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Getting help early: An online mental health self-assessment tool for young people

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Abstract

Background: Online self-assessments are becoming more popular. They can serve as a screening tool for specific conditions or assess mental health more broadly but often lack in depth evaluation.

Methods: This study presents preliminary data from an online self-assessment tool for young people within the age range of 12–30 years (Link: redcap.hmri.org.au/surveys/?s = MK7RCELJ79). It covers key symptoms of mood and psychotic disorders and risk factors, such as eating issues, substance use, suicidality, and deliberate self-harming behaviours. Participants self-assessed their level of functioning, access to ongoing interventions, and satisfaction with the help received. Based on the severity of mental health problems and the level of risk, different recommendations of how to seek help were provided.

Results: Out of 303, 114 participants gave permission to analyse their data. A high-risk profile was defined by anxiety symptoms, panic attacks, suicidal ideation, and urges to self-harm. These individuals were more likely to report psychotic or depression symptoms, recreational substance use and low day-to-day functioning. Ongoing treatment and the satisfaction with it were not determined by the severity of symptoms.

Conclusions: These preliminary results suggest that the online self-assessment tool reaches the intended young audience, particularly those with some degree of mental health problems.

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Plain language summary

Online self-assessments are becoming more popular particularly with young people. They can serve as a screening tool to assess mental health. We developed a new online self-assessment tool for young people 12 to 30 years of age (Link: redcap.hmri.org.au/surveys/?s=MK7RCELJ79). It covers key symptoms of mood and psychotic disorders and risk factors, such as eating issues, substance use, suicidality, and deliberate self-harming behaviours. The tool also asks for a self-assessment of their level of functioning, their access to professional help, and their satisfaction with the help received. The assessment concludes with recommendations how to seek help dependent on the severity of their mental health problems and level of risk. We had 303 young people visiting the tool and 114 gave permission to analyse their data. Young people with anxiety symptoms, panic attacks, suicidal ideation, and urges to self-harm were considered at high risk. They more likely to report psychotic or depression symptoms and recreational substance use and low day-to-day functioning. Ongoing treatment and the satisfaction with it were not determined by the severity of mental health problems. These preliminary results suggest that the online self-assessment tool reaches the intended young audience, particularly those with mental health problems.

Keywords

Youth mental health, risk factors, psychopathology, level of functioning, comprehensive assessment of at-risk mental state

Introduction

Mental illness and substance use disorders account for the largest burden of illness among young people, based on Disability-adjusted Life Years estimates (Whiteford et al., 2015). The *Australian Burden of Disease Study* identified the age cohort between 12 and 25 years as the most affected by mental illness compared to all other medical conditions in the same age group (Australian Institute of Health and Welfare, 2022). In addition, 75% of all mental illnesses manifest before the age of 25 (McGorry & Mei, 2018). Attention and behavioural disorders can be diagnosed as early as 3 years of age, followed by anxiety disorders between the ages of 7 and 14, and emerging bipolar affective and psychotic conditions in adolescents and young adults (Kessler et al., 2007).

Young people with mental health problems are the least supported in the Australian health system, despite the fact that this cohort offers the best opportunity for early intervention before the conditions worsen if untreated (McGorry, 2007). Nonetheless, initiatives such as *Headspace* (Headspace, 2006) have established youth-friendly services outside state-run mental health service providers in Australia. However, the effective use of assessment services is still impeded by social stigma and limited mental health literacy (Easton et al., 2013).

Young people are increasingly relying on internet-based information (Odgers & Jensen, 2020). There are numerous mental health resources available online, such as *Headspace*, the *Black Dog Institute* (Parker, 2002), and *Beyond Blue* (Kennett, 2000) in Australia, as well as *Mental Health America (*Mental Health America, 1909*)* overseas, which offer a suite of online mental health self-assessments. For instance, *Beyond Blue* offers an *Anxiety and Depression Test* K10 (Beyond Blue, 2000), which is based on *Kessler's Psychological Distress Scale* (K19; Andrews & Slade, 2001). After completing the test, participants receive feedback and possible contact points.

Another Australian online initiative is the government-funded *Head to Health* website, which initially launched as *Mental Health Gateway* in 2017 and became a fully functional website in 2022

(Head to Health, 2022). This platform not only provides information on mental health providers, but also offers online self-assessment tools. This self-assessment covers a wide range of psychological stress factors. Upon completion, participants receive a personalised PDF document with a summary of their mental health concerns, together with professional follow-up information.

Although these platforms provide cost-effective guidance for consumers, they have some limitations. Notably, they cannot be used as a substitute in situations that demand mental health professional intervention or vital support during crisis circumstances. In addition, these resources can occasionally be misleading due to the risk of inappropriate "self-diagnosing".

