent with previous research.

18
19 300 Specifically, Jarman et al. (30) compared the psychological distress from a general population with
20
21 301 the findings from an employee wellbeing survey among public servants in Tasmania. The authors
22
23 302 found that the mean psychological distress (using the Kessler 10) scores from public service workers
24
25 303 was higher than the general population, and suggested that the differences could be attributed to
26
27 304 workplace specific stressors such as the rationalisation of the workforce, job insecurity, and effort-
28
29 305 reward imbalance (31,32). The lower levels of wellbeing amongst public sector employees has also
30
31 306 been found in other jurisdictions (33) The prevalence of high future mental health risk is comparable
32
33 307 with the models that informed the development of the future risk tool, which used the same measures
34
35 308 in a State-wide sample across many different occupational groups. While different occupational
36
37 309 groups commonly report very different levels of mental ill-health (34), the similarity in risk-
38
39 310 prevalence between this study and earlier work suggests that there are common drivers of mental ill-
40
41 311 health risk across industries (e.g., prior ill health, discrimination).

42
43 312 The majority of those who were not receiving mental health support at the time of the BHC accepted
44
45 313 referrals to mental health support services (i.e., MindSpot, mental health GP referrals, and
46
47 314 myCompass) based on their risk scores. There were no differences in the demographic characteristics
48
49 315 of participants with high current distress that accepted referrals compared to those who did not accept
50
51 316 referrals. The findings from the participant survey suggest that only a small number of participants
52
53 317 felt uncomfortable about answering the mental health questions, and most participants agreed with
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55 318 their mental health risk scores. Participants mostly reported that the advice that was offered as part of
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3 319 the BHC was useful and that they intended on using the mental health services to which they were
4
5 320 referred. Overall, these results suggest that the revised BHC is suitable for use amongst workers.
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7 321
8
9 322 The participant feedback survey revealed that around one out of five participants found the mental
10
11 323 health questions difficult to understand, which would require the BHC to be refined to facilitate
12
13 324 understanding. The findings from the survey also highlighted ways in which comprehension could be
14
15 325 improved. Specifically, confusion around the DQ5 question 'I found social settings upsetting', and
16
17 326 around whether the future risk question for whether participants have had 'mental health problems in
18
19 327 the past two years' could be addressed by providing participants with suitable prompts. For the future
20
21 328 risk question around 'satisfaction with health', prompts could be offered to clarify that health refers to
22
23 329 both mental and physical health, or re-order the question to a location where the participant would not
24
25 330 be biased toward interpreting the question as referring to either physical or mental health.
26
27 331 For participants who reported that they prefer a more comprehensive health check or were sceptical
28
29 332 that their future mental health risk can be accurately determined from a small number of questions,
30
31 333 their experience could be improved by setting more realistic expectations about the program. That is,
32
33 334 the BHC should be introduced as a concise screener tool used to identify participants who are 'at risk'
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35 335 and refer them to clinical support services, as opposed to a definitive diagnostic test, consistent with
36
37 336 the messaging from other online assessment tools such as the Black Dog Institute's Online Clinic
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39 337 assessment (35). The information about how future risk is calculated (i.e., a combination of physical
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41 338 and mental health questions, modifiable and non-modifiable factors) as well as noting that the future
42
43 339 risk score is based on existing research, will help assure participants who are sceptical about the
44
45 340 validity of the assessments.
46
47 341 The BHC could be implemented as an online assessment (e.g., with automated scoring, advice, and
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49 342 referrals), which presents an opportunity to scale the program and extend the reach to a larger number
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51 343 of organisations and remote locations. Future research could explore whether participants would find
52
53 344 an online BHC to be as useful as a face-to-face version, given that the participants have responded
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55 345 positively to the personalised advice delivered by health professionals. A limitation of the current
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57 346 study is that the current study did not collect demographic information in the participant feedback
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3 347 survey, so the sample from the feedback survey cannot be compared to the BHC sample.
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5 348 Additionally, the current study does not provide any insight into the long-term benefits of the
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7 349 program. Future research can also use the BHC to track the health of workers longitudinally and
8
9 350 examine the relative impacts of the workplace health program on the health outcomes of workers. The
10
11 351 current research suggests that the revised BHC with mental health assessments, referral pathways and
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13 352 advice are acceptable and suitable for the workplace setting, but also highlights ways in which the
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15 353 revised BHC could be improved. To our knowledge, the revised BHC is the first mental health
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17 354 assessment that tests for both current and future mental health risk in the workplace.
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Table 1. Breakdown of Brief Health Checks and surveys by organisation

Organisation Name	Number of worksites	Participants	
		Brief Health Checks n = 912 (%)	Feedback surveys n = 238 (%)
Department of Education			
Major Cities	13	363 (39.8%)	124 (52.1%)
Regional/remote	16	264 (28.9%)	51 (21.4%)
icare NSW			
Major Cities	6	285 (31.3%)	63 (26.5%)
TOTAL Major Cities	19	648 (71.1%)	187 (78.6%)
TOTAL Regional/remote	16	264 (28.9%)	51 (21.4%)
TOTAL	35	912	238

Table 2. Characteristics of participants who completed Brief Health Checks (N = 912)

	Unweighted N (%)	Weighted N (%)
Age group ^C		
18-34 years	256 (28.1%)	326.9 (35.8%)
35-39 years	148 (16.2%)	101.2 (11.1%)
40-44 years	115 (12.6%)	104.1 (11.4%)
45-54 years	238 (26.1%)	200.9 (22.0%)
55-64 years	142 (15.6%)	139.8 (15.3%)
65 years or over	13 (1.4%)	39.1 (4.3%)
Gender		
Male	253 (27.7%)	480.2 (52.7%)
Female	659 (72.3%)	431.8 (47.3%)
Current Distress Categories ^A		
High	208 (22.9%)	188.3 (20.7%)
Moderate	216 (23.7%)	228.0 (25.0%)
Low	486 (53.4%)	494.0 (54.3%)
Future Risk Categories ^B		
High	77 (11.0%)	69.3 (9.6%)
Moderate	143 (20.3%)	140.7 (19.4%)
Low	482 (68.7%)	513.7 (71.0%)

