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Word Count: 4100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

1 **ABSTRACT**

2 **Objectives**

3 The Brief Health Check (BHC) is a health screener used by the Get Healthy at Work program, which

4 identifies workers with chronic disease risk and provides them with advice and referrals to support

5 services. The BHC was revised to include mental health to provide a holistic approach to workplace

6 health. This study aimed to evaluate the acceptability and appropriateness of the revised BHC by

7 comparing the results around psychological distress and future risk with previous research, and a

8 participant feedback survey

9 **Method**

10 Data collection took place between October 2018 and May 2019. The study used data that were

11 collected as part of program delivery, as well as a participant feedback survey that was administered

12 after the health check was completed.

13 **Results**

14 BHCs were completed by n = 912 workers, out of which, n = 238 completed the feedback survey. The

15 mean Distress Questionnaire 5 score was 10.5, and 10% of participants met the threshold for 'high'

16 future risk. The feedback survey revealed that the majority of participants found the mental health

17 advice to be useful, agreed with their mental health distress and risk ratings, and intended on using the

18 referred services.

19 **Conclusion**

20 The findings around mental health risk were comparable to previous findings in employed samples.

21 The inclusion of mental health assessments, advice and referral pathways into the BHC was found to

22 be acceptable and the subsequent referrals were appropriate, indicating that this approach could be

23 scaled up and implemented to help address worker's mental ill-health

24

Strengths and Limitations of the Study

25

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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41 Mental health issues are very prevalent in the Australian population, with one in five adults (aged 18-

42 85) having experienced mental disorders within the last 12 months, and 45.5% of the total population

43 having experienced a mental disorder at some point in their lifetime (1). Mental health issues in the

44 working population can be costly to employers in terms of lost productivity and turnover, as well as to

45 society at large in the form of health service use, where $9.9 billion was spent on mental health

46 related services in Australia from 2017-18 (2–5). For individual workers, mental health issues can

47 impact negatively on workplace engagement as well as overall quality of life (6,7). In recent years,

48 governing bodies in Australia have implemented strategies to facilitate the promotion of mental

49 wellbeing in the workplace (8,9). One of the channels through which this strategy is implemented is

50 through existing workplace health programs, which have significant reach in the working population

51 and present opportunities for promoting mental wellbeing (e.g., the Mentally Healthy Workplaces

52 program from SafeWork NSW) (10).

53 Workplace health programs are health promotion and protection strategies implemented in the

54 workplace (11), with the goal of establishing organisational cultures that promote and provide healthy

55 lifestyle choices. Systematic reviews of such programs have found positive impacts on the health and

56 wellbeing of workers as well as the productivity of the organisation (12–14). In New South Wales

57 (NSW), the Get Healthy at Work program was launched in 2014, along with a Brief Health Check

58 (BHC) with the aim of reducing type 2 (T2) diabetes and cardiovascular disease risk amongst

59 workers. The supports workplaces to create health promoting structures and processes, along with a

60 Brief Health Check (BHC) designed to help individual workers to reduce their lifestyle risk factors

61 (i.e., waist circumference, diet, physical activity, and smoking). The BHC identifies workers with

62 high type 2 diabetes and cardiovascular risk, refers them to external support services, and offers

63 personalised advice (15).

64 In late 2018, the Get Healthy at Work program sought to include mental health into the BHC to

65 provide a holistic assessment for employee health and wellbeing. The BHC was expanded to include

66 mental health assessments, referral pathways to mental health support services, as well as personalised

67 mental health advice. Similar to the development of the original BHC (16), the development of the

68 mental health items followed a translational formative evaluation process (17), which began with

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69   synthesising the evidence, consulting with practitioners/academics, as well as stakeholders. From this

70   process, program managers decided to use the Distress Questionnaire 5 (DQ5), which is a short

71   assessment of current psychological distress (18).

72

73   The BHC also sought to prevent future incidence of psychological distress in participating workers.

74   Therefore, the revised BHC includes a risk algorithm developed by Morris and Glozier (an

75   unpublished internal report) to identify participants who are at risk of experiencing mental health

76   issues within the next 12 months.

77   Based on advice from the clinical advisory panel, the revised BHC refers participants with high

78   current distress (according to the DQ5 score) to the MindSpot free online supported mental health

79   clinic (19), as well as to a general practitioner. Those found to have moderate current distress are

80   referred to myCompass (20), an online mental health program that is self-guided. Both myCompass

81   and MindSpot (21,22,23) have demonstrated efficacy in improving mental health outcomes.

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

83   Further, because of the importance of positive lifestyle modification in promoting mental wellbeing

84   (24–26), the BHC offers personalised advice around how individuals could improve their mental

85   wellbeing by modifying their lifestyle through improved diet and physical activity.

86   Following the translational formative evaluation process (17), the current study aims to evaluate the

87   revised BHC within workplaces to assess whether it can be scaled up for state-wide delivery and

88   identify ways in which the tool can be improved. The key implementation research questions to be

89   examined were: (i) Comparability: How do the findings around current psychological distress and

90   high mental health risk in the applied setting compare with previous research? (ii) Acceptability: Do

91   workers find the new mental health questions easy to understand? Do participants agree with the

92   results they received? Is there any potential harm in using these assessments? Do participants agree

93   with the risk ratings they received? (iii) Uptake and engagement: What is the uptake of referrals

94   made? Do participants intend on using the services to which they were referred? Do participants find

95   the personalised mental health advice useful?