Despite the availability of feasible online tools for mental health self-assessment, there is a need of studies to assess their utility on the young population. Balcombe and De Leo (2023) conducted a systematic review and a meta-analysis of digital mental health platforms and interventions. The final dataset consisted of 22 studies employing quantitative, qualitative, or both methods published between 2012 and 2022. The authors found evidence supporting the feasibility of online tools, but criticised the limited data, the heterogeneity in study designs, and the lack of focus on specific populations, such as young people.

In addition, most of studies focused on the self-evaluation of depression symptoms among the young population do not cover a diverse range of interventions and self-evaluation measures (Orchard et al., 2021). In addition, the influence of individual social environments and the cognitive ability for accurate self-assessment was a common limitation in those studies, thus highlighting the need to shed more light on the topic.

The psychological self-assessment and management tool MyHEARTSMAP (Virk et al., 2019) has been shown to successfully connect youth with appropriate mental healthcare. Virk et al. (2019) revealed good to excellent inter-rater reliability across all psychosocial sections of the assessment tool within diverse community samples.

Despite the prevalence of mental health issues in the young population, only approximately half of the youth in primary care are screened for mental health and risk behaviour issues (Martel et al., 2021). This systematic review showed that although electronic screening proved to be both feasible and acceptable for consumers and providers, raising sensitive issues with the provider continued to cause some discomfort. Overall, the authors concluded that the benefits outweigh drawbacks, including the resistance to implementing such screening by some clinicians. Therefore, there is a need of to improve self-assessment tools and study their feasibility and applicability.

The tool introduced in this study shares a similar goal of connecting young people with mental health concerns with professionals via their primary healthcare provider. Given the familiarity of young people with online tools, we consider our online approach to be youth-friendly. Additionally, the online self-assessment can be conducted privately and can provide valuable insights into the pathology of the reported symptoms, which may ultimately serve as a motivational catalyst for seeking professional help.

The purpose of the current study was to evaluate the usefulness and acceptance of a new online self-assessment tool as well as investigating the characteristics of this population of young people aged from 12 to 30 years, such as demographics, global function levels, psychopathology, illicit substance use, level of risk, access to mental health care, and their satisfaction with it.

Methods

Study design

The current study explores existing on-line data from a self-selected young population volunteering their data for research. Comparison groups were defined post hoc by predetermined criteria splitting the sample according their levels of risk.

Subjects

Data from 303 participants was collected from April 2021 to November 2022.

The study was approved by The University of Newcastle Human Research Ethics Committee (Reference: H-2016-0098; Chief Investigator: Professor (Emeritus) Ulrich Schall, Hunter Medical Research Institute, Healthy Minds Program). Participation in the study was voluntary, and no incentives were provided to participants. The Hunter Medical Research Institute and The University of Newcastle promoted the online-self-assessment tool through their official websites, as well as via social media platforms such as Facebook and Twitter (now X). Link: redcap.hmri.org.au/surveys/?s = MK7RCELJ79

Measures

The online self-assessment tool was developed from the *Comprehensive Assessment of At-risk Mental State* (*CAARMS*; Yung et al., 2005), which is a structured interview originally designed to identify young people at high-risk of developing severe mental illnesses, such as schizophrenia, as a starting point for the development of the online tool. The *CAARMS* evaluates the individuals' functioning levels, psychopathological symptoms associated with emerging psychotic conditions, cognitive and behavioural changes, substance use, and emotional disturbances. When the *CAARMS* interview is conducted by trained health professionals, it can last for approximately 1 hour (Yung et al., 2005), which is not practical for an online self-assessment. Hence, in order to optimise *CAARMS* for its online use, CAARMS served as a starting point for item selection by mental health experts including psychiatrists and clinical psychologists, followed by the involvement of young people to keep the language simple and clear (Moss, 2016). Although youth-friendlessness per se was not formally tested, consumer feedback suggested its youth-friendly design. The *REDCap* software was used to program the tool (Harvey, 2018). The self-assessment can be completed in approximately 15 minutes.

Structure of the self-assessment tool

An initial privacy statement informed participants that no identifiable data would be collected. However, participants were given the choice to voluntarily disclose further personal information with informed written consent (i.e., recorded online with their data set). Otherwise, all data were deleted, with only the number of users and self-assessment completions recorded. The disclaimer was presented following the privacy statement (Figure 1).

Participants were provided with a unique identification number, which was assigned to their individual copy of the questionnaire for their records. Upon agreeing to proceed, participants were asked to estimate their level of global functioning on a sliding scale from zero to 100, where a score of 100 indicated the lowest level of global functioning (2).