^A n = 2 participants did not complete the DQ5 questions

^B Future risk scores were only calculated for participants who did not have high current distress (DQ5), n = 702

^C Age data was collected using the categories below. These groupings are used by the BHC to determine type 2 diabetes risk which is not a focus of the current study

Table 3. Brief Health Checks referral outcomes for mental health

Referrals from Brief Health Checks	Accept/ Self-referral	Declined/ Not referred
MindSpot		
Currently seeing a mental health professional (n = 41)	23 (56.1%)	18 (43.9%)
Not currently seeing a mental health professional (n = 139)	95 (68.3%)	44 (31.7%)
Mental Health GP referral		
Currently seeing a mental health professional (n = 41)	21 (51.2%)	20 (48.8%)
Not currently seeing a mental health professional (n = 139)	86 (61.9%)	53 (38.1%)
myCompass		
Currently seeing a mental health professional (n = 17)	14 (82.4%)	3 (17.6%)
Not currently seeing a mental health professional (n = 149)	95 (63.8%)	54 (36.2%)

The question around whether participants were currently seeking support were introduced later in the pilot. For this table, the base for high current distress n = 180; and the base for moderate risk n = 166

Contributors

JX drafted the manuscript and conducted data analyses. JX and VM conducted qualitative analyses on the survey responses. All authors contributed to revising the manuscript.

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Conflict of Interest Statement

The authors do not have any conflict of interest.

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Data Sharing Statement

Data are available from the corresponding author upon request

Patient and Public Involvement statement

Participants and public were not involved in the design, conduct, reporting or dissemination plans of this research.

Line and page numbers refer to the main document (not tracked)

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract Page 1, line 1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found Page 2
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported Page 4-5, line 41 – 95
Objectives	3	State specific objectives, including any prespecified hypotheses Page 5; line 86-95
Methods		
Study design	4	Present key elements of study design early in the paper Page 6 line 97 METHOD section
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection Page 6; line 101
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants Page 6; 109 (Participants who complete the BHC were eligible for the feedback survey)
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable Page 6; line 115-133
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 Page 6-7; line 116-133 (for psychological risk measures) Page 7; 135- 162 (for outcomes of interest)
Bias	9	Describe any efforts to address potential sources of bias Page 7; line 137 (Data were weighed to population proportions to account for bias in the sample) Page 9; line 180 (Interviewers who administered the feedback surveys were blind to the results of the BHC)
Study size	10	Explain how the study size was arrived at The study used secondary data that was collected as part of regular program delivery. Sample power is explained on Page 6; line 112
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why The handling of measures was described on Page 6-7; line 117 - 133 (Measures section)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding The analysis section also describes how certain variables were analysed/grouped Page 7; line 135 onwards (Analysis section)

Line and page numbers refer to the main document (not tracked)

		(b) Describe any methods used to examine subgroups and interactions Page 8 line 153; Included examination of sub-groups based on help seeking behaviours
		(c) Explain how missing data were addressed Page 8 line 163
		(d) If applicable, describe analytical methods taking account of sampling strategy Page 7; line 137 data were weighted
		(e) Describe any sensitivity analyses No sensitivity analyses were included
Results		
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 Number of participants described in Table 1 (Page 19)
		(b) Give reasons for non-participation at each stage Page 6; line 107-111; The study did not have stages. Non-participation in the participant feedback survey was described.
		(c) Consider use of a flow diagram A flow diagram was not used
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders Participants were described in Table 1 and 2 (Page 19)
		(b) Indicate number of participants with missing data for each variable of interest Page 19. Table 2 (Footnote)
Outcome data	15*	Report numbers of outcome events or summary measures Page 19; Table 2 and Page 20; Table 3
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 Page 10; line 210-221. The study accounted for sampling bias using weighting. Unweighted data is presented in Table 2.
		(b) Report category boundaries when continuous variables were categorized Page 7 line 115-133, Described in Method section
		(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 Page 9-13
Discussion		
Key results	18	Summarise key results with reference to study objectives Page 13 297. For measures. Page 13 312. For participant feedback
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 Page 14, line 345-349
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence

Line and page numbers refer to the main document (not tracked)

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3 **Page 15 line 350.**
4 Generalisability 21 Discuss the generalisability (external validity) of the study results
5 **Page 13 line 297**

6 **Other information**

7 Funding 22 Give the source of funding and the role of the funders for the present study and, if
8 applicable, for the original study on which the present article is based
9 **Page 21**

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12 *Give information separately for exposed and unexposed groups.

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15 **Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and
16 published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely
17 available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at
18 <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is
19 available at www.strobe-statement.org.
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Evaluation of a mental health screening tool using cross sectional surveys in a workplace setting

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Evaluation of a mental health screening tool using cross sectional surveys in a workplace setting

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Psychology, public health, mental health, occupational health practice, health screening

ABSTRACT**Objectives**

The Brief Health Check (BHC) is a health screener used by the Get Healthy at Work program, which identifies workers with chronic disease risk and provides them with advice and referrals to support services. The BHC was revised to include mental health to provide a holistic approach to workplace health. This study aimed to evaluate the acceptability and appropriateness of the revised BHC by comparing the results around psychological distress and future risk with previous research, and a participant feedback survey

Method

Data collection took place between October 2018 and May 2019. The study used data that were collected as part of program delivery, as well as a participant feedback survey that was administered after the health check was completed.

Results

BHCs were completed by n = 912 workers, out of which, n = 238 completed the feedback survey. The mean Distress Questionnaire 5 score was 10.5, and 10% of participants met the threshold for 'high' future risk. The feedback survey revealed that the majority of participants found the mental health advice to be useful (76%), agreed with their mental health distress and risk ratings (92-94%), and most intended on using the referred services (62-68%).