96   **METHOD**

97   The study used BHC cross sectional survey data that was collected as part of regular program delivery

98   to determine the comparability of results and uptake of referral pathways. A cross sectional feedback

99   survey was administered after completing the BHC. The feedback survey was included to help answer

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

124 participant is likely to meet the criteria for specific disorders with a lower rate of false positives

125 compared to participants who are classified as having 'moderate' distress.

126 Future risk tool

127 The future risk tool used in the BHC was adapted from Fernandez et al. (27) by Morris and Glozier,

128 which is the first mental health risk algorithm to be created for the working population in Australia.

129 Fernandez et al. (27) outline a process for developing a future risk tool. For future risk scores, the

130 revised BHC uses thresholds defined by Morris and Glozier, in which participants who exceed the

131 algorithm's threshold for high risk are expected to have a 28% chance of experiencing psychological

132 distress in the next 12 months. Participants who exceed the threshold for moderate risk are expected to

133 have a 22% chance of experiencing psychological distress in the next 12 months.

134

135 **Analysis**

136 i) Comparability: The results around current distress and prevalence of future risk categories in

137 the BHC were compared to previous research. The BHC sample was weighted for age and

138 gender before the results were compared to previous data, which examined findings at the

139 population level. The weight values were based on the 2016 Australian Census filtered for

140 individuals who were employed (28). A two-sample t-test was used to compare the mean

141 DQ5 score from the current study with the results from Batterham et al. (18), and the

142 prevalence of future risk was compared to the models that informed the development of the

143 future risk tool by descriptive statistics.

144 ii) Acceptability: The feedback survey asked participants whether the questions were difficult to

145 understand, and whether participants felt uncomfortable about answering any of the mental

146 health questions. Both were examined using 'Yes/No' questions followed by open-ended

147 questions to identify the items that were difficult or made participants feel uncomfortable.

148 These questions aimed to assess any potential issues with comprehension and harm associated

149 with the revised BHC.

150 iii) Uptake and engagement: The uptake of the referred services was recorded in the BHC

151 questionnaire, where participants have 'accepted' referrals if they agreed to be referred during

152   the BHC session by the health professional, or indicated that they will register for the service

153   after the BHC. Referral outcomes were stratified by current help seeking behaviour (i.e.,

154   whether participants are currently seeing a mental health professional), as well as

155   demographic characteristics to assess the rate of uptake in those who are not receiving help,

156   and a range of population groups. Uptake of the referred services was also examined through

157   the participant feedback survey, which asked participants whether they intend on using the

158   service to which they were referred in the BHC (examined using multiple choice

159   'Yes/No/Intend to use at a later time'). The feedback survey also asked participants whether

160   they found the mental health advice useful on a five-point scale. The authors do not have

161   visibility of the number of participants who access their referred service after the BHCs were

162   conducted.

163   Participants who did not complete the DQ5 or future risk questionnaires were excluded from the

164   analyses. Participants who did not answer a question in the feedback survey were removed from the

165   analysis of that question.

166   **Brief Health Check**

167   The revised BHC was administered face-to-face within participating worksites by trained health

168   professionals, such as accredited dietitians or exercise physiologists. Participants completed a

169   questionnaire related to diet, physical activity, demographic characteristics, and physical and mental

170   health risk profiles, distress (DQ5), and health related behaviours. The BHC questionnaires were

171   completed on paper (n = 198) or equivalent digital forms (n = 714). Once the risk scores were

172   calculated, the health practitioners provided feedback about the risk scores, and provided appropriate

173   referrals and advice depending on the risk profile of the participant. Health professionals then

174   recorded whether participants accepted referrals. A single BHC session took around 20 minutes to

175   complete.

176

177   **Participant feedback survey**

178   Between one to three interviewers were present at each of the 13 worksites participating in the

179   feedback survey. Once participants completed the BHC, they were asked to participate in a survey

180   administered by the trained interviewers, who were blinded to the results from the BHC. The surveys

181   included seven questions that were administered verbally and responses were collected on paper

182   forms. The survey took no longer than 10 minutes to complete. The questions were a combination of

183   closed and open-ended responses that were developed for this study. The open-ended responses about

184   difficulties understanding questions and feeling uncomfortable about answering questions were

185   analysed by two co-authors (JX and VM) using closed-coding to identify the specific BHC questions

186   referenced in participant feedback. Open-ended responses around participant feedback, agreement

187   with current distress and future risk ratings, and intention to use services were analysed using open

188   coding. The authors coded the responses independently, and then met to reach a consensus on the

189   assignment of the codes.

190

191   **Ethics**

192   Ethical approval for the analysis of routine program data and participant feedback was obtained from

193   South Western Sydney Local Health District Human Ethics Committee (Ref: ETH12061). The ethics

194   approval covered the routine analysis of program data (BHCs) and the participant feedback survey,

195   for which verbal consent was obtained from participants.

196

197   **RESULTS**

198   **Profile of worksites**

199   A total of 35 worksites participated in the study and 13 worksites allowed participant feedback

200   surveys to be administered. The total number of completed BHCs was n = 912, and a total of n = 238

201   participants completed the feedback survey. The authors did not have visibility of the number of

202   employees within each organisation that were invited to complete the BHC. Based on an estimate of

203   the number of employees across the worksites (n = 7,200), and the assumption that all employees at

204   each worksite were invited, a conservative estimate of the response rate for the BHC (with n = 912

205   completes) is 12.7%. A breakdown of completed BHCs, number of surveys within organisations and

206   the location of the worksite is presented in Table 1. The urban/rural/remoteness of the worksite was

207   based on postcode, using the Accessibility and Remoteness Index of Australia (29).