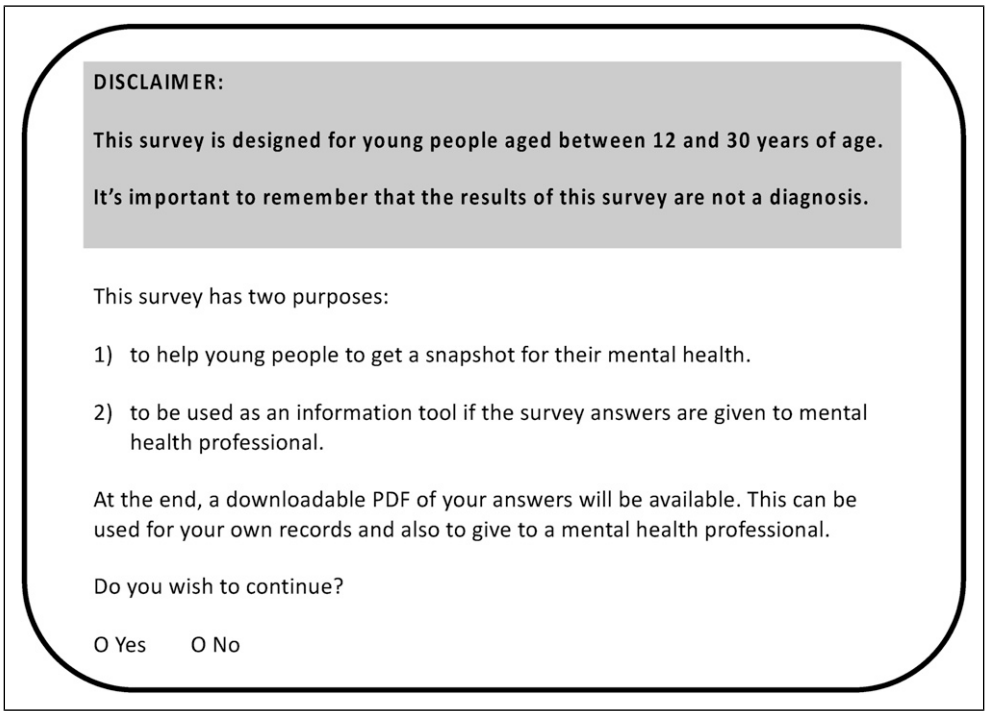

Figure 1. Disclaimer for the online self-assessment.

Participants who reported lower functioning levels had the opportunity to elaborate on their difficulties, including specifying the duration of these challenges in the preceding year. A duration exceeding one month per year was defined as an indication of a serious problem.

The next questionnaire items explored phenomena related to the high risk of developing a psychotic illness according to *CAARMS* criteria. Participants were asked to provide "yes" or "no" responses to each item (Table 1). When selecting one or more items within each category, participants were prompted to specify whether their experiences occurred more frequently than once per week.

The subsequent section of the self-assessment tool covered general mental health concerns (Table 2). The level of risk to self-harm was assessed in a subsequent section (Table 3), followed by questions concerning recreational substance use (Table 4). Once completed, participants were asked for consent to use their data for research purposes and to provide further demographic information, including age, gender, indigenous Australian identity, whether they were a first or second-generation migrant to Australia, postcode, family history of schizophrenia or bipolar affective disorder, medication prescriptions for mental health conditions, engagement with mental health professionals, and satisfaction with the received support. Participants were also asked whether they took the survey for themselves or on behalf of another person.

All participants received personalised recommendations (Table 5) upon completing the self-assessment, regardless of their data-sharing choices or the provision of additional information. The specific feedback provided (Table 3) was dependent on the participant's individual level of risk (Table 3). Recommendations (1) and (2) were tailored to other flagged mental health problems identified during the self-assessment (Table 1, 2 and 4). In cases where no mental health issues were identified, recommendation (4) was provided.

Table 1. Unusual Thought Content and Form and Perceptual Phenomena.

