Modifiable health risk behaviours and attitudes towards behaviour change of clients attending community-based substance use treatment services

DANIKA TREMAIN[1,2,3], MEGAN FREUND[1,2,3], LUKE WOLFENDEN[1,2,3], PAULA WYE[1,3,4], JENNY BOWMAN[3,4], ADRIAN DUNLOP[2,3,5,6], KAREN GILLHAM[1,3], KATE BARTLEM[1,3,4], KATHLEEN McELWAINE[1,2,3], BETH GOW[1,3] & JOHN WIGGERS[1,2,3]

[1]*Population Health, Hunter New England Local Health District, Newcastle, Australia,* [2]*Faculty of Health, The University of Newcastle, Newcastle, Australia,* [3]*Hunter Medical Research Institute, Newcastle, Australia,* [4]*School of Psychology, Faculty of Science and Information Technology, The University of Newcastle, Newcastle, Australia,* [5]*Centre for Translational Neuroscience and Mental Health, Newcastle, Australia, and* [6]*Drug and Alcohol Clinical Services, Hunter New England Local Health District, Newcastle, Australia*

Abstract

Introduction and Aims. *Health risk behaviours, such as smoking, nutrition and physical inactivity, are significant contributors to chronic disease for people with substance use disorders. This study reports the prevalence of these behaviours amongst substance use treatment clients, their attitudes towards modifying such behaviours and the acceptability of receiving support to do so. Client characteristics associated with risk status and interest in modifying behaviours were examined.* ***Design and Methods.*** *A cross-sectional survey was undertaken with clients of 15 community substance use treatment services within in New South Wales, Australia. Data for the study were collected via computer assisted telephone interviews.* ***Results.*** *Of those contactable and eligible, 386 (71%) clients completed the survey. Clients reported a high prevalence of smoking (80%), insufficient fruit and/or vegetable consumption (89%) and insufficient physical activity (31%). Overall, 51–69% of clients reported considering modifying their health risk behaviours and 88–97% thought it was acceptable to be provided preventive care to address such behaviours. Younger clients were more likely to smoke (18–34 years (odds ratio [OR] = 4.6 [95% confidence interval [CI] = 1.9, 11.3]); 35–54 years (OR = 2.6 [95% CI = 1.2, 5.7])) and be interested in increasing vegetable consumption (18–34 years (OR = 4.4 [95% CI = 1.3, 14.8]); 35–54 years (OR = 8.0 [95% CI = 2.5, 25.4])) than older clients (≥55 years).* ***Discussion and Conclusions.*** *There is a high prevalence of health risk behaviours amongst clients of community substance use treatment services. However, contrary to commonly cited barriers to care provision, clients are interested in modifying their risk behaviours and report that receiving preventive care to address these behaviours is acceptable.* [Tremain D, Freund M, Wolfenden L, Wye P, Bowman J, Dunlop A, Gillham K, Bartlem K, McElwaine K, Gow B, Wiggers J. Modifiable health risk behaviours and attitudes towards behaviour change of clients attending community-based substance use treatment services. *Drug Alcohol Rev* 2017;36:369–377.]

Key words: substance abuse treatment centre, tobacco smoking, nutritional status, physical activity, community healthcare.

Introduction

Internationally and in Australia, people with substance use disorders experience life expectancies up to 23 years shorter than the general population [1,2]. Although a proportion of this reduced life expectancy results from substance use, other health risk behaviours, namely smoking, insufficient fruit and vegetable intake and insufficient physical activity, are also significant contributors [3]. As in the general population, such health behaviours

are likely to contribute to the high prevalence of preventable diseases within this population, such as cardiovascular and respiratory disease, and cancer [1,2,4].

Tobacco use in Australia and internationally has been found to be consistently higher amongst people with substance use problems (74–88%) [5,6] compared with the general community (13–18%) [7–9]. However, little is known about the prevalence of other behavioural risks for chronic disease, such as insufficient physical activity and fruit and vegetable consumption. One study reported higher levels of moderate to vigorous physical activity amongst 223 patients attending Australian residential substance use treatment services compared to the general community (45% vs. 28%) [10]. An Italian study describing fruit and vegetable consumption of people with substance use problems reported only 15% of 58 patients attending an Italian residential alcohol treatment service consumed any fruit and vegetables daily, an intake far lower than is consumed in the general population [11].