208

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

224

225   **Acceptability**

226   <u>Mental health questions</u>

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

236 mental health issues that were diagnosed or included all mental health problems. Most of the

237 participants who had trouble understanding the DQ5, linked their difficulties to the question 'I found

238 social settings upsetting' and whether 'social settings' referred to all social settings or just those in the

239 workplace. Many participants who had trouble with DQ5 or the future risk questions also reported

240 that the health professionals conducting the BHC offered useful prompts which helped them answer

241 these questions. A small proportion (7.6%, n = 18) reported that they felt uncomfortable about

242 answering one or more of the mental health questions. When probed further about the specific

243 questions they had concerns about, most of these participants indicated that they felt uncomfortable

244 about talking about mental health in general (n = 12, 5%), while 1.3% (n = 3) linked their response to

245 the DQ5, and 2.1% (n = 5) linked their response to the future risk questions.

246

247 <u>Agreement with risk ratings</u>

248 From the participant feedback surveys, only 5.9% (n = 14) of participants disagreed with their current

249 distress scores, and 8.0% (n = 19) disagreed with their future risk scores. Of the participants who

250 disagreed with their either their current or future mental health risk, there was a mix of those who

251 expected their scores to be higher (current: n = 1, 0.4%; future: n = 3, 1.3%) or lower (current: n = 4,

252 1.7%; future: n = 7, n = 2.9%) than what they received. For those who disagreed with their current

253 distress or future risk scores, some participants did not disagree with the rating per se but expressed

254 scepticism that the questions could provide an accurate assessment of their mental health state or

255 predict their future risk: *"Assessing risk for the future seems unrealistic - impossible to know what*

256 *will happen in the future. Not sure how the assessment/questions work".*

257

258 **Uptake and engagement**

259 <u>Uptake of referrals</u>

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

261 3. Questions around whether participants were currently seeing a mental health professional were

262 introduced later in the pilot, and so the sample size for Table 3 is smaller than the total number of

263 completed BHCs. Of participants who had high current distress and were not currently receiving

264   support from a mental health professional, the majority (n = 95, 68.3%) accepted referrals to

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

266   61.9%). Referral outcomes were further examined by age, gender, and cultural background to assess

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

268   were no significant differences between any demographic groups in accepting referrals to MindSpot

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

270   males (n = 33, 49.3%) to accept a referral to myCompass (χ^2 = 4.2, p = .04).

271   Based on the participant feedback surveys, the majority of participants indicated that they intended to

272   access the mental health services to which they were referred (myCompass n = 62, 76.5%; MindSpot

273   n = 31, 72.1%; n = 21, GP 72%). Some participants who indicated that they did not plan on accessing

274   MindSpot or myCompass suggested that they would prefer face-to-face mental health support: *"No,*

275   *not likely to go online…I would rather see someone face-to-face"*. However, a number of participants

276   suggested that they might use these services in the future: *"I don't think I need [MindSpot] right now,*

277   *but it is good to know about it if I need to access it later"*.

278

279   [TABLE 3 ABOUT HERE]

280

281   <u>Advice</u>

282   Out of the participants who received mental health advice during the BHC, most reported that the

283   advice they received was useful (n = 89, 76.1% reported that the advice was 'Very useful'/'Fairly

284   useful'; n = 26, 22.2% reported that the advice was 'A little useful'/ 'Not useful at all'; and n = 2,

285   1.7% indicated that they 'Don't know'). When asked to provide further feedback about the advice

286   they received, some participants suggested that the advice helped them learn more about their mental

287   wellbeing: *"I knew much of the information on physical health, but mental health was all new to me.*

288   *Surprised about the links between physical health and mental health…I didn't previously ever even*

289   *consider my mental health"*. Participants who suggested that the advice confirmed what they already

290   know, saw this as a useful instance of reinforcing their understanding of healthy lifestyle behaviours:

291   *"[I] already know about own mental and physical states, but was good to get confirmation and*

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292 *reminder"*. Participants who felt that the advice was 'A little useful'/ 'Not useful' indicated that the

293 advice was not specific enough: *"I am [already] conscious of my physical and mental health, the*

294 *check-up was very broad"*.

295

296 **DISCUSSION**

297 The findings from the current study suggests that the revised BHC is appropriate for assessing both

298 current and future mental health risk in the workplace context. The mean DQ5 score from the current

299 study is higher than that from Batterham et al., which is consistent with previous research.

300 Specifically, Jarman et al. (30) compared the psychological distress from a general population with

301 the findings from an employee wellbeing survey among public servants in Tasmania. The authors

302 found that the mean psychological distress (using the Kessler 10) scores from public service workers

303 was higher than the general population, and suggested that the differences could be attributed to

304 workplace specific stressors such as the rationalisation of the workforce, job insecurity, and effort-

305 reward imbalance (31,32). The lower levels of wellbeing amongst public sector employees has also

306 been found in other jurisdictions (33) The prevalence of high future mental health risk is comparable

307 with the models that informed the development of the future risk tool, which used the same measures

308 in a State-wide sample across many different occupational groups. While different occupational

309 groups commonly report very different levels of mental ill-health (34), the similarity in risk-

310 prevalence between this study and earlier work suggests that there are common drivers of mental ill-

311 health risk across industries (e.g., prior ill health, discrimination).