Conclusion

The findings around mental health risk were comparable to previous findings in employed samples. The inclusion of mental health assessments, advice and referral pathways into the BHC was found to be acceptable and the subsequent referrals were appropriate, indicating that this approach could be scaled up and implemented to help address worker's mental ill-health

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3 25 **Strengths and Limitations of the Study**
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- 5 26 • The study is the first to use the DQ5, a general population health screener tool, in a working
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7 27 population
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9 28 • This is the first health screener in Australia to include both current psychological distress and
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11 29 future mental health risk
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14 30 • The study did not employ a longitudinal design, and future research could follow up with
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16 31 employees to assess the impact of the health check
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18 32 • The study did not ask about demographics in the participant feedback survey, so it is uncertain
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20 33 how the participant feedback survey sample compared to the larger sample which completed the
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22 34 BHCs.
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3 36 Mental health issues are very prevalent in the Australian population, with one in five adults (aged 18-
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5 37 85) having experienced mental disorders within the last 12 months, and 45.5% of the total population
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7 38 having experienced a mental disorder at some point in their lifetime (1). Mental health issues in the
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9 39 working population can be costly to employers in terms of lost productivity and turnover, as well as to
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11 40 society at large in the form of health service use, where \$9.9 billion was spent on mental health
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13 41 related services in Australia from 2017-18 (2–5). For individual workers, mental health issues can
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15 42 impact negatively on workplace engagement as well as overall quality of life (6,7). In recent years,
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17 43 governing bodies in Australia have implemented strategies to facilitate the promotion of mental
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19 44 wellbeing in the workplace (8,9). One of the channels through which this strategy is implemented is
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21 45 through existing workplace health programs, which have significant reach in the working population
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23 46 and present opportunities for promoting mental wellbeing (e.g., the Mentally Healthy Workplaces
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25 47 program from SafeWork NSW) (10).
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28 48 Workplace health programs are health promotion and protection strategies implemented in the
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30 49 workplace (11), with the goal of establishing organisational cultures that promote and provide healthy
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32 50 lifestyle choices. Systematic reviews of such programs have found positive impacts on the health and
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34 51 wellbeing of workers as well as the productivity of the organisation (12–14). In New South Wales
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36 52 (NSW), the Get Healthy at Work program was launched in 2014, along with a Brief Health Check
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38 53 (BHC) with the aim of reducing type 2 (T2) diabetes and cardiovascular disease risk amongst
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40 54 workers. The supports workplaces to create health promoting structures and processes, along with a
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42 55 Brief Health Check (BHC) designed to help individual workers to reduce their lifestyle risk factors
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44 56 (i.e., waist circumference, diet, physical activity, and smoking). The BHC identifies workers with
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46 57 high type 2 diabetes and cardiovascular risk, refers them to external support services, and offers
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48 58 personalised advice (15).
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51 59 In late 2018, the Get Healthy at Work program sought to include mental health into the BHC to
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53 60 provide a holistic assessment for employee health and wellbeing. The BHC was expanded to include
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55 61 mental health assessments, referral pathways to mental health support services, as well as personalised
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57 62 mental health advice. Similar to the development of the original BHC (16), the development of the
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59 63 mental health items followed a translational formative evaluation process (17), which began with

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3 64 synthesising the evidence, consulting with practitioners/academics, as well as stakeholders. From this
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5 65 process, program managers decided to use the Distress Questionnaire 5 (DQ5), which is a short
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7 66 assessment of current psychological distress (18).

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9 67 The BHC also sought to prevent future incidence of psychological distress in participating workers.
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11 68 Therefore, the revised BHC includes a risk algorithm developed by Morris and Glozier (an
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13 69 unpublished internal report) to identify participants who are at risk of experiencing mental health
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15 70 issues within the next 12 months.

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18 71 Based on advice from the clinical advisory panel, the revised BHC refers participants with high
19
20 72 current distress (according to the DQ5 score) to the MindSpot free online supported mental health
21
22 73 clinic (19), as well as to a general practitioner. Those found to have moderate current distress are
23
24 74 referred to myCompass (20), an online mental health program that is self-guided. Both myCompass
25
26 75 and MindSpot (21,22,23) have demonstrated efficacy in improving mental health outcomes.

27
28 76 Participants with high future risk scores are given advice to help manage their mental wellbeing.

29
30 77 Further, because of the importance of positive lifestyle modification in promoting mental wellbeing
31
32 78 (24–26), the BHC offers personalised advice around how individuals could improve their mental
33
34 79 wellbeing by modifying their lifestyle through improved diet and physical activity.

35
36
37 80 Following the translational formative evaluation process (17), the current study aims to evaluate the
38
39 81 revised BHC within workplaces to assess whether it can be scaled up for state-wide delivery and
40
41 82 identify ways in which the tool can be improved. The key implementation research questions to be
42
43 83 examined were: (i) Comparability: How do the findings around current psychological distress and
44
45 84 high mental health risk in the applied setting compare with previous research? (ii) Acceptability: Do
46
47 85 workers find the new mental health questions easy to understand? Do participants agree with the
48
49 86 results they received? Is there any potential harm in using these assessments? Do participants agree
50
51 87 with the risk ratings they received? (iii) Uptake and engagement: What is the uptake of referrals
52
53 88 made? Do participants intend on using the services to which they were referred? Do participants find
54
55 89 the personalised mental health advice useful?

56
57
58 90 **METHOD**
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60

1
2
3 91 The study used BHC cross sectional survey data that was collected as part of regular program delivery
4
5 92 to determine the comparability of results and uptake of referral pathways. A cross sectional feedback
6
7 93 survey was administered after completing the BHC. The feedback survey was included to help answer
8
9 94 the research questions around acceptability, uptake of referrals and engagement with advice.