Thoughts and feelings	
1	Do you experience uncertainty about your thoughts or a feeling that something in the world around you is not quite right? For instance, do you feel like people, objects, or events have a particular, and perhaps unusual significance for you? [If 'Yes': Do these feelings occur multiple times a week?]
2	Do you feel that someone is giving you a hard time or trying to hurt you? Do you have the perception that someone is spying on you, spreading rumours about you, stalking you or even conspiring against you? [If 'Yes': Do you know this as a matter of fact or has it been confirmed by others?]
Gustatory, olfactory, sensory, auditory, and visual hallucinations	
3	Do you sometimes hear something that others did not hear, such as your name being called out or the phone ringing when it did not ring?
5	Do you sometimes hear a voice in your head that is not your own? Do you experience visions like seeing shadows or things that others cannot see?
6	Have you ever felt like you are being touched or that something is beneath your skin?
7	Have you ever experienced strange and unexplainable sensations in your body?
8	Have your sense of taste or smell changed? For instance, do things sometimes taste or smell bad or different, and others do not share the same experience? [If 'Yes' to any of the hallucination items: Does this happen several times per week?]
Linguistic peculiarities	
9	Do you find difficult to communicate with others? For instance, do you lose track of what you want to say, or struggle to get your point across effectively?
10	Have people ever mentioned that you sometimes speak in a way that does not make sense or that you use uncommon or incorrect words? [If 'Yes': Does this occur several times per week?]

Table 2. Other Potential Mental Health Problems.

	General feelings items
1	I Am usually a happy person
2	I Often feel low, fatigued, a lack of energy and motivation
3	I Have trouble sleeping
4	I Have noticed a decreased appetite and have lost weight
5	I Eat more than I want and feel guilty about it
6	I Sometimes experience bursts of energy that disrupt my sleep, occasionally leading to a loss of self-control and regrettable actions
7	I Am usually a relaxed and considerate person
8	My friends like me and I feel supported and safe with them
9	I Am a very organised person. I Feel distress if I cannot do things my way
10	I Am easily irritated, often "short fused", and my anger or outbursts can be scary
11	I Feel like I was born in the wrong body

Category scores and group assignments

In order to categorise participants, variable categories were generated and sum scores assigned based on the number of affirmative responses in each category: psychosis (Table 1), general psychopathology and depression, respectively (Table 2), high risk (Table 3), and substance use (Table 4).

Table 3. High-Risk Determination Items.

Feelings about yourself	
1	I Often experience excessive anxiety and tend to avoid people or situations that trigger this anxiety
2	I Suffer from panic attacks
3	I Sometimes have thoughts that life would be better if I was dead
4	I Have impulses to self-harm, such as cutting or burning myself when I feel distressed or upset

Table 4. Recreational Substance-Use Items.

Use of certain drugs	
1	I Smoke weed because it helps my sleep
2	I Regularly smoke weed
3	I Enjoy having a drink or two, but I easily lose control when I drink more than I intended to
4	I Have done party drugs
5	I Still do party drugs

Table 5. Recommendations Dependent of Severity of Mental Health Problems.

1	Some of your responses suggest that you are under-supported for your mental health. This is nothing to be worried about, but it is a good idea to check in with your GP. You can obtain a PDF copy of your survey results on the next page. If you can't see your GP, you can also reach out to headspace at 02 4929 4201. Further support options can be found at: eHeadspace - 1800 650 890, kids helpline - 1800 55 1800, and lifeline - 13 11 14
2	Some of your responses suggest that you need support for your mental health. We encourage you to check in with your GP. You can obtain a PDF copy of your survey results on the next page. If you are unable see your GP, you can contact headspace on 02 4929 4201. Further help can be found at: eHeadspace - 1800 650 890, kids helpline - 1800 55 1800, and lifeline - 13 11 14
3	Based on some of your responses. We strongly urge you contact your GP or local mental health service. Please take a PDF copy of your results and give these to your GP. If visiting your GP is not an option, you can also call headspace on 02 4929 4201. Additional assistance can be found at: eHeadspace - 1800 650 890, kids helpline - 1800 55 1800, and lifeline - 13 11 14
4	No worries. You seem to be doing well! however, as this is a brief survey, we cannot guarantee that this is actually the case. If you still have concerns, consider speaking with your school counsellor or GP. Contacting headspace (02 4929 4201) is another option. You can save your answers as a PDF for your personal records copy or share it with the professional you wish to see. Clicking 'submit' will take you to your PDF.

The Depression category (Table 2) comprised the following six items: *"I am usually a happy person; I often feel low, fatigued, a lack of energy and motivation; I have trouble sleeping; I have noticed a decreased appetite and have lost weight; I am usually a relaxed and considerate person; I am easily irritated, often "short fused", and my anger or outbursts can be scary."*

The high-risk group was defined by agreeing to more than one high-risk item (Table 3). Participants agreeing to only one or none of the high-risk items were classified as the "low-risk group".

We hypothesised that the low versus high-risk groups differ in gender identity, self-harming behaviours, severity of depression, and their risk of psychosis. We further hypothesised that

receiving care and being satisfied with it as well as the self-assessed function level is determined by substance use and severity of psychopathology.

