A web-based application for reducing methamphetamine use amongst Aboriginal and Torres Strait Islander people: A wait-list control randomised trial.

Rachel Reilly, Rebecca McKetin, Federica Barzi, Tayla Degan, Nadine Ezard, Kate Conigrave, Julia Butt, Yvette Roe, Handan Wand, Brendan Quinn, Wade Longbottom, Carla Treloar, Adrian Dunlop, James Ward

Submitted to: Journal of Medical Internet Research
on: March 13, 2024

Table of Contents

A web-based application for reducing methamphetamine use amongst Aboriginal and Torres Strait Islander people: A wait-list control randomised trial.

Rachel Reilly[1, 2] BA, MClincSci, DPsych; Rebecca McKetin[3] BSci, PhD; Federica Barzi[4] PhD; Tayla Degan[3] MPsych, PhD; Nadine Ezard[3, 5] BA, MPH, MBBS, PhD; Kate Conigrave[6] MBBS, PhD; Julia Butt[7] BSci, PhD; Yvette Roe[8] PhD; Handan Wand[9] MSci, PhD; Brendan Quinn[10] BA, PhD; Wade Longbottom[11]; Carla Treloar[12] BSci, PhD; Adrian Dunlop[13] MBBS, PhD; James Ward[4] PhD

[1]Wardliparingga Aboriginal Health Equity South Australian Health and Medical Research Institute Adelaide AU
[2]School of Psychology University of Adelaide Adelaide AU
[3]National Drug and Alcohol Research Centre University of New South Wales Sydney AU
[4]Poche Centre for Indigenous Health University of Queensland Brisbane AU
[5]St Vincent's Hospital Sydney AU
[6]Faculty of Medicine and Health University of Sydney Sydney AU
[7]School of Arts and Humanities Edith Cowan University Perth AU
[8]Molly Wardaguga Research Centre Charles Darwin University Brisbane AU
[9]The Kirby Institute University of New South Wales Sydney AU
[10]Burnet Institute Melbourne AU
[11]South Coast Aboriginal Medical Service Corporation Nowra AU
[12]Centre for Social Research in Health Social Policy Research Centre University of New South Wales Sydney AU
[13]School of Medicine and Public Health University of Newcastle Newcastle AU

Corresponding Author:
Rachel Reilly BA, MClincSci, DPsych
School of Psychology
University of Adelaide
North Terrace
Adelaide
AU

Abstract

Background: Digital interventions can help to overcome barriers to care including stigma, geographical distance and a lack of culturally appropriate treatment options. We Can Do This was a web-app designed with input from cultural advisors and end-users to support Aboriginal and Torres Strait Islander people seeking to stop or reduce their use of methamphetamine and increase psychosocial wellbeing.

Objective: We sought to evaluate the effectiveness of the web-app via a wait-list control, randomised trial

Methods: Aboriginal and Torres Strait Islander people aged 16 or over who self-identified as having used methamphetamine weekly for the past three months were invited to participate online. Following a baseline survey, participants were randomised to either the intervention group, who could access the web-app for six weeks, or the control group, who received harm-minimisation material. Participants repeated the survey at one, two and three months post-baseline. We hypothesized that the intervention group would have significantly reduced frequency of use at three-month follow-up. Secondary outcomes included help-seeking, psychosocial distress and days spent out of usual role due to methamphetamine use.

Results: Participants at baseline were 210 Aboriginal and/or Torres Strait Islander men and women aged 16 or over. Methamphetamine use declined significantly in all participants who completed three-month follow-up, however there were no significant differences between intervention and control groups on the primary or secondary outcomes.

Conclusions: Drop out and a lack of sustained engagement hindered our ability to evaluate the effectiveness of the web-app. Nonetheless, the trial gleaned some useful lessons relating to recruitment and engagement in web-apps. Clinical Trial: Australian New Zealand Clinical Trials Registry ACTRN12619000134123p;

https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=376088&isReview=true

(JMIR Preprints 13/03/2024:58341)
DOI: https://doi.org/10.2196/preprints.58341

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

A web-based application for reducing methamphetamine use amongst Aboriginal and Torres Strait Islander people: A wait-list control randomised trial *Original Paper*

Rachel Reilly, BA(Hons), MClinSci, D.Psych[1]
Rebecca McKetin, BSci(Hons), PhD[2]
Federica Barzi, PhD[3]
Tayla Degan, MPsych (Clin), PhD[2]
Nadine Ezard, BA, MPH, MBBS, PhD[4,5]
Kate Conigrave, MBBS, PhD[6]
Julia Butt, BSci(Hons), PhD[7]
Yvette Roe, PhD[8]
Handan Wand, MSci, PhD[9]
Brendan Quinn, BA(Hons), PhD[10]
Wade Longbottom[11]
Carla Treloar, BSc(Hons), PhD[12]
Adrian Dunlop, MBBS, PhD[13]
James Ward, PhD[3]

1. Wardliparingga Aboriginal Health Equity Theme, South Australian health and Medical Research Institute; Adelaide, Australia; School of Psychology, University of Adelaide, Adelaide, Australia.
2. National Drug and Alcohol Research Centre, University of New South Wales, Sydney, Australia.
3. POCHE Centre for Indigenous Health, Faculty of Health and Behavioural Sciences, Brisbane, Australia.
4. National Centre for Clinical Research on Emerging Drugs, National Drug and Alcohol Research Centre, University of New South Wales, Sydney, Australia;
5. St Vincent's Hospital Sydney, Australia
6. Faculty of Medicine and health, University of Sydney, Sydney, Australia.
7. School of Arts and Humanities, Edith Cowan University, Perth, Western Australia.
8. Molly Wardaguga Research Centre, Charles Darwin University, Brisbane, Australia.
9. The Kirby Institute, University of New South Wales, Sydney, Australia.
10. Burnet Institute, Melbourne, Australia
11. South Coast Aboriginal Medical Service Corporation, Nowra, Australia
12. Centre for Social Research in Health, Social Policy Research Centre, University of New South Wales, Sydney, Australia
13. School of Medicine and Public Health, University of Newcastle, Newcastle, Australia

Corresponding author: Rachel Reilly, rachel.reilly@sahmri.com, SAHMRI, PO Box 11060, Adelaide 5001

Each author certifies that their contribution to this work meets the standards of the International Committee of Medical Journal Editors

ABSTRACT

Introduction: Digital interventions can help to overcome barriers to care including stigma, geographical distance and a lack of culturally appropriate treatment options. *We Can Do This* is a web-app that was designed with input from cultural advisors and end-users to support Aboriginal and Torres Strait Islander people seeking to stop or reduce their use of methamphetamine and increase psychosocial wellbeing. We evaluated the effectiveness of the 'We Can Do This' web-app as a psychosocial treatment for Aboriginal and Torres Strait Islander people who use methamphetamine.

Methods: The web-app was evaluated using a randomised wait-list controlled parallel group trial. Participants were Aboriginal and Torres Strait Islander people aged 16 years or over who self-identified as having used methamphetamine at least weekly for the past three months. Participants were randomised on a 1:1 ratio to receive either access to the web-app for 6 weeks or a waitlist control group. Both groups received access to online harm minimisation information. The primary outcome was days of methamphetamine use in the past 4 weeks assessed at one, two and three months post-randomisation. Secondary outcomes included severity of methamphetamine dependence (Severity of Dependence Scale), psychological distress (Kessler 10), help-seeking behaviour, and days spent out of role due to methamphetamine use. The trial was prospectively registered (ANZCTRN12619000134123).