Few studies have investigated whether people with substance use problems are interested in modifying their health risk behaviours. Most research in this population has focused on interest in smoking cessation, and found that up to 80% of people with substance use problems express a desire to quit smoking [10,12]. For example, a study of 163 patients attending seven community and residential addiction services in the United Kingdom found that 79% of participants wanted to quit smoking, and 46% were interested in talking to someone to help them do so [12]. Only one study could be located that examined interest in changing other health risks amongst clients of substance use treatment services. The study of 228 patients attending Australian residential substance use treatment services reported that the majority of participants were 'seriously thinking about' quitting smoking (67%), improving their diet (56%), increasing their physical activity (81%) or losing weight (67%) [10]. Only one study, conducted by Kelly *et al.* [10], reported the prevalence of multiple risks for people with substance use problems. The authors found almost 80% of residential substance use treatment clients reported two or more risk factors, and of those participants who reported smoking tobacco, 86% reported at least one other risk factor. However, the authors are not aware of any studies that have examined the prevalence of multiple health risk behaviours amongst those in community substance use treatment settings.

Substance use treatment clinical services provide an opportunity for interventions to address health behaviour risks in this population [13–15]. Clinical practice guidelines recommend the delivery of such preventive health care [16,17]. A commonly cited barrier to the provision of preventive care is clinicians' belief that clients will not accept such care if it is provided [18]. Client acceptability of preventive care has been found to be high in general health and mental health settings [7,19]; however, the authors are unaware of any research that has examined the acceptability of preventive care to reduce chronic disease risks amongst clients attending substance use services. An understanding of client attitudes towards preventive care is important to address such barriers and assess how amenable clients of substance treatment services are to receive intervention support.

In the context of the limited evidence base, the aim of this study was to examine the prevalence of smoking, insufficient fruit and vegetable consumption, and insufficient physical activity of clients attending community-based substance use treatment services. In addition, client interest in modifying such behaviours and client acceptability of the provision of preventive care by their substance use treatment clinicians was examined. Client characteristics associated with risk and interest in modifying risk behaviours were also investigated.

Methods

Design and setting

A cross-sectional survey was undertaken with clients of community-based substance use treatment services within one health district in New South Wales (NSW), Australia from May to October 2012. The district includes 19 community-based substance use services, providing approximately 96 000 appointments each year. Ethics approval was granted by the Hunter New England Human Research (approval No. 09/06/17/4.03) and the University of Newcastle Research (approval No. H-2010-1116) ethics committees.

Services

The services provide substance use counselling and management (for substances including alcohol, cannabis, opioid), outpatient withdrawal services, stimulant assessment and treatment, cannabis assessment and treatment, opioid substitution pharmacotherapy (i.e. methadone and buprenorphine maintenance) and court diversion programs (offers drug treatment as an alternative to court sentencing). All such services were eligible to participate with the exception of those that provided inpatient or intake-only care, primarily provided care to clients under the age of 18, or only provided care to clients in a group setting.

Participants and recruitment

Clients were eligible to participate in the survey if they were: 18 years of age or over, had a face-to-face appointment with an eligible service within the previous two

weeks, had not previously participated in the survey, had not been identified as inappropriate for contact by their clinician (for example, the client is seeing a confidential service) and were physically and mentally capable of completing the survey (as assessed upon contact with the interviewer).

Each week, for six consecutive months, 45 clients were randomly selected from the substance use treatment services' electronic medical record system using the survey select procedure in SAS v9.3. Selected clients were mailed an information letter containing the study aims, data collection procedures and a toll free number to call if they did not wish to be contacted. Two weeks after receiving the letter, a trained interviewer contacted the client to confirm eligibility and undertake or arrange participation in a computer assisted telephone interview. Participants did not receive incentives to participate in the survey.

Measures

Client characteristics

Clients were asked about their: employment status, Aboriginal and/or Torres Strait Islander status, marital status, highest level of education attained and any mental or physical conditions for which they were receiving medical attention in the previous two months. Age, gender and postcode were obtained from the electronic medical records.

Prevalence of health risk behaviours

Clients were asked to report their health risk behaviours in the month prior to seeing the service as follows: whether they were a smoker of any tobacco products (yes-daily, yes-at least once a week, yes-less than once a week, not at all-quit less than 4 months ago, not at all-quit 4 or more months ago, not at all-never smoked) [20], how many serves of vegetables (0, 1, 2, 3, 4, 5 or more, don't know) and fruit (0, 1, 2 or more, don't know) they consumed on average each day [21], and how many days a week they usually undertook 30 min or more of moderate intensity physical activity (activity that increases your heart rate or makes you breathe harder than normal) (0, 1, 2, 3, 4, 5 or more, don't know) [22]. Items were based on validated questionnaires used in previous surveys of health risk behaviours [20–22].