Statistical analyses

Demographics and statistical analyses were performed with *SPSS* software (IBM © SPSS Statistics, Version 29). A significance level (α) was set at $p < .05$ (two-tailed). Item frequencies were assessed with χ^2 *Tests,* while group comparisons were performed non-parametrically based on category sum scores using the *Mann-Whitney U Test* due to analysing ordinal data.

Spearman Correlation Coefficients and the *Kruskal–Wallis Test* was employed to test the association of the number of high-risk items (0–4; Table 3) with the sum scores for psychosis (Table 1), substance use (Table 4), and depression items (Table 2) as well as self-rated daily functioning (Figure 2).

Regression analyses were employed to explore relationships of psychopathology and substance use with self-rated global function levels, engagement with health professionals and finding it helpful. Gender and age were included as moderator variables. The assumptions for linear regression (i.e., normality, linearity, homoscedasticity, and multicollinearity) were tested in *SPSS*. *Boxplots* were used to examine data for potential outliers. Statistical power was calculated post hoc as *Partial Eta Square* (η^2) for *Mann-Whitney U* and *Kruskal-Wallis Tests. For* χ^2 *Tests, Cramer's V* and *phi* (ϕ) was used.

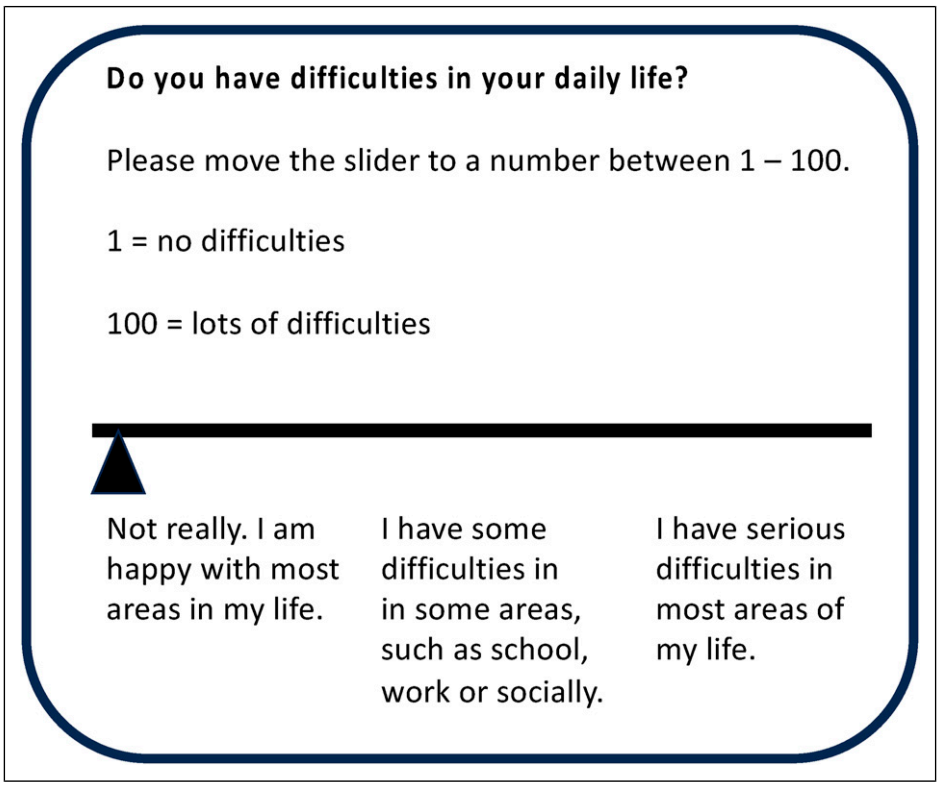

Figure 2. Level of self-assessed global functioning.

Results

Sample selection and demographics

Out of the total 303 participants, 125 data sets were incomplete and 6 participants were over 30 years old. In addition, one data set was a test run by the programmer and 57 participants declined the use of their data for research. Therefore, the current study includes 114 data sets, consisting of 75 females, 30 males, and 9 individuals identifying as gender diverse (M = 18.6 years, SD = 4.0. However, 20 individuals did not reveal their age. Four individuals (3.5%) identified as indigenous, which corresponds to the proportion of indigenous people in the Australian population (Stoneham et al., 2014). Most participants resided in New South Wales, one in Western Australia, and 18 participants did not provide their postcode (Figure 3).

High risk sample characteristics

Among the participants, only 26 (23%) did not agree to any of the four high-risk items, whilst 101 (89%) admitted to at least one of the high-risk items (Table 3), and thus were recommended to seek professional help (Option 3 in Table 5).