Results: Participants (N = 210) were randomised to receive either access to the web-app (n = 115) or the waitlist control condition (n = 95). Follow-up was 63% at 1 month, 57% at 2 months and 54% at 3 months. There were no significant group differences in days of methamphetamine use in the past 4 weeks at 1 the month (mean difference 0.2 days, 95% CI -1.5 – 2.0 days), 2 month (mean difference 0.6 days, 95% CI -1.0 – 2.4 days) or 3 month (mean difference 1.4 days, 95% CI –0.3 – 3.3 days) follow-up. There were no significant group differences in K10 scores, SDS scores, days out of role or help-seeking at any of the three follow up timepoints. There was poor adherence to the web-app: only 20% of participants in the intervention group returned to the web-app after their initial log-in. Participants cited personal issues and forgetting about the web-app as the most common reasons for non-adherence.

Discussion and Conclusions: We found poor engagement with this web-app. The web-app had no significant effects on methamphetamine use or psychosocial well-being. Poor adherence and low follow-up hindered our ability to accurately evaluate the effectiveness of the web-app. Future web-apps for this population need to consider methods to increase participant engagement.

Keywords: Methamphetamine; Aboriginal and Torres Strait Islander Health; Web-based intervention; randomised controlled trial

INTRODUCTION

Methamphetamine use is an issue of deep concern in Australia, including in Aboriginal and Torres Strait Islander communities.[1-4] Although rates vary geographically and Aboriginal and Torres Strait Islander people tend to be under-represented in national population surveys, the available data suggests that nationally, the rate of methamphetamine use is at least two times higher amongst Aboriginal and Torres Strait Islander people compared to the general population (2.9% vs 1.3%).[5, 6] Regular and frequent methamphetamine use is associated with long term physical, psychological and social harms.[7, 8] Previous research has found that while both Aboriginal and Torres Strait Islander and non-Indigenous people who have recently used methamphetamine experienced harms such as an excess burden of psychological distress, exposure to violence and economic exclusion [9], Aboriginal and Torres Strait Islander people who have recently used methamphetamine reported significantly higher rates of racial discrimination, excessive grief, perceived social isolation and complex trauma than their non-Indigenous counterparts.[1, 9, 10] Key protective factors for Aboriginal and Torres Strait Islander participants included connection to culture and contact with Elders.[1]

These differences in the social processes leading to use, the contexts in which people use, and the community and cultural strengths that may assist recovery points to a need for culturally specific resources for Aboriginal and Torres Strait Islander people seeking to reduce or stop using methamphetamine. [9] In a context where demand for specialist alcohol and other drug (AOD) treatment across urban, rural and remote settings in Australia is not met by available services, much of the burden for providing care to people who use methamphetamine falls to primary health care services.[11] The Novel Interventions to Address Methamphetamine in Aboriginal and Torres Strait Islander Communities (NIMAC) project was developed in response to calls from Aboriginal Community Controlled Health Services (ACCHS) and the community at large to find ways to better support ACCHS to reduce the harms associated with methamphetamine use.[1, 4, 9]

Web-based interventions have emerged as a popular, feasible and cost-effective way to provide treatment for substance use disorders. Evidence suggests that web-based interventions can be effective in the treatment of substance use disorders.[12-14] However, effectiveness can vary according to intervention type, characteristics of both the web-app and end-users, and substances targeted.[12-15] Although research in this space is ongoing, to date, there are limited interventions tailored to the treatment of methamphetamine use [12] and no known interventions targeting methamphetamine use for Aboriginal and Torres Strait Islander communities.

A scoping review of evidence on uptake of web-based interventions in Indigenous communities

internationally, found that such interventions can reduce barriers stemming from geographical distance, access to specialists, or stigma; they can support health practitioners provide better care to clients for a range of health conditions, but they need to be developed in partnership with communities.[16] There is evidence that online and digital interventions are acceptable and feasible in Aboriginal and Torres Strait Islander communities, with several such interventions developed for AOD assessment [17, 18], psychosocial assessment and care planning [19], and suicide prevention. [20] Given the lack of specialist AOD services and the stigma associated with methamphetamine use, which is known to prevent help-seeking [4], an online intervention was considered a possible way to improve access to an evidence based therapeutic intervention. Further, in a survey conducted within the NIMAC project of 734 Aboriginal and/or Torres Strait Islander and non-Indigenous people who had used methamphetamine in the previous 12 months, we found that more than 90% of respondents had a mobile phone, and of these, 80% accessed the internet on their phone, which provided some initial indication that an online intervention may be feasible for this population.[9]

The objective of this research was to test the effectiveness of the *We Can Do This* web-app. The details of the web-app have been reported elsewhere.[21] In brief, *We Can Do This* comprised seven modules that were co-designed with clinicians, representatives of Aboriginal Community Controlled Health Services and people with experience of use. Psychoeducational material, interactive exercises, planning and goal setting exercises were drawn from cognitive behavioural therapy, motivational interviewing, acceptance commitment therapy and narrative approaches. Content was presented with films based on real narratives developed from qualitative interviews, and cultural content provided by advisors from diverse Aboriginal nations.[21]

Our primary hypothesis was that participants who use the web-app regularly for six weeks would have significantly reduced days of methamphetamine use in the last four weeks at one-, two- and three-months post-intervention, compared to wait-listed participants with access to treatment as usual (TAU) including information about harm-minimisation and where to access support. We also hypothesised change on secondary outcomes at three-month follow-up would include increased help-seeking, decreased psychosocial distress and fewer days out of role.

METHODS

Trial Design

The web-app was evaluated via a wait-list randomised control trial conducted in partnership with 10 urban and regional Aboriginal Community Controlled Health Services (ACCHS) across six Australian states and territories including South Australia (2), New South Wales (3), Queensland (1), Northern Territory (1), Western Australia (1) and Victoria (2). The trial protocol was registered with the Australian and New Zealand Clinical Trials Registry (ANZCTRN12619000134123) on 10 April, 2019.[21] Participants were randomly allocated to the intervention or wait-list group with 1:1 ratio. Random numbers were generated using the statistical software Stata 14.0 (College Station, TX) by a statistician not otherwise involved in the trial. The trial was approved by ethics committees in all relevant jurisdictions: Aboriginal Health Research Ethics Committee of South Australia (04-19-810); Aboriginal Health and Medical Research Council of New South Wales (1484/19); University of Queensland (2020001710); Menzies School of Health Research (2019-3330); Central Australian Human Research Ethics Committee (CA-20-3779); Western Australian Aboriginal Health Ethics Committee (1002); St Vincent's Hospital Melbourne Human Research Ethics Committee (52756: 149/20); University of Tasmania (23229);

Participants

Participants were eligible to participate if they were Aboriginal and/or Torres Strait Islander, aged 16

or over, and self-identifying that they had been using methamphetamine about weekly for the previous three months. Eligibility was confirmed by participant self-report on entry to the online web-app platform. Participants were initially recruited via advertisements in health services and on social media. All participants were invited to provide informed consent online prior to completing any study assessments.