95 **Sample**

96 The revised BHC was first administered within two NSW government organisations that consented to
97 using the revised BHC: the Department of Education, and icare NSW (a government insurance and
98 workers compensation unit). Data collection for the current study ran from October 2017 to May
99 2018. The worksites for both organisations were in metro and regional/rural areas. Each participating
100 organisation promoted the BHC at each worksite, and participants who completed the BHC were
101 asked to complete the feedback survey immediately after completing the BHC. The participant
102 feedback survey was administered at worksites that allowed the participant feedback survey to be
103 administered (i.e., 13 of the 35 worksites that were involved in the pilot). The study made use of all
104 BHC data that was collected during the study period, as well as all participants who consented to
105 provide feedback via the survey. The BHC sample was large enough to detect small effect sizes
106 (Cohens's $d = .2$ at 80% power) when comparing samples on the DQ5.

107 **Participant involvement**

108 Participants provided data for the study and were not involved in the design, reporting or
109 dissemination for this project.

110 **Measures**

111 **DQ5**

112 The DQ5 has greater sensitivity than other widely used measures (i.e., Kessler 6 and 10) for
113 identifying individuals currently at risk for specific anxiety disorders. The development of the DQ
114 was described in detail in the paper by Batterham et al. (18). The BHC uses the cut-points defined by
115 Batterham et al. (18) to classify participants into different levels of current distress. That is,
116 participants with DQ5 scores equal to or greater than 11 were identified as having 'moderate' current
117 distress, where a participant is likely to meet the criteria for a wide range of disorders, and those with
118 DQ5 scores equal to or greater than 14 were identified as having 'high' current distress, where a

1
2
3 119 participant is likely to meet the criteria for specific disorders with a lower rate of false positives
4
5 120 compared to participants who are classified as having ‘moderate’ distress.
6
7 121 Future risk tool
8
9 122 The future risk tool used in the BHC was adapted from Fernandez et al. (27) by Morris and Glozier,
10
11 123 which is the first mental health risk algorithm to be created for the working population in Australia.
12
13 124 Morris & Glozier updated the algorithm using 2015 and 2016 data from the Household and Income
14
15 125 Labour Dynamics in Australia survey and obtained a comparable *C*-index (0.71) and positive
16
17 126 predictive value (0.28) in validation¹. The coefficients for the future risk algorithm are presented in
18
19 127 Table 1. For future risk scores, the revised BHC uses thresholds defined by Morris and Glozier, in
20
21 128 which participants who exceed the algorithm’s threshold for high risk are expected to have a 28%
22
23 129 chance of experiencing psychological distress in the next 12 months. Participants who exceed the
24
25 130 threshold for moderate risk are expected to have a 22% chance of experiencing psychological distress
26
27 131 in the next 12 months.

30 132 [TABLE 1 ABOUT HERE]

32 133 Analysis

34
35 134 i) Comparability: The results around current distress and prevalence of future risk categories in
36
37 135 the BHC were compared to previous research. The BHC sample was weighted for age and
38
39 136 gender before the results were compared to previous data, which examined findings at the
40
41 137 population level. The weight values were based on the 2016 Australian Census filtered for
42
43 138 individuals who were employed (28). A two-sample t-test was used to compare the mean
44
45 139 DQ5 score from the current study with the results from Batterham et al. (18), and the
46
47 140 prevalence of future risk was compared to the models that informed the development of the
48
49 141 future risk tool by descriptive statistics.

55
56 ¹ The formula for the future risk algorithm is:

57 $Y_i = -1.288 + (0.03)Age: 35-39 + (-0.167)Age: 40-44 + (-0.04)Age: 45 to 54 + (-0.167)Age: 55 to 54 + (-$
58 $0.207)Age: 65 \& \text{ over} + (0.104)Country \text{ of origin: Asia} + (-0.011)Country \text{ of origin: Middle East/N. Africa} + (-$
59 $0.080)Country \text{ of origin: Other} + (0.032)Aboriginal \text{ or Torres St. Islander} + (-0.085)Sex: male + (0.672)Recent$
60 $mental \text{ illness} + (0.281)Bullied + (-0.068)Health \text{ satisfaction} + (0.151)Loneliness + (0.047)Binge \text{ drink} +$
 $(0.158)Smoker + (0.056)Physically \text{ inactive}$

- 1
2
3 142 ii) Acceptability: The feedback survey asked participants whether the questions were difficult to
4
5 143 understand, and whether participants felt uncomfortable about answering any of the mental
6
7 144 health questions. Both were examined using ‘Yes/No’ questions followed by open-ended
8
9 145 questions to identify the items that were difficult or made participants feel uncomfortable.
10
11 146 These questions aimed to assess any potential issues with comprehension and harm associated
12
13 147 with the revised BHC.
14
15 148 iii) Uptake and engagement: The uptake of the referred services was recorded in the BHC
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17 149 questionnaire, where participants have ‘accepted’ referrals if they agreed to be referred during
18
19 150 the BHC session by the health professional, or indicated that they will register for the service
20
21 151 after the BHC. Referral outcomes were stratified by current help seeking behaviour (i.e.,
22
23 152 whether participants are currently seeing a mental health professional), as well as
24
25 153 demographic characteristics to assess the rate of uptake in those who are not receiving help,
26
27 154 and a range of population groups. Uptake of the referred services was also examined through
28
29 155 the participant feedback survey, which asked participants whether they intend on using the
30
31 156 service to which they were referred in the BHC (examined using multiple choice
32
33 157 ‘Yes/No/Intend to use at a later time’). The feedback survey also asked participants whether
34
35 158 they found the mental health advice useful on a five-point scale. The authors do not have
36
37 159 visibility of the number of participants who access their referred service after the BHCs were
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39 160 conducted.