Of the participants, 88 (77%) agreed to two or three of the high-risk items and 37 (32%) agreed to all four high-risk items. Of those, 36% were female, 20% male and 44% identified as gender diverse. In addition, 11 participants were first-generation migrants and 25 were second-generation migrants. There was no significant association of high-risk with migration status ($\chi^2 = 1.48$, $df = 2$, $p > .05$). Finally, 44 participants (38%) reported undergoing mental health treatment (41% female, 27% male, and 56% gender diverse participants), with 30 of them (70%) expressing satisfaction with their treatment (60% female, 18% male, and 22% gender diverse participants).

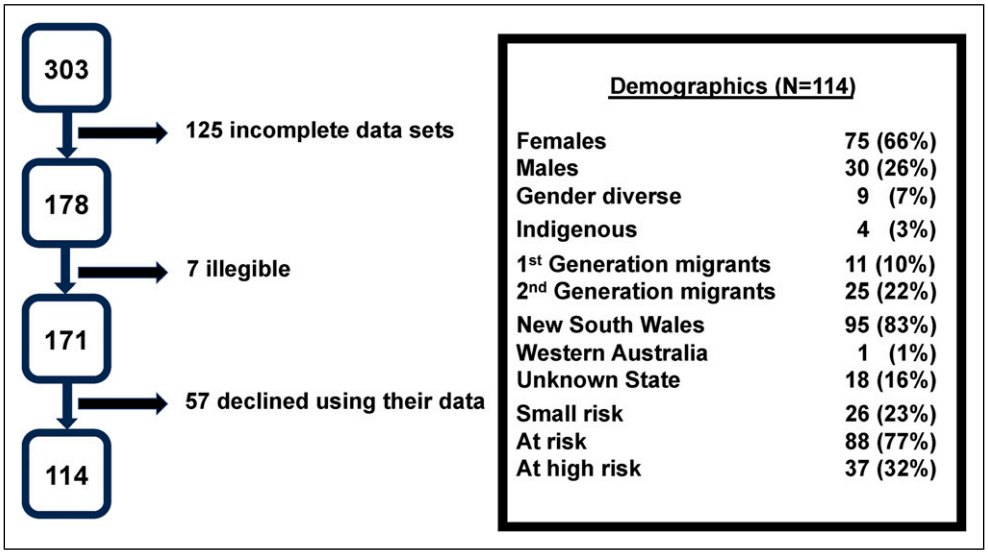

Figure 3. Sample selection and demographics of final data set. See results section for further details.

There were no significant differences in gender identification (χ^2 = 0.01, df = 2, p > .05). However, the item "*I feel like I was born in the wrong body"* was associated with gender (9 females, 7 males and 5 gender diverse participants; χ^2 = 10.8, df = 2, p < .01; *Cramer's V* = .31).

Approximately half of the participants (51%) agreed with the statement *"I eat more than I want and feel guilty about it",* with variations across gender (45 female, 6 male, and 7 gender diverse participants; χ^2 = 16.55, df = 2, p < .001; *Cramer's V* = .38).

Higher sums scores of psychosis, substance use, and depression items were associated with higher levels of risk, respectively (H = 12.67–44.17, df = 4, p = .013 - p < .001; η^2 = .36 -. 39). Higher levels of risk were also associated with lower self-rated function levels (H = 30.85, df = 4, p < .001; η^2 = *.27*). Migration status was not significantly associated with high risk (H = 1.67, df = 4, p > .05).

The substance use score was significantly higher in the high-risk group versus the low-risk group (U = 1324.50, p < .05; η^2 = 20; Figure 4(a)). Self-assessed global function levels were lower in the high-risk group (U = 737.00, p < .001; η^2 = .47; Figure 4(b)). The combined depression score was also significantly higher in the high-risk group (U = 704.50, p < .001; η^2 = .49; Figure 5(a)). Not agreeing to *"I am usually a happy person"* was significantly more frequent in the high-risk group (χ^2 = 15.78, df = 1, p < .001, φ = .37). Finally, the combined psychosis score was also higher in the high-risk group (U = 622.00, p < .001; η^2 = .53; Figure 5(b)). Agreeing to recreational substance use (H = 1.65, p > .05), depression (H = 1.54, p > .05) and psychosis-related (H = 0.69, p > .05) items did not differ between gender.

Global function levels and mental health

The mean value for the global level of functioning was 61.96 (SD = 22.32). The explorative regression analysis identified depression, psychosis and substance use combined to significantly predict self-assessed global function levels (*ANOVA F* = 25.44, p < .001; R^2 = 0.41) with depression items showing the strongest association (β = 0.63, p < .001; Figure 6), while elevated risk for psychosis predicted lower self-rated function levels (r_s = 0.37, p < .001).