Initially, the web-app was designed to facilitate direct referral via the app to weekly support from health practitioners at partner health services. To enable wider recruitment, this function was modified to enable participants to self-refer to a local service regardless of geographical location within Australia (see https://www.anzctr.org.au/ for details). In consultation with the trial management committee, additional changes made post-trial commencement to aid recruitment were 1) Providing a voucher for reimbursement for completion of the baseline survey ($25); 2) Increasing the value of voucher reimbursement for the first follow-up survey (from $20 to $25); introducing peer recruitment, where peers were offered $20 for every participant referred to the project; 4) reducing the number of questions in the assessments to reduce drop-out before reaching randomisation; and 5) extending the recruitment period.

Procedures

Advertisements directed participants to a web landing page that included information about the project in both written and audio-visual format. After providing consent, all participants completed a survey at baseline prior to randomisation. After participants completed the baseline survey, they were randomised to either the intervention group or a waitlist control group according to a 1:1 ratio. The randomisation schedule was developed by a statistician who was not involved with study participants (HW). Random numbers were generated using the statistical software Stata 14.0 (StataCorp LLC). All participants were followed up at one-, two- and three-months post-baseline. Assessments were completed via self-report online, with an option to have a researcher call to complete the assessment over the phone if this was considered easier. Attempts were made to contact all participants by email, SMS and phone for follow-up assessments if they failed to respond to follow-up assessments within two weeks. After 120 days post baseline, participants were considered lost to follow-up.

Intervention

The intervention group received access to the *We Can Do This* web-app for 6-weeks. Participants could access the seven modules on smart-phone, tablet or computer, and complete in a self-paced manner. There was no restriction on the order in which participants could complete the modules. To commence the intervention, participants set up an account in the web-app. During the six weeks' access of the intervention, they received weekly reminders to log-in via email, with encouragement

to log in for around half an hour per week. If the system identified that a participant had not logged in for seven days, this triggered a text message with a prompt to log in and a link to the web-app.[21]

Control Group

Participants allocated to the wait-list group were directed to the study website, with links to harm-minimisation information and options for self-referral to alcohol and other drug (AOD) counselling. Participants in this group were sent a link with access to the web-app immediately following the completion of their final follow-up survey. The wait-list control group then had access to the web-app for six weeks.

Measures

Primary outcome

The primary outcome was the number of days the participant used methamphetamine in the past 4 weeks, assessed at baseline and one, two and three months post-baseline using the Australian Treatment Outcome Profile (ATOP, [22]).

Secondary outcomes

Secondary outcomes were help-seeking intention, assessed using the General Help-Seeking Questionnaire [23], readiness to change (Readiness to Change Questionnaire [24]); psychological distress (Kessler 10 [25]); severity of dependence on methamphetamine in the past month (Severity of Dependence Scale (SDS) [26]); and other substance use during the past month, including cannabis, alcohol, tobacco, benzodiazepines, heroin, other opioids, cocaine, ecstasy and other drugs (ATOP [22]), and days out of role during the past month, resulting from methamphetamine use.[27]

Other measures

Usability and acceptability of the web-app were measured using the Internet Intervention Adherence Questionnaire [28], which includes questions about barriers and facilitators to using the program and optional free-text to report any criticisms or other feedback.

Overall feasibility of the online intervention was assessed by observing the uptake and use of the online intervention (number of modules accessed). Number of visits to the web-app overall and per module were monitored using Google Analytics. The Internet Intervention Adherence Questionnaire [28] was included in the second follow-up questionnaire for the intervention group.

Statistical methods

Based on our previous research we expected a baseline mean of 16 days methamphetamine use in the past 4 weeks.[29, 30] Our original sample size of 288 participants was intended to detect a reduction from a mean of 16 (standard deviation 14.5) days of use in the past four weeks to a mean of eight use

days in the past four weeks at each of the follow-up points, with 90% power at a p< 0.01, allowing for 30% attrition (i.e., 100 per group at follow-up). Our final sample included 210 participants and we observed a 40% attrition. With this sample we are able to detect a reduction from 16 days use in the past four weeks to a mean of six use days in the past four weeks at each of the follow-up points, with 90% power at p< 0.01

Data analysis

An intention-to-treat analysis was used to compare the primary and secondary outcomes for the intervention vs. the wait-list, two and three months from baseline. Descriptive statistics of baseline characteristics were provided by randomisation group. Continuous variables were summarised with mean and standard deviation (SD) when appropriate, or median and interquartile range (IQR) when not normally distributed, categorical variables were summarized with frequency and percentage.

Multilevel mixed-effects generalized linear model, with either a Gaussian, Poisson or robust Poisson distribution as appropriate for each specific outcome, were used to estimate change between: (i) baseline and 1-month assessment (ii) baseline and 2-month assessment (iii) 3-month and 3-month assessment. To compare the changes described above between study arms the models included a categorical variable for the study arms, a categorical variable for each time point and an interaction term between arm and time. The use of mixed models has the advantage of allowing the modelling of the correlation between repeats of outcome recorded within the same participant. A per-protocol analyses was carried out to assess the effect of the intervention for those participants that accessed the app at last once versus those participants that never accessed the app. Sensitivity analyses were also carried out that included baseline outcomes in the models when descriptive analyses showed important between intervention arm differences for baseline scores.

Statistical significance was set at p < 0.01. Statistical analysis was conducted using Stata 18 (StataCorp, TX, USA) statistical software.

RESULTS

Recruitment continued for a total of 22 months from December 2019 to October 2022 with the final follow-up completed in February 2022. Of the 210 participants who completed the baseline survey, 95 were randomised into the wait-list control group and 115 into the intervention group. Participant flow and attrition is shown in Figure 1.

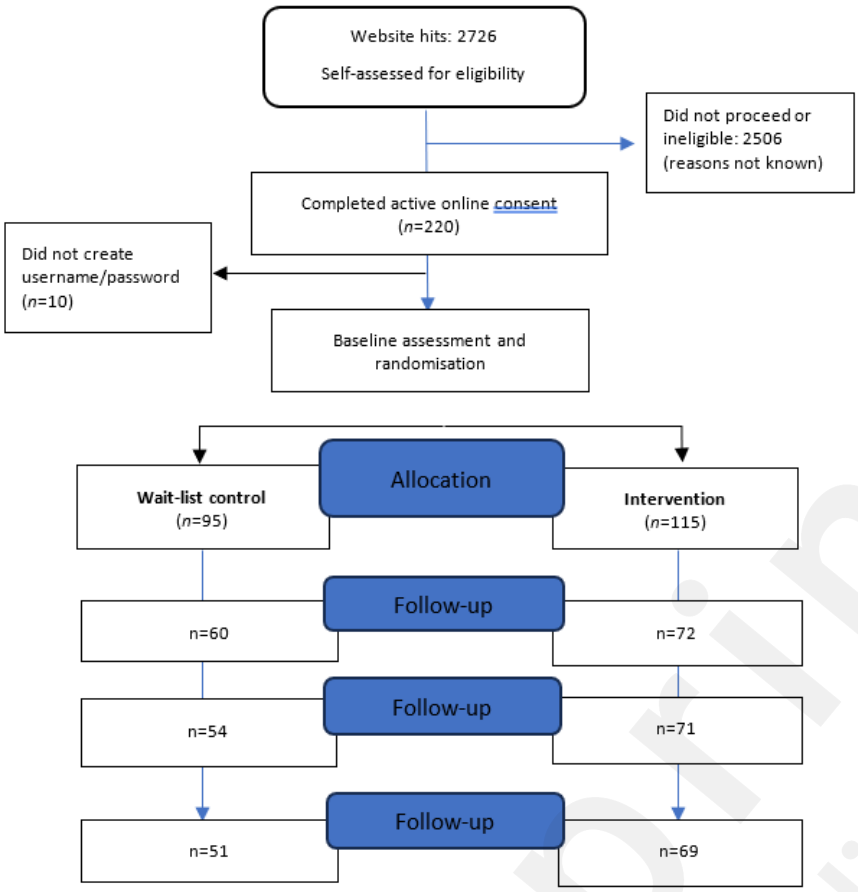


Figure 1: Numbers of participants who self-assessed for eligibility, completed online consent and baseline assessment, were randomised to intervention or wait-list control and retained for follow-up at one, two and three months.