Using Australian National Guidelines [23–25] clients were defined as having a behavioural risk if they: smoked any tobacco products [23], consumed fewer than two serves of fruit, consumed fewer than five serves of vegetables per day [24], or participated in less than 30 min of physical activity on at least five days per week [25].

Client interest in modifying health risk behaviours

For each of their behavioural risks, clients were asked to report if, in the next month, they were 'seriously thinking about' eating more vegetables, eating more fruit, undertaking more physical activity and quitting smoking (yes, no, don't know) [26–28]. Clients who identified as being a smoker (daily or less than once a week) were asked additional questions regarding interest in smoking cessation as follows: *how much do you want to quit smoking* (not at all, a little, some, very much, don't know); *if you decided to quit completely, how sure are you that you would be able to do it* (not at all sure, a little sure, somewhat sure, very sure, don't know); *do you plan to quit smoking* (yes, no, don't know); *by when do you plan to quit* (in the next: 1 month, 3 months, 6 months, more than 6 months, don't know) and *how determined are you to quit* (not at all determined, a little determined, somewhat determined, very determined, don't know) [29].

Acceptability of preventive care delivery

Questions regarding acceptability of preventive care delivery addressed three key elements of preventive care; ask, advise, refer (2As + R) [30]. Clients were asked to indicate their agreement (strongly agree, agree, unsure, disagree, strongly disagree) to three statements regarding: the acceptability of substance use treatment clinicians asking about their health behaviours (all clients); providing brief advice to modify health risk behaviours (clients not meeting recommended guidelines) and arranging a referral to further support (clients not meeting recommended guidelines) for each behavioural risk factor (smoking, insufficient fruit and vegetable consumption, and insufficient physical activity). Clients were also asked to indicate the overall acceptability of the provision of each element of preventive care (assessment, brief advice and referral) provided by their substance use treatment clinician. Such questions have been previously used to assess clinician acceptability of preventive care provision in other community-based health care settings [31,32].

Statistical analysis

Statistical analyses were completed using SAS (version 9.3) [33]. Client residential postcodes were used to determine disadvantage (based on the Socio-Economic Indexes for Areas [SEIFA]). Each postcode has a corresponding SEIFA score, and the scores were collapsed into higher NSW half [SEIFA score > 991] and lower NSW half [SEIFA score ≤ 991] [34] based on the median score for NSW (991). Postcodes were also used to determine remoteness (Access/Remoteness Index of Australia), and collapsed into two categories: major cities

and regional/remote towns [35]. Participants were recorded as Aboriginal and/or Torres Strait Islander origin if they identified as Aboriginal and/or Torres Strait Islander origin within the computer assisted telephone interview and/or had this information recorded in their electronic medical records. Participant age was categorised as 18–24, 25–34, 35–44, 45–54, 55–64, 66+ [36], and simplified to 18–34, 35–54, 55+ [37] for the multivariate regression models.

Descriptive statistics were used to report client characteristics, prevalence of health risk behaviours, interest in modifying health risk behaviours and acceptability of care. Client responses regarding acceptability of care were collapsed into agree (strongly agree, agree) and disagree (strongly disagree, disagree, unsure and don't know). Clients who responded 'don't know' to the prevalence of health risk behaviours questions were categorised as not meeting the recommended guidelines for that risk factor. Client responses regarding interest in changing health risk behaviours were collapsed into yes and no (no, don't know). χ^2 analysis was used to compare demographics of participants and non-participants.

Client characteristics associated with health behaviour risks and interest in changing behaviours

Logistic regression analyses were undertaken for each of the three health risk behaviours separately, and for interest in changing each of the health risk behaviours (seven models) to identify independent associations. For modelling purposes, interest in increasing fruit consumption and increasing vegetable consumption were examined separately. The multivariate regression models included all variables (age, gender, disadvantage, remoteness, Aboriginality, marital status, education, employment status, number of health risk behaviours and service type), given each was hypothesised to be associated with risk behaviour based on socioecological frameworks and previous empirical research [8,36]. Alpha values were adjusted to 0.01 given multiple significance testing. Multivariate analyses were reported as adjusted odds ratios with 95% confidence intervals.