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43 161 Participants who did not complete the DQ5 or future risk questionnaires were excluded from the
44
45 162 analyses. Participants who did not answer a question in the feedback survey were removed from the
46
47 163 analysis of that question.
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51 165 **Brief Health Check**

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53 166 The revised BHC was administered face-to-face within participating worksites by trained health
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55 167 professionals, such as accredited dietitians or exercise physiologists. Participants completed a
56
57 168 questionnaire related to diet, physical activity, demographic characteristics, and physical and mental
58
59 169 health risk profiles, distress (DQ5), and health related behaviours. The BHC questionnaires were

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2
3 170 completed on paper (n = 198) or equivalent digital forms (n = 714). Once the risk scores were
4
5 171 calculated, the health practitioners provided feedback about the risk scores, and provided appropriate
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7 172 referrals and advice depending on the risk profile of the participant. Health professionals then
8
9 173 recorded whether participants accepted referrals. A single BHC session took around 20 minutes to
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11 174 complete.
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15 176 **Participant feedback survey**

17 177 Between one to three interviewers were present at each of the 13 worksites participating in the
18
19 178 feedback survey. Once participants completed the BHC, they were asked to participate in a survey
20
21 179 administered by the trained interviewers, who were blinded to the results from the BHC. The surveys
22
23 180 included seven questions that were administered verbally and responses were collected on paper
24
25 181 forms. The survey took no longer than 10 minutes to complete. The questions were a combination of
26
27 182 closed and open-ended responses that were developed for this study. The open-ended responses about
28
29 183 difficulties understanding questions and feeling uncomfortable about answering questions were
30
31 184 analysed by two co-authors (JX and VM) using closed-coding to identify the specific BHC questions
32
33 185 referenced in participant feedback. Open-ended responses around participant feedback, agreement
34
35 186 with current distress and future risk ratings, and intention to use services were analysed using open
36
37 187 coding. The authors coded the responses independently, and then met to reach a consensus on the
38
39 188 assignment of the codes.
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43 189

44 190 **Ethics**

45
46 191 Ethical approval for the analysis of routine program data and participant feedback was obtained from
47
48 192 South Western Sydney Local Health District Human Ethics Committee (Ref: ETH12061). The ethics
49
50 193 approval covered the routine analysis of program data (BHCs) and the participant feedback survey,
51
52 194 for which verbal consent was obtained from participants.
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56 195

57 196 **RESULTS**

58 197 **Profile of worksites**

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3 198 A total of 35 worksites participated in the study and 13 worksites allowed participant feedback
4
5 199 surveys to be administered. The total number of completed BHCs was $n = 912$, and a total of $n = 238$
6
7 200 participants completed the feedback survey. The authors did not have visibility of the number of
8
9 201 employees within each organisation that were invited to complete the BHC. Based on an estimate of
10
11 202 the number of employees across the worksites ($n = 7,200$), and the assumption that all employees at
12
13 203 each worksite were invited, a conservative estimate of the response rate for the BHC (with $n = 912$
14
15 204 completes) is 12.7%. A breakdown of completed BHCs, number of surveys within organisations and
16
17 205 the location of the worksite is presented in Table 2. The urban/rural/remoteness of the worksite was
18
19 206 based on postcode, using the Accessibility and Remoteness Index of Australia (29).
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21
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23

24 208 [TABLE 2 ABOUT HERE]

26 209 **Comparability**

28 210 The characteristics of participants, including the current distress results and prevalence of future risk
29
30 211 categories are presented in Table 3. Two participants did not complete the DQ5 and were excluded
31
32 212 from the analyses. Future risk scores were only calculated for participants who did not have a high
33
34 213 level of current distress (i.e., those with DQ5 scores < 14). In the current study, the weighted mean
35
36 214 DQ5 score was 10.5 (SD = 4.2). This was significantly higher than the weighted mean scores from the
37
38 215 study by Batterham et al (18) (mean DQ5 score = 9.28, SD = 4.08), via an independent samples t-test:
39
40 216 $t(4083) = 7.8, p < .001$, and the difference was small in terms of effect size (Cohen's $d = 0.29$). For
41
42 217 the prevalence of future risk in the weighted sample, 9.6% of participants met the threshold to be in
43
44 218 the 'high' future risk category, in which 28% of participants are expected to experience psychological
45
46 219 distress within 12 months. This is consistent with the population proportion that was expected to meet
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48 220 this threshold according to the future risk algorithm (10% or 90th percentile).
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53 222 [TABLE 3 ABOUT HERE]

58 224 **Acceptability**

60 225 Mental health questions

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3 226 The participant feedback survey revealed that 17.2% (n = 41) of respondents found the mental health
4
5 227 questions difficult to understand. Participants reported that they found one (13.4%, n = 32) or two
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7 228 (2.5%, n = 6) questions difficult, and the remainder reported that their difficulties were due to general
8
9 229 comprehension or recall (1.2%, n = 3). The responses were back-coded to identify the specific
10
11 230 questions that were difficult to understand, which showed that 10.9% (n = 26) of participants found
12
13 231 the future risk questions to be difficult, and 6.7% (n = 16) of participants found the DQ5 questions to
14
15 232 be difficult. Of the participants who found the future risk questions to be difficult, themes emerged
16
17 233 regarding whether the question around 'satisfaction with your health' referred to mental or physical
18
19 234 health, and whether the question 'Have you had mental health problems in the past 2 years' referred to
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21 235 mental health issues that were diagnosed or included all mental health problems. Most of the
22
23 236 participants who had trouble understanding the DQ5, linked their difficulties to the question 'I found
24
25 237 social settings upsetting' and whether 'social settings' referred to all social settings or just those in the
26
27 238 workplace. Many participants who had trouble with DQ5 or the future risk questions also reported
28
29 239 that the health professionals conducting the BHC offered useful prompts which helped them answer
30
31 240 these questions. A small proportion (7.6%, n = 18) reported that they felt uncomfortable about
32
33 241 answering one or more of the mental health questions. When probed further about the specific
34
35 242 questions they had concerns about, most of these participants indicated that they felt uncomfortable
36
37 243 about talking about mental health in general (n = 12, 5%), while 1.3% (n = 3) linked their response to
38
39 244 the DQ5, and 2.1% (n = 5) linked their response to the future risk questions.
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45 246 Agreement with risk ratings