Baseline participant characteristics are shown in Table 1. In both groups, close to 90% were Aboriginal, with the remainder either both Aboriginal and Torres Strait Islander or Torres Strait Islander. Participants' mean (SD) age was 33.9 (8.7) years. They had been using methamphetamine from a median age of 21 years (IQR 18-28 years) and had used methamphetamine on a median (IQR) of 20 [13-25] days in the past 4 weeks. Eighty-two per cent smoked tobacco (92% of these, daily). Other substance use consisted mainly of cannabis (65%) and alcohol (60%), with cannabis being used more often than alcohol (median (IQR) of 13 (0-28) days for cannabis vs. 11 (1-28) days for alcohol). Other drug use was less common (Table 1).

There were more men in the intervention group (64%) compared to the control group (43%) but the two groups were broadly equivalent on other sociodemographic variables and drug use (Table 1).

Table 1. Table 2. Summary of baseline socioeconomic factors and drug use by study arm and overall

	Intervention (*n* = 115)	**Waitlist (*n* = 95)**	**Total (*N* = 210)**
Age (N= 208), mean (SD)	34.5 (9.2)	33.2 (8.1)	33.9 (8.7)
Gender (n=209)			

Male, n (%)	49 (43)	60 (63.2)	109 (52.2)
Sexual identity (n=210)			
LGBTQI, n (%)	9 (7.8)	19 (20)	28 (13.3)
Aboriginality (n=206)			
Aboriginal, n (%)	100 (89.3)	85 (90.4)	185 (89.8)
Relationship status (n=210)			
Single, n (%)	70 (60.9)	55 (57.9)	125 (59.5)
Employment status (n=210)			
Working (at all): n (%)	24 (20.9)	35 (36.8)	59 (28.1)
Highest level of education (n=208)			
Completed high school (≥Y12), n (%)	42 (36.8)	36 (38.3)	78 (37.5)
Age first meth use (years) (n=208), Median (IQR)	22 [19-29]	21 [18-27]	21 [18-28]
Days of methamphetamine use in the past 4 weeks, Median (IQR)	19 [14-25]	20 [11-27]	20 [13-25]
Route of methamphetamine use (n=209), n (%)			
Injecting	53 (46.1)	44 (46.8)	97 (46.4)
Smoking	61 (53.0)	46 (48.9)	107 (51.2)
Other	1 (1.0)	4 (4.3)	5 (2.4)
Other drug use in the past 4 weeks, n (%)			
Alcohol	71 (61.7)	56 (59)	127 (60.3)
Cannabis	57 (60)	57 (60)	114 (60)
Tobacco	93 (81.6)	78 (82.1)	171 (81.8)
Cocaine	14 (12.2)	14(14.7)	28 (13.5)
Heroin	12 (10.4)	6 (6.3)	18 (8.6)
Other opioids	20 (17.5)	18 (20.0)	38 (18.2)
Benzodiazepines	40 (34.8)	31 (33.3)	71 (34.1)
Other drugs	13 (11.3)	6 (6.3)	19 (9.0)

Outcomes

Days of methamphetamine use reduced significantly in both intervention and control groups ($p<0.04$), but there was no significant difference between the groups at one, two or three months post-baseline (Figure 2A). As shown in Table 2, there were no significant group differences in the secondary outcomes, including psychological distress (K10); severity of dependence; help-seeking; days out of role; and other drug use.

Usage data acquired through Google Analytics showed a large proportion (80%) of participants logged into the web-app once and did not subsequently return. Retrospective analysis of the intervention condition only, comparing those participants who did not log into the web-app again after initial sign up (‘never’) versus those who logged in at least once more (‘at least once’), showed a significant reduction in use amongst those who returned (Figure 2B).

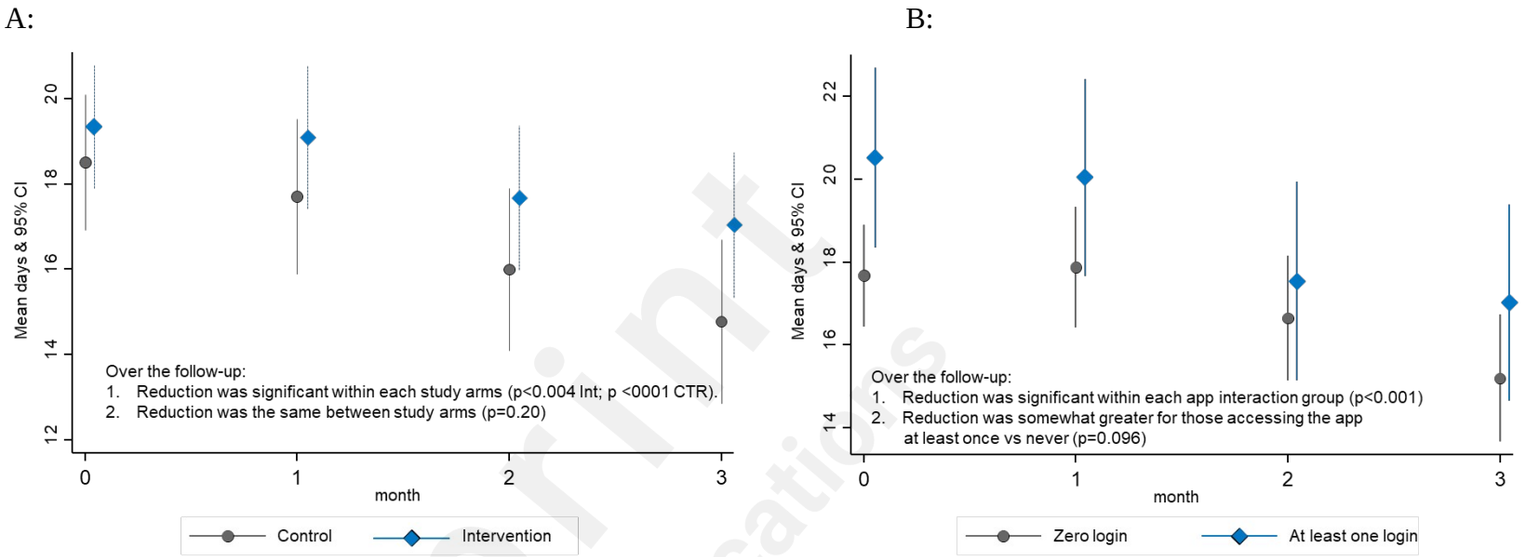


Figure 2- A: Mean days and 95% confidence interval (CI) of methamphetamine use at baseline (month 0) and at each of the three follow-up months - intervention arm versus waitlist arm; B: Mean and 95% CI days of methamphetamine use at baseline (time 0) and at each of the three follow-up months for the intervention arm only, for participants who logged in the *We Can Do This* web-app at least once after initial sign up versus those that never logged in the web-app after initial sign up.