312 The majority of those who were not receiving mental health support at the time of the BHC accepted

313 referrals to mental health support services (i.e., MindSpot, mental health GP referrals, and

314 myCompass) based on their risk scores. There were no differences in the demographic characteristics

315 of participants with high current distress that accepted referrals compared to those who did not accept

316 referrals. The findings from the participant survey suggest that only a small number of participants

317 felt uncomfortable about answering the mental health questions, and most participants agreed with

318 their mental health risk scores. Participants mostly reported that the advice that was offered as part of

319 the BHC was useful and that they intended on using the mental health services to which they were

320 referred. Overall, these results suggest that the revised BHC is suitable for use amongst workers.

321

322 The participant feedback survey revealed that around one out of five participants found the mental

323 health questions difficult to understand, which would require the BHC to be refined to facilitate

324 understanding. The findings from the survey also highlighted ways in which comprehension could be

325 improved. Specifically, confusion around the DQ5 question 'I found social settings upsetting', and

326 around whether the future risk question for whether participants have had 'mental health problems in

327 the past two years' could be addressed by providing participants with suitable prompts. For the future

328 risk question around 'satisfaction with health', prompts could be offered to clarify that health refers to

329 both mental and physical health, or re-order the question to a location where the participant would not

330 be biased toward interpreting the question as referring to either physical or mental health.

331 For participants who reported that they prefer a more comprehensive health check or were sceptical

332 that their future mental health risk can be accurately determined from a small number of questions,

333 their experience could be improved by setting more realistic expectations about the program. That is,

334 the BHC should be introduced as a concise screener tool used to identify participants who are 'at risk'

335 and refer them to clinical support services, as opposed to a definitive diagnostic test, consistent with

336 the messaging from other online assessment tools such as the Black Dog Institute's Online Clinic

337 assessment (35). The information about how future risk is calculated (i.e., a combination of physical

338 and mental health questions, modifiable and non-modifiable factors) as well as noting that the future

339 risk score is based on existing research, will help assure participants who are sceptical about the

340 validity of the assessments.

341 The BHC could be implemented as an online assessment (e.g., with automated scoring, advice, and

342 referrals), which presents an opportunity to scale the program and extend the reach to a larger number

343 of organisations and remote locations. Future research could explore whether participants would find

344 an online BHC to be as useful as a face-to-face version, given that the participants have responded

345 positively to the personalised advice delivered by health professionals. A limitation of the current

346 study is that the current study did not collect demographic information in the participant feedback

347 survey, so the sample from the feedback survey cannot be compared to the BHC sample.

348 Additionally, the current study does not provide any insight into the long-term benefits of the

349 program. Future research can also use the BHC to track the health of workers longitudinally and

350 examine the relative impacts of the workplace health program on the health outcomes of workers. The

351 current research suggests that the revised BHC with mental health assessments, referral pathways and

352 advice are acceptable and suitable for the workplace setting, but also highlights ways in which the

353 revised BHC could be improved. To our knowledge, the revised BHC is the first mental health

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

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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.

Acknowledgements

The authors would like to thank Ms Jillian Green (SafeWork NSW) and Prof Samuel Harvey

(University of New South Wales) for their support and advice.

Conflict of Interest Statement

The authors do not have any conflict of interest.

Funding

This work was funded by the Centre for Population Health, NSW Ministry of Health. The contents of

this paper are solely the responsibility of the individual authors and do not reflect the view of NSW

Ministry of Health.

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)

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

Other information

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

*Give information separately for exposed and unexposed groups.

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

BMJ Open

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

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-052155.R1
Article Type:	Original research
Date Submitted by the Author:	29-Dec-2021
Complete List of Authors:	Xu, Joe; NSW Health, Office of Preventive Health Willems, Alexander ; NSW Health, NSW Office of Preventive Health Li, Vincy; NSW Health, NSW Office of Preventive Health Glozier, Nick; University of Sydney Brain and Mind Research Institute, Batterham, Philip; Australian National University, 2Centre for Mental Health Research Malone, Victoria; NSW Health, NSW Office of Preventive Health Morris, Richard; The University of Sydney, Central Clinical School Rissel, Chris; University of Sydney, School of Public Health
Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health
Keywords:	PUBLIC HEALTH, MENTAL HEALTH, PSYCHIATRY

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

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Word Count: 4568

1 **ABSTRACT**

2 **Objectives**

3 The Brief Health Check (BHC) is a health screener used by the Get Healthy at Work program, which

4 identifies workers with chronic disease risk and provides them with advice and referrals to support

5 services. The BHC was revised to include mental health to provide a holistic approach to workplace

6 health. This study aimed to evaluate the acceptability and appropriateness of the revised BHC by

7 comparing the results around psychological distress and future risk with previous research, and a

8 participant feedback survey

9 **Method**

10 Data collection took place between October 2018 and May 2019. The study used data that were

11 collected as part of program delivery, as well as a participant feedback survey that was administered

12 after the health check was completed.