Results

Sample

Fifteen community substance use treatment services were eligible and participated in the study. Of the 1087 clients randomly selected to participate, 602 were able to be contacted, 545 (91%) were eligible and 386 (71%) completed the survey. Such a sample allows an estimate of prevalence of a behavioural risk with a precision of approximately ±2.5% (assuming worst case of 50%

Table 1. *Participant characteristics (n = 386)*

Demographic	Client, *n* (%)
Gender	
Male	253 (66)
Female	133 (34)
Aboriginal and/or Torres Strait Islander Origin	
Yes	73 (19)
No	313 (81)
Age	
Mean (SD)	40 (11)
18–24	25 (6)
25–34	108 (28)
35–44	130 (34)
45–54	85 (22)
55–64	31 (8)
65+	7 (2)
Employment status	
Employed	86 (22)
Not employed	300 (78)
Marital status	
Living with partner	106 (28)
Not living with partner	280 (73)
Highest education level completed	
Some high school or less	248 (64)
Completed high school	41 (11)
Trade certificate, university degree or higher	97 (25)
Geographic location	
Major cities	154 (40)
Regional/remote	230 (60)
Index of disadvantage	
Lower NSW half [<991]	287 (75)
Higher NSW half [≥991]	97 (25)
Service team	
Counselling	182 (47)
Stimulant treatment	14 (4)
Court diversion services	29 (8)
Pharmacotherapy	161 (42)

prevalence) at a 95% significance level. The majority of the participants were male (66%), were unemployed (78%) and lived in regional or remote areas (60%) (Table 1). Compared to non-participants, participants were less likely to be of Aboriginal and/or Torres Strait Islander origin (20% vs. 14%, $P = 0.01$) and less likely to be under 40 years of age (64% vs. 51%, $P < 0.001$). There were no other significant differences in demographics between participants and non-participants.

Prevalence of health risk behaviours

Nearly all participants (97%) were at risk for at least one health risk behaviour and 81% were at risk for at least two of the three health risk behaviours. The most prevalent risk behaviour was insufficient fruit and/or vegetable consumption (89%), followed by smoking (80%) and insufficient physical activity (31%) (Table 2).

Table 2. *Client reported behavioural risks and interest in modifying behaviour*

Health risk behaviour	*n* (%)
Prevalence of health risk behaviours	
Smoking	310 (80)
>10 cigarettes smoked per day[a]	203 (67)
First cigarette within 30 min of waking[a]	214 (70)
Insufficient fruit and/or vegetable consumption	343 (89)
Insufficient fruit	266 (69)
Insufficient vegetables	292 (76)
Insufficient physical activity (<5 days per week)	121 (31)
0 days per week	51 (13)
1–4 days per week	70 (18)
Number of risks	
0	10 (3)
1	62 (16)
2	230 (60)
3	84 (22)
Interest in changing health risk behaviours	
Interest in quitting smoking in the next month (*n* = 289)[b]	198 (69)
Somewhat or very sure can quit (*n* = 288)	168 (59)
Plan to quit (*n* = 288)	202 (70)
Plan to quit in next 6 months (*n* = 203)	124 (61)
Determined to quit (*n* = 203)	176 (87)
Interest in increasing fruit consumption in the next month (*n* = 232)[b]	128 (55)
Interest in increasing vegetable consumption in the next month (*n* = 283)[b]	144 (51)
Interest in increasing physical activity in the next month (*n* = 98)[b]	66 (67)

[a]Only included clients who reported smoking tobacco daily (*n* = 304).
[b]Sample only included participants who were identified as not meeting the recommended guidelines for smoking, fruit and vegetable consumption and physical activity at the time of the interview.

Client interest in modifying health risk behaviours

Overall, the majority of participants not meeting the recommended guidelines reported seriously considering modifying their health risk behaviours. Participants were most interested in quitting smoking (69%) and increasing physical activity (67%) and less interested in increasing their fruit (55%) or vegetable (51%) consumption. Of the participants who reported planning to quit smoking, the majority were determined to quit (87%) and planned to quit within the next six months (61%) (Table 2).

Acceptability of preventive care delivery

The majority of participants agreed that it was acceptable to be asked about their health risk behaviours by their substance use treatment clinician (90–97%), and if the client was not meeting the recommended guidelines, to be provided with brief advice (91–92%) and offered a referral to further support (88–94%) for each health risk behaviour. The most acceptable element of care provision was assessment of smoking (97%), and the least acceptable element of care provision was an offer to arrange referral for insufficient fruit and/or vegetable consumption (88%) (Table 3).

Association between client characteristics and risk status and interest in changing health risk behaviours

Age was the only characteristic independently associated with behavioural risk following multivariate analyses. Specifically, participants aged 18–34 years (odds ratio [OR] = 4.6 [95% confidence interval, CI = 1.9, 11.3]) and 35–54 years (OR = 2.6 [95% CI = 1.2, 5.7]) were more likely to smoke compared to those 55 years of age or older ($P = 0.004$) (Table 4). In regards to interest in modifying risk behaviours, participants aged 18–34 years (OR = 4.4 [95% CI = 1.3, 14.8]) and 35–54 years (OR = 8.0 [95% CI = 2.5, 25.4]) were more interested in increasing their vegetable consumption than those 55 years of age or older ($P < 0.001$) (Table 5).