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47 247 From the participant feedback surveys, only 5.9% (n = 14) of participants disagreed with their current
48
49 248 distress scores, and 8.0% (n = 19) disagreed with their future risk scores. Of the participants who
50
51 249 disagreed with their either their current or future mental health risk, there was a mix of those who
52
53 250 expected their scores to be higher (current: n = 1, 0.4%; future: n = 3, 1.3%) or lower (current: n = 4,
54
55 251 1.7%; future: n = 7, n = 2.9%) than what they received. For those who disagreed with their current
56
57 252 distress or future risk scores, some participants did not disagree with the rating per se but expressed
58
59 253 scepticism that the questions could provide an accurate assessment of their mental health state or
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1
2
3 254 predict their future risk: *“Assessing risk for the future seems unrealistic - impossible to know what*
4
5 255 *will happen in the future. Not sure how the assessment/questions work”*.

6
7 256

8
9 257 **Uptake and engagement**

10
11 258 Uptake of referrals

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14 259 The breakdown of participants who accepted referrals during the BHC session are presented in Table

15
16 260 4. Questions around whether participants were currently seeing a mental health professional were

17
18 261 introduced later in the pilot, and so the sample size for Table 4 is smaller than the total number of

19
20 262 completed BHCs. Of participants who had high current distress and were not currently receiving

21
22 263 support from a mental health professional (n = 139), the majority (n = 95, 68.3%) accepted referrals to

23
24 264 MindSpot, and most participants accepted referrals to their GP for mental health support (n = 86,

25
26 265 61.9%). Referral outcomes were further examined by age, gender, and cultural background to assess

27
28 266 whether referral rates differ across population groups. For participants with high current distress, there

29
30 267 were no significant differences between any demographic groups in accepting referrals to MindSpot

31
32 268 or their GP (using χ^2 tests; p 's > .05). Females (n = 97, 65.1%) were significantly more likely than

33
34 269 males (n = 33, 49.3%) to accept a referral to myCompass ($\chi^2 = 4.2, p = .04$).

35
36
37 270 Based on the participant feedback surveys, the majority of participants indicated that they intended to

38
39 271 access the mental health services to which they were referred (myCompass n = 62/81, 76.5%;

40
41 272 MindSpot n = 31/43, 72.1%; n = 21/29, GP 72%). Some participants who indicated that they did not

42
43 273 plan on accessing MindSpot or myCompass suggested that they would prefer face-to-face mental

44
45 274 health support: *“No, not likely to go online...I would rather see someone face-to-face”*. However, a

46
47 275 number of participants suggested that they might use these services in the future: *“I don't think I need*

48
49 276 *[MindSpot] right now, but it is good to know about it if I need to access it later”*.

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51 277

52
53 278 [TABLE 4 ABOUT HERE]

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55 279

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57
58 280 Advice

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2
3 281 Out of the participants who received mental health advice during the BHC, most reported that the
4
5 282 advice they received was useful (n = 89, 76.1% reported that the advice was ‘Very useful’/‘Fairly
6
7 283 useful’; n = 26, 22.2% reported that the advice was ‘A little useful’/ ‘Not useful at all’; and n = 2,
8
9 284 1.7% indicated that they ‘Don’t know’). When asked to provide further feedback about the advice
10
11 285 they received, some participants suggested that the advice helped them learn more about their mental
12
13 286 wellbeing: “*I knew much of the information on physical health, but mental health was all new to me.*
14
15 287 *Surprised about the links between physical health and mental health...I didn't previously ever even*
16
17 288 *consider my mental health*”. Participants who suggested that the advice confirmed what they already
18
19 289 know, saw this as a useful instance of reinforcing their understanding of healthy lifestyle behaviours:
20
21 290 “*[I] already know about own mental and physical states, but was good to get confirmation and*
22
23 291 *reminder*”. Participants who felt that the advice was ‘A little useful’/ ‘Not useful’ indicated that the
24
25 292 advice was not specific enough: “*I am [already] conscious of my physical and mental health, the*
26
27 293 *check-up was very broad*”.

294

295 **DISCUSSION**

296 The findings from the current study suggests that the revised BHC is appropriate for assessing both
297 current and future mental health risk in the workplace context. The mean DQ5 score from the current
298 study is higher than that from Batterham et al., which is consistent with previous research.
299 Specifically, Jarman et al. (30) compared the psychological distress from a general population with
300 the findings from an employee wellbeing survey among public servants in Tasmania. The authors
301 found that the mean psychological distress (using the Kessler 10) scores from public service workers
302 was higher than the general population, and suggested that the differences could be attributed to
303 workplace specific stressors such as the rationalisation of the workforce, job insecurity, and effort-
304 reward imbalance (31,32). The lower levels of wellbeing amongst public sector employees has also
305 been found in other jurisdictions (33). A recent study of secondary school teachers in NSW by Parker
306 et al. (34) found a mean DQ5 value (i.e., mean = 11.25, s.d. = 3.8), a similar result to the current
307 study, although this was from a small sample. The prevalence of high future mental health risk is
308 comparable with the models that informed the development of the future risk tool, which used the

1
2
3 309 same measures in a State-wide sample across many different occupational groups. While different
4
5 310 occupational groups commonly report very different levels of mental ill-health (35), the similarity in
6
7 311 risk-prevalence between this study and earlier work suggests that there are common drivers of mental
8
9 312 ill-health risk across industries (e.g., prior ill health, discrimination).