13 **Results**

14 BHCs were completed by n = 912 workers, out of which, n = 238 completed the feedback survey. The

15 mean Distress Questionnaire 5 score was 10.5, and 10% of participants met the threshold for 'high'

16 future risk. The feedback survey revealed that the majority of participants found the mental health

17 advice to be useful (76%), agreed with their mental health distress and risk ratings (92-94%), and

18 most intended on using the referred services (62-68%).

19 **Conclusion**

20 The findings around mental health risk were comparable to previous findings in employed samples.

21 The inclusion of mental health assessments, advice and referral pathways into the BHC was found to

22 be acceptable and the subsequent referrals were appropriate, indicating that this approach could be

23 scaled up and implemented to help address worker's mental ill-health

24

Strengths and Limitations of the Study

25

26 • The study is the first to use the DQ5, a general population health screener tool, in a working

27 population

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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36   Mental health issues are very prevalent in the Australian population, with one in five adults (aged 18-

37   85) having experienced mental disorders within the last 12 months, and 45.5% of the total population

38   having experienced a mental disorder at some point in their lifetime (1). Mental health issues in the

39   working population can be costly to employers in terms of lost productivity and turnover, as well as to

40   society at large in the form of health service use, where $9.9 billion was spent on mental health

41   related services in Australia from 2017-18 (2–5). For individual workers, mental health issues can

42   impact negatively on workplace engagement as well as overall quality of life (6,7). In recent years,

43   governing bodies in Australia have implemented strategies to facilitate the promotion of mental

44   wellbeing in the workplace (8,9). One of the channels through which this strategy is implemented is

45   through existing workplace health programs, which have significant reach in the working population

46   and present opportunities for promoting mental wellbeing (e.g., the Mentally Healthy Workplaces

47   program from SafeWork NSW) (10).

48   Workplace health programs are health promotion and protection strategies implemented in the

49   workplace (11), with the goal of establishing organisational cultures that promote and provide healthy

50   lifestyle choices. Systematic reviews of such programs have found positive impacts on the health and

51   wellbeing of workers as well as the productivity of the organisation (12–14). In New South Wales

52   (NSW), the Get Healthy at Work program was launched in 2014, along with a Brief Health Check

53   (BHC) with the aim of reducing type 2 (T2) diabetes and cardiovascular disease risk amongst

54   workers. The supports workplaces to create health promoting structures and processes, along with a

55   Brief Health Check (BHC) designed to help individual workers to reduce their lifestyle risk factors

56   (i.e., waist circumference, diet, physical activity, and smoking). The BHC identifies workers with

57   high type 2 diabetes and cardiovascular risk, refers them to external support services, and offers

58   personalised advice (15).

59   In late 2018, the Get Healthy at Work program sought to include mental health into the BHC to

60   provide a holistic assessment for employee health and wellbeing. The BHC was expanded to include

61   mental health assessments, referral pathways to mental health support services, as well as personalised

62   mental health advice. Similar to the development of the original BHC (16), the development of the

63   mental health items followed a translational formative evaluation process (17), which began with

Page **4** of **23**

64 synthesising the evidence, consulting with practitioners/academics, as well as stakeholders. From this

65 process, program managers decided to use the Distress Questionnaire 5 (DQ5), which is a short

66 assessment of current psychological distress (18).

67 The BHC also sought to prevent future incidence of psychological distress in participating workers.

68 Therefore, the revised BHC includes a risk algorithm developed by Morris and Glozier (an

69 unpublished internal report) to identify participants who are at risk of experiencing mental health

70 issues within the next 12 months.

71 Based on advice from the clinical advisory panel, the revised BHC refers participants with high

72 current distress (according to the DQ5 score) to the MindSpot free online supported mental health

73 clinic (19), as well as to a general practitioner. Those found to have moderate current distress are

74 referred to myCompass (20), an online mental health program that is self-guided. Both myCompass

75 and MindSpot (21,22,23) have demonstrated efficacy in improving mental health outcomes.

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

77 Further, because of the importance of positive lifestyle modification in promoting mental wellbeing

78 (24–26), the BHC offers personalised advice around how individuals could improve their mental

79 wellbeing by modifying their lifestyle through improved diet and physical activity.

80 Following the translational formative evaluation process (17), the current study aims to evaluate the

81 revised BHC within workplaces to assess whether it can be scaled up for state-wide delivery and

82 identify ways in which the tool can be improved. The key implementation research questions to be

83 examined were: (i) Comparability: How do the findings around current psychological distress and

84 high mental health risk in the applied setting compare with previous research? (ii) Acceptability: Do

85 workers find the new mental health questions easy to understand? Do participants agree with the

86 results they received? Is there any potential harm in using these assessments? Do participants agree

87 with the risk ratings they received? (iii) Uptake and engagement: What is the uptake of referrals

88 made? Do participants intend on using the services to which they were referred? Do participants find

89 the personalised mental health advice useful?

90 **METHOD**

91   The study used BHC cross sectional survey data that was collected as part of regular program delivery

92   to determine the comparability of results and uptake of referral pathways. A cross sectional feedback

93   survey was administered after completing the BHC. The feedback survey was included to help answer

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

119   participant is likely to meet the criteria for specific disorders with a lower rate of false positives

120   compared to participants who are classified as having 'moderate' distress.

121   Future risk tool

122   The future risk tool used in the BHC was adapted from Fernandez et al. (27) by Morris and Glozier,

123   which is the first mental health risk algorithm to be created for the working population in Australia.