Table 2. Mean (and 95% CI), rate (and 95% CI) for each study outcome at baseline, month 1, month 2 and month 3 in each study arm and corresponding treatment effect (difference of means, relative rate and 95% CI)

	Baseline	Month 1	Month 2	Month 3
Primary outcome				
Days of methamphetamine use – last four weeks: mean (95% CI)				
Intervention	19.5 (17.3-21.8)	19.1 (16.7-21.4)	17.8 (15.6-20.0)	17.2 (15.0-19.3)
Waitlist	18.5 (16.4-20.8)	17.8 (15.4-20.2)	16.1 (13.9-18.3)	14.8 (12.7-16.9)
Treatment effect (days & 95% CI)		0.2 (-1.5,2.0)	0.6 (-1.0, 2.4)	1.4 (-0.3, 3.3)
Secondary outcomes:				
K10 score: mean (95% CI)				
Intervention	31.3 (29.6-33.0)	31.7 (29.5,33.8)	29.2 (27.1-31.2)	28.2 (26.2-30.3)
Waitlist	29.8 (27.9-31.6)	28.7 (26.4-31.0)	26.6 (24.3-28.9)	25.9 (23.6-28.2)
Treatment effect (K10 & 95% CI)		1.4 (-1.9,4.7)	1.0 (-2.2,4.2)	0.8 (-2.4, 4.1)
SDS score: mean (95% CI)				
Intervention	8.7 (8.1-9.3)	8.4 (7.7-9.1)	8.7 (8.0-9.4)	8.5 (7.8-9.3)
Waitlist	8.5 (7.8-9.1)	8.7 (8.0-9.5)	7.9 (7.1-8.7)	7.4 (6.7-8.3)
Treatment effect (SDS & 95% CI)		-0.5 (-1.6,0.5)	0.6 (-0.5, 1.7)	0.9 (-0.2, 2.0)
Days out of role rate (95% CI) of 0 to 1 day a moth				
Intervention	26.3 (18.1-34.4)	26.4 (16.3-36.6)	14.1 (6.1-22.1)	16.3 (7.6-25.0)
Waitlist	27.3 (18.2-36.4)	29.1 (17.5-40.6)	30.2 (17.9-42.4)	31.1 (18.3-43.7)
Treatment effect (RR & 95% CI)		0.94 (0.48-1.8)	0.48 (0.22-1.07)	0.55 (0.26-1.13)
Days cut back on role rate (95% CI) of 0 to 1 day a moth				
Intervention	33.3 (24.7-42.0)	33.3 (22.1-44.4)	29.0 (18.3-39.7)	25.4 (14.9-35.8)
Waitlist	27.3 (16.2-38.4)	29.1 (14.7-43.4)	30.2 (14.8-45.5)	31.1 (15.3-46.9)
Treatment effect RR (95% CI)		0.94 (0.40-2.21)	0.48 (0.19-1.26)	0.55 (0.21-1.40)
Sought help (Yes): rate (95% CI)				
Intervention	21.0 (10.6-21.5)	22.9 (9.3-36.5)	22.4 (9.1-35.7)	28.3 (12.5-44.0)
Waitlist	20.0 (9.4-30.7)	8.7 (0.1-16.8)	12.9 (2.3-23.4)	20.7 (6.4-34.9)
Treatment effect RR (95% CI)		2.52 (0.75,8.4)	1.66 (0.54,5.06)	1.30 (0.48-3.55)
Days Alcohol use: mean (95% CI)				
Intervention	13.1 (10.6-15.5)	11.3 (9.4-13.2)	10.1 (8.5-11.7)	8.6 (6.9-10.3)
Waitlist	13.3 (10.6-16.0)	10.5 (8.6-12.4)	8.0 (6.5-9.5)	8.0 (6.1-9.9)
Treatment effect days (95% CI)		1.0 (-1.6,3.3)	2.3 (-0.3,4.4)	0.8 (-2.7,3.9)
Cannabis use: rate (& 95% CI)				
Intervention	77.4 (12.6-98.2)	56.9 (9.1-100)	57.5 (9.2-100)	54.5 (8.7-100)
Waitlist	53.3 (8.4-98.2)	36.2 (5.5-66.8)	43.9 (6.7-81.2)	38.1 (5.8-70.4)
Treatment effect RR (95% CI)		1.08 (0.93-1.25)	0.90 (0.85-1.15)	0.98 (0.85-1.14)
Tobacco use (any use) rate (95%CI)				
Intervention	81.1 (73.6-88.6)	85.8 (77.8-93.9)	85.5 (77.2-93.8)	78.6 (69.0-88.3)
Waitlist	81.4 (73.1-81.4)	70.8 (58.8-82.7)	75.6 (86.9-64.2)	71.2 (83.4-59.1)
Treatment effect RR (95% CI)		2.1 (1.01-4.1)	1.7 (0.81-3.61)	1.37 (0.70-2.66)
Any other drug use# rate (95% CI)				
Intervention	47.8 (38.6-57.0)	35.9 (24.8-47.0)	41.2 (29.6-52.8)	38.7 (27.1-50.3)

Waitlist	46.3 (36.1-56.4)	48.1 (35.4-60.8)	46.9 (33.5-60.4)	43.5 (30.0-56.9)
Treatment effect RR (95% CI)		0.73 (0.47-1.11)	0.85 (0.56-1.29)	0.86 (0.56-1.34)

Any use of heroin, benzodiazepine, heroin, other opioids, cocaine, ecstasy or other drugs

Estimates were derived using multilevel mixed effects generalized linear models including random effects for the intercept and for time, with either a Gaussian, Poisson or robust Poisson distribution as appropriate for each specific outcome. The treatment effect is calculated as the difference between the intervention and waitlist at 1-month assessment, 2-month assessment and 3-month month assessment. The use of multilevel mixed effect models allows for estimates of treatment effects that are adjusted for between study arms differences at baseline.

Usability and adherence

The most common issues participants cited as obstacles for completing the web-app (either a "little problem" or a "major problem") were "personal issues stopped me from using the web program" (55%) and "I just forgot to go to the web program" (51%). Problems with the internet or computer were cited by 39-41% of participants. Issues with navigability and presentation of the web-app were less often cited as barriers (20-29%), although 41% said the program was not useful and 43% said they simply did not want to do it. Practical barriers, like other people using the computer, or not having enough time to do the intervention, where cited by 44% and 42% respectively. Items that were most frequently considered major problems for using the web-app (>10%) were: forgetting to use it, personal issues, believing it would take too long, not having time and the computer not working or having problems.

The majority of respondents indicated that several matters were not problems that prevented them from using the web-app, including internet connectivity, comprehension of the program, navigation, work issues getting in the way, difficulty reading the screen or too many words. The frequency of responses to all usability and adherence questions are included as an Appendix (Table 3).