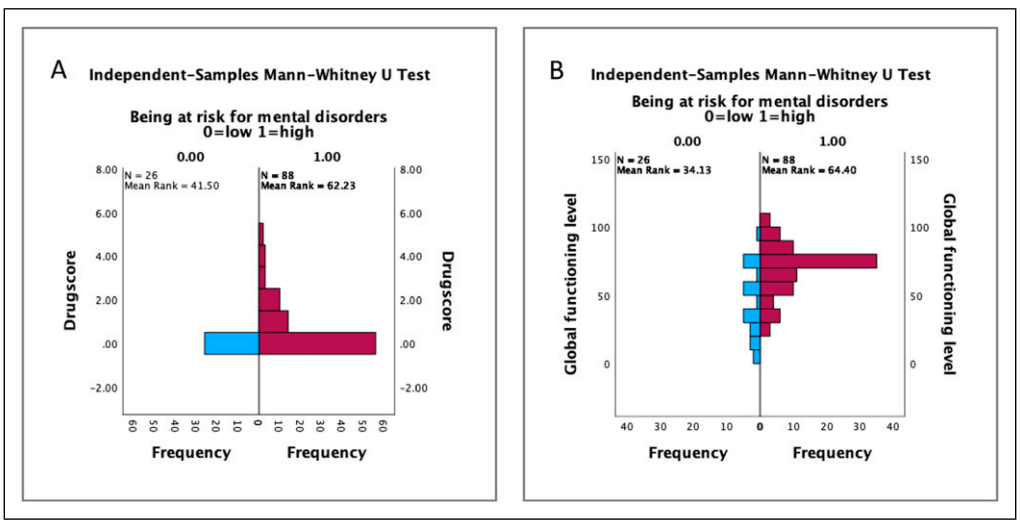

Figure 4. (a) Recreational substance use and (b) global function levels of high versus low mental health risk.

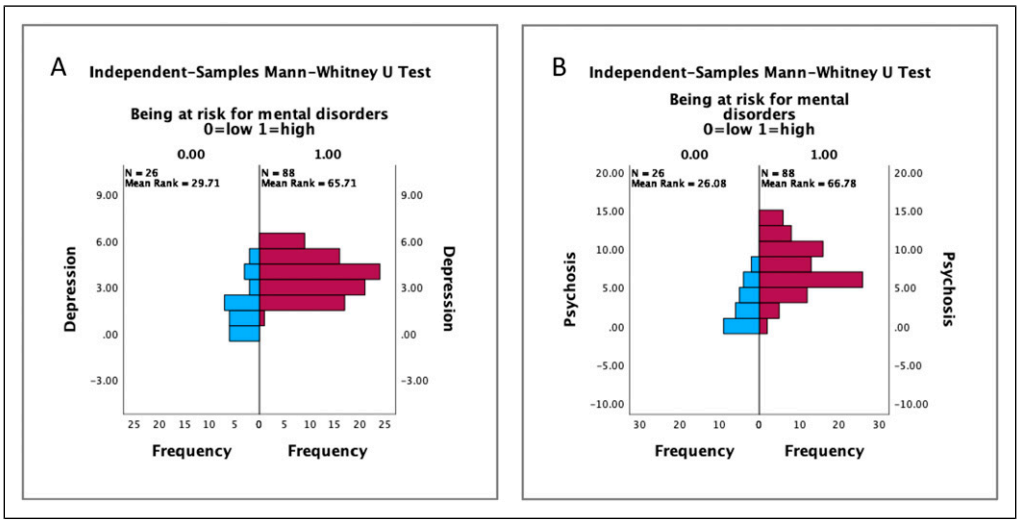

Figure 5. (a) Depression score and (b) psychosis score high versus low mental health risk.