124   Morris & Glozier updated the algorithm using 2015 and 2016 data from the Household and Income

125   Labour Dynamics in Australia survey and obtained a comparable *C*-index (0.71) and positive

126   predictive value (0.28) in validation[1]. The coefficients for the future risk algorithm are presented in

127   Table 1. For future risk scores, the revised BHC uses thresholds defined by Morris and Glozier, in

128   which participants who exceed the algorithm's threshold for high risk are expected to have a 28%

129   chance of experiencing psychological distress in the next 12 months. Participants who exceed the

130   threshold for moderate risk are expected to have a 22% chance of experiencing psychological distress

131   in the next 12 months.

132   [TABLE 1 ABOUT HERE]

133   **Analysis**

134   i)   Comparability: The results around current distress and prevalence of future risk categories in

135   the BHC were compared to previous research. The BHC sample was weighted for age and

136   gender before the results were compared to previous data, which examined findings at the

137   population level. The weight values were based on the 2016 Australian Census filtered for

138   individuals who were employed (28). A two-sample t-test was used to compare the mean

139   DQ5 score from the current study with the results from Batterham et al. (18), and the

140   prevalence of future risk was compared to the models that informed the development of the

141   future risk tool by descriptive statistics.

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[1] The formula for the future risk algorithm is:

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 + (-0.207)Age: 65 & over + (0.104)Country of origin: Asia + (-0.011)Country of origin: Middle East/N. Africa + (-0.080)Country of origin: Other + (0.032)Aboriginal or Torres St. Islander + (-0.085)Sex:male + (0.672)Recent mental illness + (0.281)Bullied + (-0.068)Health satisfaction + (0.151)Loneliness + (0.047)Binge drink + (0.158)Smoker + (0.056)Physically inactive

142   ii)   Acceptability: The feedback survey asked participants whether the questions were difficult to

143   understand, and whether participants felt uncomfortable about answering any of the mental

144   health questions. Both were examined using 'Yes/No' questions followed by open-ended

145   questions to identify the items that were difficult or made participants feel uncomfortable.

146   These questions aimed to assess any potential issues with comprehension and harm associated

147   with the revised BHC.

148   iii)   Uptake and engagement: The uptake of the referred services was recorded in the BHC

149   questionnaire, where participants have 'accepted' referrals if they agreed to be referred during

150   the BHC session by the health professional, or indicated that they will register for the service

151   after the BHC. Referral outcomes were stratified by current help seeking behaviour (i.e.,

152   whether participants are currently seeing a mental health professional), as well as

153   demographic characteristics to assess the rate of uptake in those who are not receiving help,

154   and a range of population groups. Uptake of the referred services was also examined through

155   the participant feedback survey, which asked participants whether they intend on using the

156   service to which they were referred in the BHC (examined using multiple choice

157   'Yes/No/Intend to use at a later time'). The feedback survey also asked participants whether

158   they found the mental health advice useful on a five-point scale. The authors do not have

159   visibility of the number of participants who access their referred service after the BHCs were

160   conducted.

161   Participants who did not complete the DQ5 or future risk questionnaires were excluded from the

162   analyses. Participants who did not answer a question in the feedback survey were removed from the

163   analysis of that question.

164

165   **Brief Health Check**

166   The revised BHC was administered face-to-face within participating worksites by trained health

167   professionals, such as accredited dietitians or exercise physiologists. Participants completed a

168   questionnaire related to diet, physical activity, demographic characteristics, and physical and mental

169   health risk profiles, distress (DQ5), and health related behaviours. The BHC questionnaires were

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170 completed on paper (n = 198) or equivalent digital forms (n = 714). Once the risk scores were

171 calculated, the health practitioners provided feedback about the risk scores, and provided appropriate

172 referrals and advice depending on the risk profile of the participant. Health professionals then

173 recorded whether participants accepted referrals. A single BHC session took around 20 minutes to

174 complete.

175

176 **Participant feedback survey**

177 Between one to three interviewers were present at each of the 13 worksites participating in the

178 feedback survey. Once participants completed the BHC, they were asked to participate in a survey

179 administered by the trained interviewers, who were blinded to the results from the BHC. The surveys

180 included seven questions that were administered verbally and responses were collected on paper

181 forms. The survey took no longer than 10 minutes to complete. The questions were a combination of

182 closed and open-ended responses that were developed for this study. The open-ended responses about

183 difficulties understanding questions and feeling uncomfortable about answering questions were

184 analysed by two co-authors (JX and VM) using closed-coding to identify the specific BHC questions

185 referenced in participant feedback. Open-ended responses around participant feedback, agreement

186 with current distress and future risk ratings, and intention to use services were analysed using open

187 coding. The authors coded the responses independently, and then met to reach a consensus on the

188 assignment of the codes.

189

190 **Ethics**

191 Ethical approval for the analysis of routine program data and participant feedback was obtained from

192 South Western Sydney Local Health District Human Ethics Committee (Ref: ETH12061). The ethics

193 approval covered the routine analysis of program data (BHCs) and the participant feedback survey,

194 for which verbal consent was obtained from participants.