DISCUSSION

We found that this web-app, *We Can Do This*, which targeted Aboriginal and Torres Strait Islander people, was not effective in reducing methamphetamine use. This is consistent with outcomes of a similar but non-targeted internet-based intervention for stimulant use [31, 32], which did not produce significant changes in stimulant use. However, it is inconsistent with the broader evidence-base for internet-based interventions, which have been found to produce significant, if modest, reductions in substance use.[12, 33] These include effective CBT-based online interventions for methamphetamine use.[34] The web app did not produce expected increases in help-seeking intention, motivation to reduce methamphetamine use, and reductions in days out of role, benefits that have been found with non-targeted internet interventions for stimulant use.[31, 32]

The most likely explanation for failure to yield expected benefits from *We Can Do This* is poor engagement with this self-directed web-based intervention, with only a small proportion of participants completing the web-app modules. This interpretation of the results is supported by our per protocol analysis, which found evidence of a reduction in methamphetamine use amongst participants who completed at least one module of the intervention. This could suggest that the web-app has the potential to be effective for those people who return to it for two or more sessions. However, delivered in its current form, it is unlikely to result in any population shift in methamphetamine use. Keeping people engaged with health-related websites and apps is a universal problem [35, 36] and it is also a specific challenge in trials of psychosocial interventions targeting stimulant use.[37]

In our case, simply forgetting to use the web-app was one of the main reasons cited as an obstacle to engagement. Retention and engagement strategies employed in this study included SMS and email reminders, however more aggressive tactics, such as push notifications, in-app messages, and 'gamification' mechanics (using rewards, competition, 'unlocking' levels or time-limited challenges) could be utilised to increase retention and engagement.[15, 38] Contingency management can also be used to increase treatment attendance and engagement with treatment-related activities [39] and may be one option to increase engagement with the web-app. Significant work would be required to update the web-app to incorporate more of these features for it to be successfully offered as a stand-alone, self-directed intervention available in the community.

Other barriers to not completing the web-app were mostly external (e.g., personal issues, not finding time, computer problems), rather than barriers related to the content or layout of the web-app. Importantly, personal issues were a major barrier. Further investigation of the type of personal issues that impeded using the web-app would be needed to understand the implications of this finding. However, it may reflect the complex and challenging lifestyle associated with having a stimulant use disorder. It may also reflect the mood disturbances commonly experienced by people with a stimulant use disorder, both related to co-occurring mental disorders, but also symptoms of withdrawal from methamphetamine. Further qualitative research and co-design of web-apps is likely to be needed to understand and overcome these barriers to adherence.

There are also factors related to the target population that have been associated with poor retention and engagement. At a population level, life stress is generally higher for Aboriginal people in Australia compared to non-Indigenous people[40]; low educational attainment and

a lack of income increases the risk of drop-out from alcohol and other drug treatment programs [41] and frequent substance use is associated with poor treatment retention.[42, 43] Cognitive factors, although inconsistently associated with treatment outcomes in other settings[42], may be relevant to a program such as *We Can Do This*, which requires both self-motivation and concentration. In light of this, there may be value in exploring alternative approaches to delivery, for example clinician-assisted web-apps, single brief interventions, or web-apps that focus on a broader range of drug-use and treatment scenarios. Qualitative research with people who have attempted to engage with the web-app will provide a deeper understanding of these issues.

Limitations

The study was subject to several limitations. The major limitation of this study was poor adherence to the internet intervention, which limited our ability to detect a treatment effect in the intention-to-treat analysis. This clearly has implications for any conclusions that can be drawn about the useability of the web-app in its current form. Drop out from the assessments may have also biased findings, particularly in the treatment completers analysis. Data on drug use relied on self-report and could not be verified. However, self-report in research studies shows high concordance with biological indicators of drug use.[44]

The anonymous online data collection was deemed necessary to enable participation from people who may otherwise not disclose information about their drug use, but it did limit the ability to confirm the veracity of the data. Although we carefully monitored use of the web-app to identify any instances of unusual access (such as multiple sign-ups from one IP address) and contacted several participants via phone to complete assessments (as per protocol), we have no way of being certain that all participants met the eligibility criteria.

Conclusion

We did not demonstrate effectiveness of this web-app in reducing methamphetamine use or increasing psychosocial well-being. Overall, engagement with the web-app was poor and hindered our ability to evaluate its effectiveness. Future web-apps for this population need to consider methods to increase participant engagement. Understanding the unique challenges and strengths of Aboriginal and Torres Strait Islander participants and communities, and ongoing guidance from communities and ACCHSs will be key to ongoing efforts to identify accessible and effective interventions for methamphetamine use.

OTHER INFORMATION

Registration: Australian New Zealand Clinical Trials Registry ACTRN12619000134123p;

https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=376088&isReview=true

Protocol: The protocol is published [21]

Funding: This research was funded by a National Health and Medical Research Council Grant #1100696

Acknowledgements

We thank the NIMAC site coordinators, study advisory group members, research participants, and health service staff, in particular Edward Wilkes, Dennis Gray, Ike Fisher, Harry Miller, Emma Donley, Angela Sloan, Kirsten Button, Peter Fullston, Warren Clements, Paul Briggs, Bree Firebrace, Shani Crumpen, Virginia Lovell, Jack Nagle, Haley Briggs, Daley Hammersley, and Tahlia McDonald; for their creative development, Blis Web Agency, Basement Studios, Actnow Social Conscious Theatre Company; for administrative and project management support, Hilina Winkenweder, Hannah Wetham, Josh Fitton, Frida Svensson, Louise Armitage, Leda Sivak and Kathleen Brodie. JW is supported by the Sylvia and Charles Viertel Senior Medical Research Fellowship and KC by a National Health and Medical Research Council Practitioner Fellowship (APP#1117582).

Data Availability:

Due to the sensitivity of the data for Aboriginal and Torres Strait Islander people, and in line with ethical and data sovereignty principles, the data will not be available to the public.