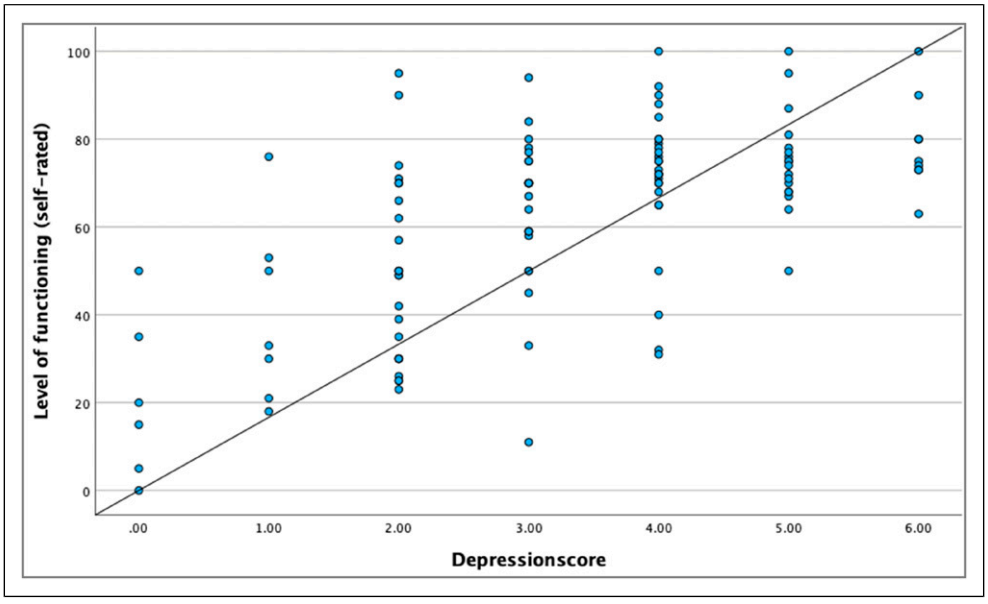

Figure 6. Correlation (r_s = 0.63, p < .001) of high depression score with low self-assessed global function levels.

Discussion

The online self-assessment tool presented here effectively reached the intended young population with various levels of mental health concerns. Only six data sets were excluded because of the age exceeding the intended range of 12–30 years. Notably, predominantly women (65.7%) conducted

the self-assessment of their mental health, suggestive of a higher motivation to seek help compared to their male counterparts, despite not differing in their risk levels. It is commonly observed that females report more often mental health problems than males (Tedstone Doherty & Kartalova-O'Doherty, 2010; Roberts, 1991). Similarly, Haavik et al. (2019) reported that female teenagers were more likely to not only identify psychological problems, but also to seek professional help.

In support of our hypotheses, a high-risk profile was associated with low global functioning, psychosis and depression items, and recreational substance use. High scores on depression, recreational substance use, and psychosis items were also associated with lower self-assessed global function levels. However, psychopathology and recreational substance use did not exhibit significant associations with ongoing treatment or satisfaction with treatment. Age and gender did not play a significant role in these associations.

When evaluating the findings of this study, it is necessary to acknowledge the inherent limitations of a self-selected sample, which is not representative of the general Australian young population. The cohort who voluntarily participated in the self-assessment for this study were burdened by a range of mental health problems. In addition, most of the data collection occurred during the COVID-19 pandemic, when schools were closed and day-to-day life was profoundly impacted by various levels of lock-downs, factors that may have influenced the participants mental health. Indeed, recent studies have reported negative impacts of the COVID pandemic on mental health, with rising levels of anxiety and increasing diagnoses of depression disorders at a population level (Fisher et al., 2020).

The self-assessment was based on the subjective experiences of potential mental health symptoms. Hence, we cannot extrapolate on potential diagnoses. However, the data provides valuable insights into how various symptom domains correlate with self-rated global functioning levels. Particularly, recreational substance consumption at concerning levels, symptoms indicative of depression, and perceptual phenomena together with unusual thought content were associated with lower self-rated global functioning and higher risk levels in our cohort. However, the actual impact on the socio-occupational functioning remains unknown. Hence, the addition of sections to the tool inquiring about areas of poor functioning in school, work, or social contexts would provide a more comprehensive understanding.

Finally, the lack of knowledge on whether the provided recommendations for seeking help were followed through is another limitation of the present study. The incorporation of a *Likert* scale to assess the likelihood of intending seeking help would be a meaningful addition to the tool.

In summary, our online mental health self-assessment tool was predominantly visited by the intended younger population. Of those completing the self-assessment and agreeing to have their data included in the current study, the level of psychopathology and risk was considerably high. However, only 38% reported receiving treatment for their mental health problems, indicating a disproportionally low participating rate in seeking professional help, particularly among male participants. The reasons for this were not assessed here and would require a more extensive database to identify potential barriers, including but not limited to factors such as rurality, financial limitations, stigma, and ethnicity.

Motivating young people with mental health problems or at risk of developing a severe mental illness, and providing appropriate youth-friendly services, are crucial to offer early evidence-based intervention. However, public mental health services are traditionally designed to provide care to patients with an established mental illness or in crisis. Hence, the threshold for young people accessing appropriate care is often too high and remains hidden below this access threshold. Offering internet-based pathways into care is a promising approach, provided that these pathways are also supported by appropriate services.

Declaration of conflicting interests

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