195

196 **RESULTS**

197 **Profile of worksites**

198   A total of 35 worksites participated in the study and 13 worksites allowed participant feedback

199   surveys to be administered. The total number of completed BHCs was n = 912, and a total of n = 238

200   participants completed the feedback survey. The authors did not have visibility of the number of

201   employees within each organisation that were invited to complete the BHC. Based on an estimate of

202   the number of employees across the worksites (n = 7,200), and the assumption that all employees at

203   each worksite were invited, a conservative estimate of the response rate for the BHC (with n = 912

204   completes) is 12.7%. A breakdown of completed BHCs, number of surveys within organisations and

205   the location of the worksite is presented in Table 2. The urban/rural/remoteness of the worksite was

206   based on postcode, using the Accessibility and Remoteness Index of Australia (29).

207

208   [TABLE 2 ABOUT HERE]

209   **Comparability**

210   The characteristics of participants, including the current distress results and prevalence of future risk

211   categories are presented in Table 3. Two participants did not complete the DQ5 and were excluded

212   from the analyses. Future risk scores were only calculated for participants who did not have a high

213   level of current distress (i.e., those with DQ5 scores < 14). In the current study, the weighted mean

214   DQ5 score was 10.5 (SD = 4.2). This was significantly higher than the weighted mean scores from the

215   study by Batterham et al (18) (mean DQ5 score = 9.28, SD = 4.08), via an independent samples t-test:

216   t (4083) = 7.8, $p < .001$, and the difference was small in terms of effect size (Cohen's d = 0.29). For

217   the prevalence of future risk in the weighted sample, 9.6% of participants met the threshold to be in

218   the 'high' future risk category, in which 28% of participants are expected to experience psychological

219   distress within 12 months. This is consistent with the population proportion that was expected to meet

220   this threshold according to the future risk algorithm (10% or 90th percentile).

221

222   [TABLE 3 ABOUT HERE]

223

224   **Acceptability**

225   Mental health questions

226 The participant feedback survey revealed that 17.2% (n = 41) of respondents found the mental health

227 questions difficult to understand. Participants reported that they found one (13.4%, n = 32) or two

228 (2.5%, n = 6) questions difficult, and the remainder reported that their difficulties were due to general

229 comprehension or recall (1.2%, n = 3). The responses were back-coded to identify the specific

230 questions that were difficult to understand, which showed that 10.9% (n = 26) of participants found

231 the future risk questions to be difficult, and 6.7% (n = 16) of participants found the DQ5 questions to

232 be difficult. Of the participants who found the future risk questions to be difficult, themes emerged

233 regarding whether the question around 'satisfaction with your health' referred to mental or physical

234 health, and whether the question 'Have you had mental health problems in the past 2 years' referred to

235 mental health issues that were diagnosed or included all mental health problems. Most of the

236 participants who had trouble understanding the DQ5, linked their difficulties to the question 'I found

237 social settings upsetting' and whether 'social settings' referred to all social settings or just those in the

238 workplace. Many participants who had trouble with DQ5 or the future risk questions also reported

239 that the health professionals conducting the BHC offered useful prompts which helped them answer

240 these questions. A small proportion (7.6%, n = 18) reported that they felt uncomfortable about

241 answering one or more of the mental health questions. When probed further about the specific

242 questions they had concerns about, most of these participants indicated that they felt uncomfortable

243 about talking about mental health in general (n = 12, 5%), while 1.3% (n = 3) linked their response to

244 the DQ5, and 2.1% (n = 5) linked their response to the future risk questions.

245

246 <u>Agreement with risk ratings</u>

247 From the participant feedback surveys, only 5.9% (n = 14) of participants disagreed with their current

248 distress scores, and 8.0% (n = 19) disagreed with their future risk scores. Of the participants who

249 disagreed with their either their current or future mental health risk, there was a mix of those who

250 expected their scores to be higher (current: n = 1, 0.4%; future: n = 3, 1.3%) or lower (current: n = 4,

251 1.7%; future: n = 7, n = 2.9%) than what they received. For those who disagreed with their current

252 distress or future risk scores, some participants did not disagree with the rating per se but expressed

253 scepticism that the questions could provide an accurate assessment of their mental health state or

254 predict their future risk: *"Assessing risk for the future seems unrealistic - impossible to know what*

255 *will happen in the future. Not sure how the assessment/questions work".*

256

257 **Uptake and engagement**

258 <u>Uptake of referrals</u>

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

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

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

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

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

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

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

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

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

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

269 males (n = 33, 49.3%) to accept a referral to myCompass (χ^2 = 4.2, *p* = .04).

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

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

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

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

274 health support: *"No, not likely to go online…I would rather see someone face-to-face".* However, a

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

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

277

278   [TABLE 4 ABOUT HERE]

279

280 <u>Advice</u>

281 Out of the participants who received mental health advice during the BHC, most reported that the

282 advice they received was useful (n = 89, 76.1% reported that the advice was 'Very useful'/'Fairly

283 useful'; n = 26, 22.2% reported that the advice was 'A little useful'/ 'Not useful at all'; and n = 2,

284 1.7% indicated that they 'Don't know'). When asked to provide further feedback about the advice

285 they received, some participants suggested that the advice helped them learn more about their mental

286 wellbeing: *"I knew much of the information on physical health, but mental health was all new to me.*

287 *Surprised about the links between physical health and mental health…I didn't previously ever even*

288 *consider my mental health"*. Participants who suggested that the advice confirmed what they already

289 know, saw this as a useful instance of reinforcing their understanding of healthy lifestyle behaviours:

290 *"[I] already know about own mental and physical states, but was good to get confirmation and*

291 *reminder"*. Participants who felt that the advice was 'A little useful'/ 'Not useful' indicated that the

292 advice was not specific enough: *"I am [already] conscious of my physical and mental health, the*

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

309   same measures in a State-wide sample across many different occupational groups. While different

310   occupational groups commonly report very different levels of mental ill-health (35), the similarity in

311   risk-prevalence between this study and earlier work suggests that there are common drivers of mental

312   ill-health risk across industries (e.g., prior ill health, discrimination).