11 313 The majority of those who were not receiving mental health support at the time of the BHC accepted
12
13 314 referrals to mental health support services (i.e., MindSpot, mental health GP referrals, and
14
15 315 myCompass) based on their risk scores. There were no differences in the demographic characteristics
16
17 316 of participants with high current distress that accepted referrals compared to those who did not accept
18
19 317 referrals. The findings from the participant survey suggest that only a small number of participants
20
21 318 felt uncomfortable about answering the mental health questions, and most participants agreed with
22
23 319 their mental health risk scores. Participants mostly reported that the advice that was offered as part of
24
25 320 the BHC was useful and that they intended on using the mental health services to which they were
26
27 321 referred. Overall, these results suggest that the revised BHC is suitable for use amongst workers.
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29 322

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33 323 The participant feedback survey revealed that around one out of five participants found the mental
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35 324 health questions difficult to understand, which would require the BHC to be refined to facilitate
36
37 325 understanding. The findings from the survey also highlighted ways in which comprehension could be
38
39 326 improved. Specifically, confusion around the DQ5 question 'I found social settings upsetting', and
40
41 327 around whether the future risk question for whether participants have had 'mental health problems in
42
43 328 the past two years' could be addressed by providing participants with suitable prompts. For the future
44
45 329 risk question around 'satisfaction with health', prompts could be offered to clarify that health refers to
46
47 330 both mental and physical health, or re-order the question to a location where the participant would not
48
49 331 be biased toward interpreting the question as referring to either physical or mental health. In terms of
50
51 332 next steps, it is recommended that the prompts for the DQ5 and future risk tool are added to the
52
53 333 revised BHC before it is implemented on a wider scale. The prompts will only be provided by the
54
55 334 health professional if a worker has trouble with the instrument and are not expected to impact on the
56
57 335 validity of those instruments.
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2
3 336 For participants who reported that they prefer a more comprehensive health check or were sceptical
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5 337 that their future mental health risk can be accurately determined from a small number of questions,
6
7 338 their experience could be improved by setting more realistic expectations about the program. That is,
8
9 339 the BHC should be introduced as a concise screener tool used to identify participants who are ‘at risk’
10
11 340 and refer them to clinical support services, as opposed to a definitive diagnostic test, consistent with
12
13 341 the messaging from other online assessment tools such as the Black Dog Institute’s Online Clinic
14
15 342 assessment (36). The information about how future risk is calculated (i.e., a combination of physical
16
17 343 and mental health questions, modifiable and non-modifiable factors) as well as noting that the future
18
19 344 risk score is based on existing research, will help assure participants who are sceptical about the
20
21 345 validity of the assessments. To improve workers’ experience with the tool, it is recommended that
22
23 346 these adjustments are incorporated into the standard BHC protocol.

24
25
26 347 As an adaptation, the BHC could be implemented as an online assessment (e.g., with automated
27
28 348 scoring, advice, and referrals), which presents an opportunity to scale up the program and extend the
29
30 349 reach to a larger number of organisations and remote locations. Future research could explore whether
31
32 350 participants would find an online BHC to be as useful as a face-to-face version, given that the
33
34 351 participants have responded positively to the personalised advice delivered by health professionals.
35
36 352 The ease of administering the revised BHC as an online tool presents opportunities for a mental health
37
38 353 screener to be deployed at scale in the workplace, while offering relevant advice and referral
39
40 354 pathways. The introduction of an accessible health screening tool aligns with the recommendation
41
42 355 from public and mental health professionals to improve the mental health of workers (37, 38).

43
44
45 356 However, the BHC with feedback and advice might not be sufficient in isolation, as studies have
46
47 357 suggested that improvements to some health outcomes are better achieved through a combination of
48
49 358 health assessments and other health promotion activities (e.g., health education, policy and
50
51 359 environmental change) (39), which highlights the importance of implementing other workplace health
52
53 360 initiatives prescribed by the Get Healthy at Work program alongside the BHC.

54
55
56 361 A limitation of the current study is that the current study did not collect demographic information in
57
58 362 the participant feedback survey, so the sample from the feedback survey cannot be compared to the
59
60 363 BHC sample. Additionally, the current study does not provide any insight into the long-term benefits

1
2
3 364 of the program. Future research can also use the BHC to track the health of workers longitudinally
4
5 365 and examine the relative impacts of the workplace health program on the health outcomes of workers.
6
7 366 The predictive accuracy of the future risk tool may also be a limitation of the current study. Although
8
9 367 the tool has modest predictive accuracy, there are no established risk prediction tools that perform
10
11 368 better in identifying the risk of future mental ill health. Predictive validity of such tools will be limited
12
13 369 by a multitude of risk factors that influence distress and the relatively low base rate of distress in
14
15 370 general population settings.
16
17 371 The current research suggests that the revised BHC with mental health assessments, referral pathways
18
19 372 and advice are acceptable and suitable for the workplace setting, but also highlights ways in which the
20
21 373 revised BHC could be improved. To our knowledge, this is first study to assess the acceptability and
22
23 374 appropriateness of the DQ5, a population health screener, in a workplace setting. Additionally, the
24
25 375 revised BHC is the first mental health assessment that tests for both current and future mental health
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28 376 risk in the workplace.
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Table 1. Future risk model

Participant Characteristics	Beta coefficient (log odds)
Aged 18 to 35	None*
Aged 35 to 39	0.030
Aged 40 to 44	-0.167
Aged 45 to 54	-0.040
Aged 55 to 64	-0.167
Aged 65 and over	-0.207
origin Australia	None*
origin Asia	0.104
origin Middle East/N. Africa	-0.011
origin Other	-0.080
Aboriginal or Torres Strait Islander	0.032
Male	-0.085
Recent history of mental illness (2-year)	0.672
Agree with "I am pushed around"	0.281
Satisfaction with health	-0.068
Agree with "I don't have anyone to confide in"	0.151
Five or more standard alcoholic drinks in any single day (last 7 days)	0.047
Are you a current smoker?	0.158
Exercise less than once per week	0.056
Constant	-1.288

Table 2. Breakdown of Brief Health Checks and surveys by organisation

Organisation Name	Number of worksites	Participants	
		Brief Health Checks n = 912 (%)	Feedback surveys n = 238 (%)
Department of Education			
Major Cities	13	363 (39.8%)	124 (52.1%)
Regional/remote	16	264 (28.9%)	51 (21.4%)
icare NSW			
Major Cities	6	285 (31.3%)	63 (26.5%)
TOTAL Major Cities	19	648 (71.1%)	187 (78.6%)
TOTAL Regional/remote	16	264 (28.9%)	51 (21.4%)
TOTAL	35	912	238