The authors declare they have no conflicts of interest

REFERENCES

1. Reilly R, Gendera S, Treloar C, Roe Y, Conigrave K, Azzopardi P, Ward J: **Identifying risk and protective factors, including culture and identity, for methamphetamine use in Aboriginal and Torres Strait Islander communities: Relevance of the 'communities that care' model**. *Social Science & Medicine* 2020, **266**(133451).
2. MacLean S, Harney A, Arabena K: **Primary health-care responses to methamphetamine use in Australian Indigenous communities**. *Australian journal of primary health* 2015, **21**(4):384-390.
3. Clough AR, Fitts M, Robertson J: **Recent warnings of a rise in crystal methamphetamine ("ice") use in rural and remote Indigenous Australian communities should be heeded**. *Medical journal of Australia* 2015, **203**(1):19-19.
4. MacLean S, Hengsen R, Stephens R: **Critical considerations in responding to crystal methamphetamine use in Australian Aboriginal communities**. *Drug and Alcohol Review* 2016, **36**(4):502-508.
5. Australian Institute of Health and Welfare: **National Drug Strategy Household Survey 2019**. In. Canberra: AIHW; 2020.
6. Ward J, Elliott S, Bryant J, Donovan B, Pitts M, Wand H, Kaldor J: **The Goanna Survey 2: Results of the second Australian survey of knowledge, relationships, behaviour and health service access relating to sexually transmissible infections (STIs) and blood borne viruses (BBVs) among Aboriginal and Torres Strait Islander young people**. In. Adelaide: South Australian Health and Medical Research Institute; 2020.
7. Snijder M, Kershaw S: **Review of methamphetamine use among Aboriginal and Torres Strait Islander people**. *Australian Indigenous HealthBulletin* 2019, **19**(3).
8. Degenhardt L, Grant S, McKetin R, Roxburgh A, Dobbins T, Farrell M, Burns L, Hall WD: **Crystalline methamphetamine use and methamphetamine related harms in Australia**. *Drug and Alcohol Review* 2017, **36**:160-170.
9. Reilly R, Wand H, McKetin R, Quinn B, Ezard N, Dunlop A, Conigrave K, Treloar C, Roe Y, Gray D *et al*: **Survey methods and characteristics of a sample of Aboriginal and Torres Strait Islander and non-Indigenous people who have recently used methamphetamine: the NIMAC survey**. *Drug and alcohol review* 2020, **39**(6):646-655.
10. Gendera S, Treloar C, Reilly R, Conigrave K, Butt J, Roe Y, Ward J: **Even though you hate everything that's going on, you know they are safer at home." Aboriginal families and kinship role in methamphetamine use harm reduction and their own support needs"**. *Drug and Alcohol Review* 2022, **41**(6).
11. McKetin R, Degenhardt L, Shanahan M, Baker AL, Lee NK, Lubman DI: **Health service utilisation attributable to methamphetamine use in Australia: Patterns, predictors and national impact**. *Medical Journal of Australia* 2017, **206**(6):236-236.
12. Boumparis N, Karyotaki E, Schaub MP, Cuijpers P, Riper H: **Internet interventions for adult illicit substance users: a meta-analysis**. *Addiction* 2017, **112**(9):1521-1532.
13. Carreiro S, Newcomb M, Leach R, Ostrowski S, Boudreaux ED, Amante D: **Current reporting of usability and impact of mHealth interventions for substance use disorder: A systematic review**. *Drug Alcohol Depend* 2020, **215**:108201.
14. Washio Y, Hayashi Y, Atreyapurapu S, Chang K, Ma T, Howard BN, van der Drift I, Browne FA, Wechsberg WM: **A Scoping Review of Computer-Based and Telecommunication Technology Interventions to Address Drug and Alcohol Misuse and Smoking in Women**. *Subst Use Misuse* 2022, **57**(8):1257-1272.

15. Sorcha M: **Fighting "zombie" health apps through K-Factor virality and other mobile gaming techniques – The application of commercial gaming techniques to create more effective mHealth solutions**. *Frontiers in public health* 2015, **4**.
16. Reilly R, Stephens J, Micklem J, Tufanaru C, Harfield S, Fisher I, Pearson O, Ward J: **Use and uptake of web-based therapeutic interventions amongst Indigenous populations in Australia, New Zealand, the United States of America and Canada: a scoping review**. *Systematic Reviews* 2020, **9**(1):123.
17. Zheng C, Conigrave JH, Conigrave KM, Wilson S, Perry J, Chikritzhs TN, Fitts MS, Lee KSK: **Patterns of drinking in Aboriginal and Torres Strait Islander peoples as self-reported on the Grog Survey App: A representative urban and remote sample**. *Drug and Alcohol Review* 2022, **41**(1):114-124.
18. Conigrave JH, Wilson S, Conigrave KM, Chikritzhs T, Hayman N, Dawson A, Ali R, Perry J, Fitts MS, Degenhardt L *et al*: **'The Drug Survey App': a protocol for developing and validating an interactive population survey tool for drug use among Aboriginal and Torres Strait Islander Australians**. *Addict Sci Clin Pract* 2022, **17**(1):17.
19. Nagel T, Dingwall KM, Sweet M, Kavanagh D, Majoni SW, Sajiv C, Cass A: **The stay strong app as a self-management tool for first nations people with chronic kidney disease: a qualitative study**. *BMC nephrology* 2022, **23**(1):1-244.
20. Tighe J, Shand F, Ridani R, Mackinnon A, De La Mata N, Christensen H: **Ibobbly mobile health intervention for suicide prevention in Australian Indigenous youth: a pilot randomised controlled trial**. *Bmj Open* 2017, **7**(1).
21. Reilly R, McKetin R, Wand H, Butt J, Smout M, Ezard N, Conigrave K, Clark Y, Quinn B, Treloar C *et al*: **A Web-Based Therapeutic Program (We Can Do This) for Reducing Methamphetamine Use and Increasing Help-Seeking Among Aboriginal and Torres Strait Islander People: Protocol for a Randomized Wait-List Controlled Trial**. *JMIR Research Protocols* 2019, **8**(7):e14084.
22. Ryan A, Holmes J, Hunt V, Dunlop A, Mammen K, Holland R, Sutton Y, Sindhusake D, Rivas G, Lintzeris N: **Validation and implementation of the Australian Treatment Outcomes Profile in specialist drug and alcohol settings**. *Drug Alcohol Rev* 2014, **33**(1):33-42.
23. Wilson C, Deane F, Ciarrochi J, Rickwood D: **Measuring help-seeking intentions: Properties of the general help-seeking questionnaire**. *Canadian Journal of Counselling* 2005, **39**(1):15-28.
24. Rollnick S, Heather N, Gold R, Hall W: **Development of a short 'readiness to change' questionnaire for use in brief opportunistic interventions among excessive drinkers**. *British Journal of Addiction* 1992, **87**(5):743-754.
25. Kessler RC: **Kessler's 10 Psychological Distress Scale**. Boston, MA: Harvard Medical School; 1996.
26. Gossop M, Darke S, Griffiths P, Hando J, Powis B, Hall W, Strang J: **The Severity of Dependence Scale (SDS): psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users**. *Addiction* 1995, **90**(5):607-614.
27. Kessler RC, Andrews G, Colpe LJ, Hiripi E: **Short screening scales to monitor population prevalences and trends in non-specific psychological distress**. *Psychological Medicine* 2002, **32**(6):959-997.
28. Ritterband LM, Ardalan K, Thorndike FP, Magee JC, Saylor DK, Cox DJ, Sutphen JL, Borowitz SM: **Real world use of an Internet intervention for pediatric encopresis**.