313   The majority of those who were not receiving mental health support at the time of the BHC accepted

314   referrals to mental health support services (i.e., MindSpot, mental health GP referrals, and

315   myCompass) based on their risk scores. There were no differences in the demographic characteristics

316   of participants with high current distress that accepted referrals compared to those who did not accept

317   referrals. The findings from the participant survey suggest that only a small number of participants

318   felt uncomfortable about answering the mental health questions, and most participants agreed with

319   their mental health risk scores. Participants mostly reported that the advice that was offered as part of

320   the BHC was useful and that they intended on using the mental health services to which they were

321   referred. Overall, these results suggest that the revised BHC is suitable for use amongst workers.

322

323   The participant feedback survey revealed that around one out of five participants found the mental

324   health questions difficult to understand, which would require the BHC to be refined to facilitate

325   understanding. The findings from the survey also highlighted ways in which comprehension could be

326   improved. Specifically, confusion around the DQ5 question 'I found social settings upsetting', and

327   around whether the future risk question for whether participants have had 'mental health problems in

328   the past two years' could be addressed by providing participants with suitable prompts. For the future

329   risk question around 'satisfaction with health', prompts could be offered to clarify that health refers to

330   both mental and physical health, or re-order the question to a location where the participant would not

331   be biased toward interpreting the question as referring to either physical or mental health. In terms of

332   next steps, it is recommended that the prompts for the DQ5 and future risk tool are added to the

333   revised BHC before it is implemented on a wider scale. The prompts will only be provided by the

334   health professional if a worker has trouble with the instrument and are not expected to impact on the

335   validity of those instruments.

336 For participants who reported that they prefer a more comprehensive health check or were sceptical

337 that their future mental health risk can be accurately determined from a small number of questions,

338 their experience could be improved by setting more realistic expectations about the program. That is,

339 the BHC should be introduced as a concise screener tool used to identify participants who are 'at risk'

340 and refer them to clinical support services, as opposed to a definitive diagnostic test, consistent with

341 the messaging from other online assessment tools such as the Black Dog Institute's Online Clinic

342 assessment (36). The information about how future risk is calculated (i.e., a combination of physical

343 and mental health questions, modifiable and non-modifiable factors) as well as noting that the future

344 risk score is based on existing research, will help assure participants who are sceptical about the

345 validity of the assessments. To improve workers' experience with the tool, it is recommended that

346 these adjustments are incorporated into the standard BHC protocol.

347 As an adaptation, the BHC could be implemented as an online assessment (e.g., with automated

348 scoring, advice, and referrals), which presents an opportunity to scale up the program and extend the

349 reach to a larger number of organisations and remote locations. Future research could explore whether

350 participants would find an online BHC to be as useful as a face-to-face version, given that the

351 participants have responded positively to the personalised advice delivered by health professionals.

352 The ease of administering the revised BHC as an online tool presents opportunities for a mental health

353 screener to be deployed at scale in the workplace, while offering relevant advice and referral

354 pathways. The introduction of an accessible health screening tool aligns with the recommendation

355 from public and mental health professionals to improve the mental health of workers (37, 38).

356 However, the BHC with feedback and advice might not be sufficient in isolation, as studies have

357 suggested that improvements to some health outcomes are better achieved through a combination of

358 health assessments and other health promotion activities (e.g., health education, policy and

359 environmental change) (39), which highlights the importance of implementing other workplace health

360 initiatives prescribed by the Get Healthy at Work program alongside the BHC.

361 A limitation of the current study is that the current study did not collect demographic information in

362 the participant feedback survey, so the sample from the feedback survey cannot be compared to the

363 BHC sample. Additionally, the current study does not provide any insight into the long-term benefits

364 of the program. Future research can also use the BHC to track the health of workers longitudinally

365 and examine the relative impacts of the workplace health program on the health outcomes of workers.

366 The predictive accuracy of the future risk tool may also be a limitation of the current study. Although

367 the tool has modest predictive accuracy, there are no established risk prediction tools that perform

368 better in identifying the risk of future mental ill health. Predictive validity of such tools will be limited

369 by a multitude of risk factors that influence distress and the relatively low base rate of distress in

370 general population settings.

371 The current research suggests that the revised BHC with mental health assessments, referral pathways

372 and advice are acceptable and suitable for the workplace setting, but also highlights ways in which the

373 revised BHC could be improved. To our knowledge, this is first study to assess the acceptability and

374 appropriateness of the DQ5, a population health screener, in a workplace setting. Additionally, the

375 revised BHC is the first mental health assessment that tests for both current and future mental health

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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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.

Conflict of Interest Statement

The authors do not have any conflict of interest.

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.

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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)

		Page 15 line 350.	
Generalisability	21	Discuss the generalisability (external validity) of the study results	
		Page 13 line 297	
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	
		Page 21	

*Give information separately for exposed and unexposed groups.

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