Table 3. Characteristics of participants who completed Brief Health Checks (N = 912)

	Unweighted N (%)	Weighted N (%)

Age group ^C		
18-34 years	256 (28.1%)	326.9 (35.8%)
35-39 years	148 (16.2%)	101.2 (11.1%)
40-44 years	115 (12.6%)	104.1 (11.4%)
45-54 years	238 (26.1%)	200.9 (22.0%)
55-64 years	142 (15.6%)	139.8 (15.3%)
65 years or over	13 (1.4%)	39.1 (4.3%)
Gender		
Male	253 (27.7%)	480.2 (52.7%)
Female	659 (72.3%)	431.8 (47.3%)
Current Distress Categories ^A		
High	208 (22.9%)	188.3 (20.7%)
Moderate	216 (23.7%)	228.0 (25.0%)
Low	486 (53.4%)	494.0 (54.3%)
Future Risk Categories ^B		
High	77 (11.0%)	69.3 (9.6%)
Moderate	143 (20.3%)	140.7 (19.4%)
Low	482 (68.7%)	513.7 (71.0%)

^A n = 2 participants did not complete the DQ5 questions

^B Future risk scores were only calculated for participants who did not have high current distress (DQ5), n = 702

^C Age data was collected using the categories below. These groupings are used by the BHC to determine type 2 diabetes risk which is not a focus of the current study

Table 4. Brief Health Checks referral outcomes for mental health

Referrals from Brief Health Checks	Accept/ Self-referral	Declined/ Not referred
MindSpot		
Currently seeing a mental health professional (n = 41)	23 (56.1%)	18 (43.9%)
Not currently seeing a mental health professional (n = 139)	95 (68.3%)	44 (31.7%)
Mental Health GP referral		
Currently seeing a mental health professional (n = 41)	21 (51.2%)	20 (48.8%)
Not currently seeing a mental health professional (n = 139)	86 (61.9%)	53 (38.1%)
myCompass		
Currently seeing a mental health professional (n = 17)	14 (82.4%)	3 (17.6%)
Not currently seeing a mental health professional (n = 149)	95 (63.8%)	54 (36.2%)

The question around whether participants were currently seeking support were introduced later in the pilot. For this table, the base for high current distress n = 180; and the base for moderate risk n = 166

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For peer review only

Contributors

JX drafted the manuscript and conducted data analyses. JX and VM conducted qualitative analyses on the survey responses. All other authors (AW, VL, NG, PB, RM, CR) contributed to revising the manuscript.

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Conflict of Interest Statement

The authors do not have any conflict of interest.

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Data Sharing Statement

Data are available from the corresponding author upon request

Patient and Public Involvement statement

Participants and public were not involved in the design, conduct, reporting or dissemination plans of this research.

Line and page numbers refer to the main document (not tracked)

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract Page 1, line 1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found Page 2
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported Page 4-5, line 41 – 95
Objectives	3	State specific objectives, including any prespecified hypotheses Page 5; line 86-95
Methods		
Study design	4	Present key elements of study design early in the paper Page 6 line 97 METHOD section
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection Page 6; line 101
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants Page 6; 109 (Participants who complete the BHC were eligible for the feedback survey)
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable Page 6; line 115-133
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 Page 6-7; line 116-133 (for psychological risk measures) Page 7; 135- 162 (for outcomes of interest)
Bias	9	Describe any efforts to address potential sources of bias Page 7; line 137 (Data were weighed to population proportions to account for bias in the sample) Page 9; line 180 (Interviewers who administered the feedback surveys were blind to the results of the BHC)
Study size	10	Explain how the study size was arrived at The study used secondary data that was collected as part of regular program delivery. Sample power is explained on Page 6; line 112
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why The handling of measures was described on Page 6-7; line 117 - 133 (Measures section)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding The analysis section also describes how certain variables were analysed/grouped Page 7; line 135 onwards (Analysis section)

Line and page numbers refer to the main document (not tracked)

		(b) Describe any methods used to examine subgroups and interactions Page 8 line 153; Included examination of sub-groups based on help seeking behaviours
		(c) Explain how missing data were addressed Page 8 line 163
		(d) If applicable, describe analytical methods taking account of sampling strategy Page 7; line 137 data were weighted
		(e) Describe any sensitivity analyses No sensitivity analyses were included
Results		
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 Number of participants described in Table 1 (Page 19)
		(b) Give reasons for non-participation at each stage Page 6; line 107-111; The study did not have stages. Non-participation in the participant feedback survey was described.
		(c) Consider use of a flow diagram A flow diagram was not used
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders Participants were described in Table 1 and 2 (Page 19)
		(b) Indicate number of participants with missing data for each variable of interest Page 19. Table 2 (Footnote)
Outcome data	15*	Report numbers of outcome events or summary measures Page 19; Table 2 and Page 20; Table 3
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 Page 10; line 210-221. The study accounted for sampling bias using weighting. Unweighted data is presented in Table 2.
		(b) Report category boundaries when continuous variables were categorized Page 7 line 115-133, Described in Method section
		(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 Page 9-13
Discussion		
Key results	18	Summarise key results with reference to study objectives Page 13 297. For measures. Page 13 312. For participant feedback
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 Page 14, line 345-349
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence

Line and page numbers refer to the main document (not tracked)

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3 [Page 15 line 350.](#)
4 Generalisability 21 Discuss the generalisability (external validity) of the study results

5 [Page 13 line 297](#)

6 **Other information**

7 Funding 22 Give the source of funding and the role of the funders for the present study and, if
8 applicable, for the original study on which the present article is based

9 [Page 21](#)
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12 *Give information separately for exposed and unexposed groups.

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