Journal of Medical Internet Research 2008, **10**(2):e16.
29. McKetin R, Najman JM, Baker AL, Lubman DI, Dawe S, Ali R, Lee NK, Mattick RP, Mamun A: **Evaluating the impact of community-based treatment options on methamphetamine use: findings from the Methamphetamine Treatment Evaluation Study (MATES)**. *Addiction* 2012, **107**(11):1998-2008.
30. Degenhardt L, Larney S, Chan G, Dobbins T, Weier M, Roxburgh A, Hall WD, McKetin R: **Estimating the number of regular and dependent methamphetamine users in Australia 2002-2014** *Medical Journal Australia* 2016, **204**(4).
31. Tait RJ, McKetin R, Kay-Lambkin F, Carron-Arthur B, Bennett A, Bennett K, Christensen H, Griffiths KM: **A randomised controlled trial of a web-based intervention for users of amphetamine-type stimulants: Six month outcomes**. *Journal of Medical Internet Research* 2014, **1**(1):e1.
32. Tait RJ, McKetin R, Kay-Lambkin F, al. e: **A Web-Based Intervention for Users of Amphetamine-Type Stimulants: 3-Month Outcomes of a Randomized Controlled Trial**. *JMIR Mental Health* 2014, **1**(1):e1.
33. Tait RJ, Christensen H: **Internet-based interventions for young people with problematic substance use: a systematic review**. *Medical Journal of Australia* 2010, **192**:S15-S21.
34. Carroll KM, Ball SA, Martino S, Nich C, Babuscio TA, Nuro KF, Gordon MA, Portnoy GA, Rounsaville BJ: **Computer-assisted delivery of cognitive-behavioral therapy for addiction: a randomized trial of CBT4CBT**. *American journal of Psychiatry* 2008, **165**(7):881-888.
35. Appsflyer: **Attention Retention! 2022 App Retention Benchmarks Report**. In. US: Appsflyer; 2022.
36. Shams F, Tai AMY, Kim J, Boyd M, Meyer M, Kazemi A, Krausz RM: **Adherence to e-health interventions for substance use and the factors influencing it: Systematic Review, meta-analysis, and meta-regression**. *DIGITAL HEALTH* 2023, **9**:20552076231203876.
37. Lappan SN, Brown AW, Hendricks PS: **Dropout rates of in-person psychosocial substance use disorder treatments: a systematic review and meta-analysis**. *Addiction* 2020, **115**(2):201-217.
38. Barbaro E, Grua EM, Malavolta I, Stercevic M, Weusthof E, Van den Hoven J: **Modelling and predicting User Engagement in mobile applications**. *Data Science* 2020, **3**:61-77.
39. Pfund RA, Ginley MK, Rash CJ, Zajac K: **Contingency management for treatment attendance: A meta-analysis**. *Journal of Substance Abuse Treatment* 2022, **133**:108556.
40. Australian Bureau of Statistics: **National Aboriginal and Torres Strait Islander Social Survey 2014-2015**. In. 4714.0, Canberra Australian Bureau of Statistics; 2016.
41. Leite JCdC, Luz MFDd, Walz JC, Filippin LI, Saldanha RP, Drachler MdL: **Motivation and adherence to psychosocial treatment for alcohol and drug use-related problems**. *Estudos de Psicologia (Campinas)* 2018, **35**(4):389-398.
42. Dean AC, London ED, Sugar CA, Kitchen CMR, Swanson A-N, Heinzerling KG, Kalechstein AD, Shoptaw S: **Predicting adherence to treatment for methamphetamine dependence from neuropsychological and drug use variables**. *Drug and alcohol dependence* 2009, **105**(1):48-55.
43. Cook R, Quinn B, Heinzerling K, Shoptaw S: **Dropout in clinical trials of**

pharmacological treatment for methamphetamine dependence: the role of initial abstinence. *Addiction* 2017, **112**:1107-1085.

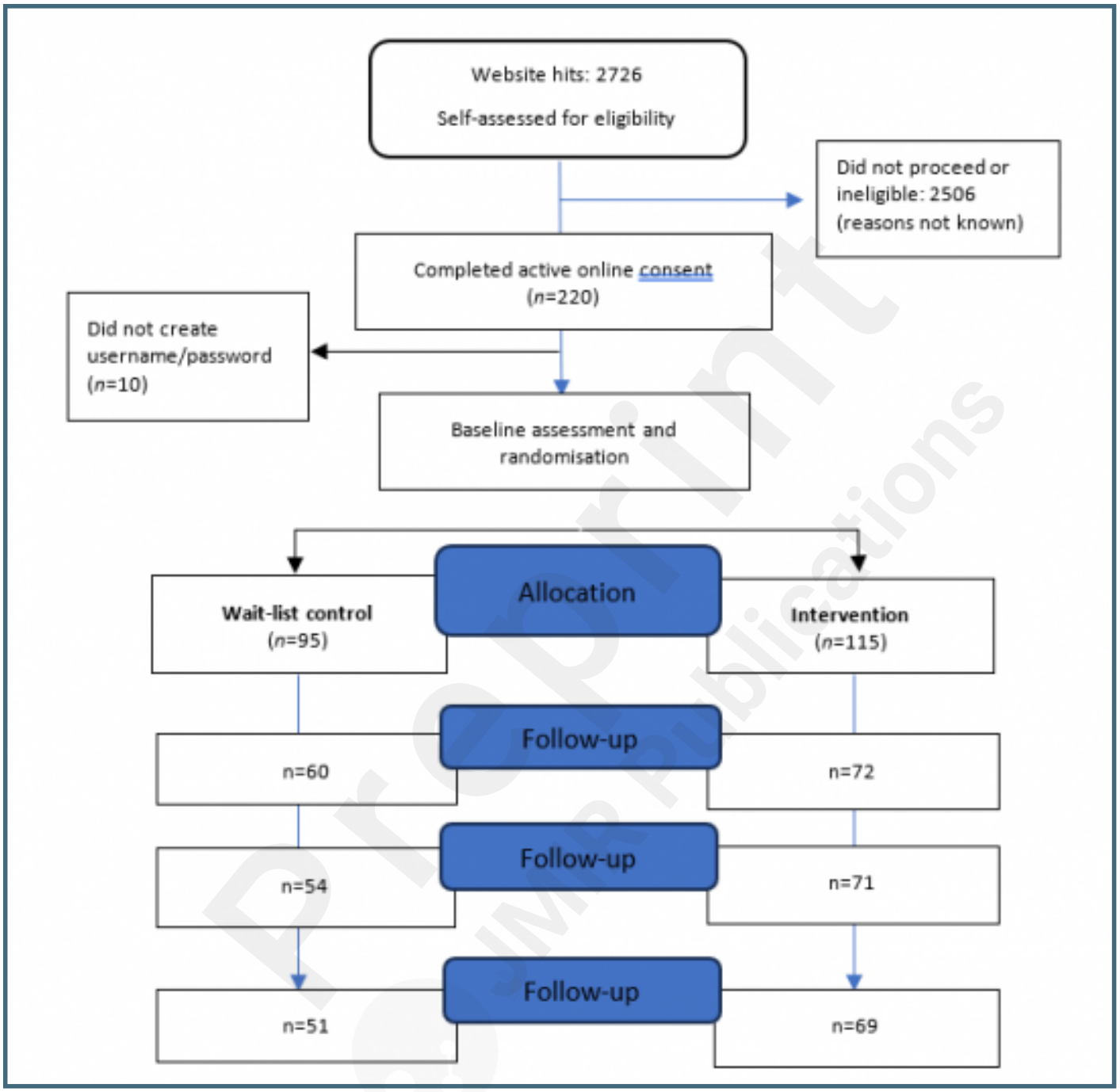
44. Bharat C, Webb P, Wilkinson Z, McKetin R, Grebely J, Farrell M, Holland A, Hickman M, Tran LT, Clark B *et al*: **Agreement between self-reported illicit drug use and biological samples: a systematic review and meta-analysis**. *Addiction* 2023, **118**(9):1624-1648.

Supplementary Files

Untitled.
URL: http://asset.jmir.pub/assets/ec4a30ea8462dbd68396eb213e67fe81.doc

Figures

Untitled.



Untitled.