Discussion

This study examined the prevalence of multiple health risk behaviours and client attitudes towards modifying such behaviours and the acceptability of receiving

Table 3. *Client reported acceptability of care delivery by their community substance use service*

Agreed preventive care acceptable	Assessment, *n* (%)	Brief advice, *n* (%)	Offer to arrange referral, *n* (%)
Smoking[a]	373 (97)	283 (91)	292 (94)
Insufficient fruit and/or vegetable consumption[a]	349 (90)	315 (92)	300 (88)
Insufficient physical activity[a]	369 (96)	111 (92)	107 (88)

[a]Sample for 'Brief advice' and 'Offer to arrange referral' included only participants not meeting the recommended guidelines for that behaviour: Smoking (*n* = 310), insufficient fruit and vegetable consumption (*n* = 343) and insufficient physical activity (*n* = 121).

Table 4. *Adjusted odds ratios and 95% confidence intervals for associations between client characteristics and behavioural risk*

	Smoking		Insufficient fruit and/or vegetable consumption		Insufficient physical activity	
	Adjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Gender		0.52		0.84		0.78
Male	1.2 (0.7–2.1)		1.1 (0.5–2.2)		0.9 (0.6–1.5)	
Female	1.0		1.0		1.0	
Aboriginal or Torres Strait Islander origin		0.57		0.02		0.17
Yes	1.2 (0.6–2.7)		0.4 (0.2–0.9)		0.7 (0.4–1.2)	
No	1.0		1.0		1.0	
Age		0.004*		0.68		0.28
18–34	4.6 (1.9–11.3)		0.8 (0.3–2.8)		1.9 (0.8–4.6)	
35–54	2.6 (1.2–5.7)		1.2 (0.4–3.6)		1.4 (0.6–3.2)	
55+	1.0		1.0		1.0	
Employment status		0.70		0.61		0.43
Employed	0.9 (0.5–1.7)		0.8 (0.4–1.8)		0.8 (0.4–1.4)	
Not employed	1.0		1.0		1.0	
Education level		0.19		0.04		0.99
Some high school or less	1.4 (0.6–3.2)		3.2 (1.3–8.3)		1.0 (0.5–2.2)	
Completed high school	1.0		1.0		1.0	
Higher education[b]	0.8 (0.3–1.9)		1.8 (0.7–5.0)		1.0 (0.5–2.3)	
Geographic location		0.64		0.43		0.82
Major cities	0.9 (0.5–1.6)		1.4 (0.6–3.0)		0.9 (0.6–1.6)	
Regional/remote	1.0		1.0		1.0	
Index of disadvantage		0.25		0.73		0.03
Lower NSW half [≤991]	1.0		1.0		1.0	
Higher NSW half [>991]	0.7 (0.4–1.3)		1.2 (0.5–2.7)		1.8 (1.1–3.0)	
Service team		0.21		0.55		0.08
Counselling	0.5 (0.3–1.0)		0.8 (0.4–1.8)		0.9 (0.5–1.4)	
Stimulant treatment	0.8 (0.2–3.3)		0.6 (0.1–3.1)		1.5 (0.5–4.7)	
Court diversion	1.0 (0.3–3.7)		3.2 (0.4–26.8)		0.2 (0.1–0.7)	
Pharmacotherapy	1.0		1.0		1.0	
No. of health risk behaviours [a]		0.17		0.10		0.44
0	0.7 (0.3–1.8)		0.3 (0.1–0.9)		1.3 (0.4–4.0)	
1	1.5 (0.8–2.6)		0.6 (0.2–1.5)		1.4 (0.8–2.4)	
2	1.0		1.0		1.0	

*Significant at $P < 0.01$ in logistic regression analysis.
[a]Total number of risk factors excluded the specific risk of focus.
[b]Trade certificate, university degree or higher.
CI, confidence interval; OR, odds ratio.

assistance for this within community substance use treatment settings. A high prevalence of smoking (80%) and insufficient fruit and/or vegetable consumption (89%) and moderate prevalence of insufficient physical activity (31%) was found amongst community substance use treatment clients. Most clients who were not meeting the recommended guidelines reported that they were seriously considering modifying their health risk behaviours (51–69%) and thought it was acceptable to be provided with care during their substance use treatment appointment to assist them to do so (88–97%).

The prevalence of smoking was consistent with that reported in prior research in substance use treatment settings [5,6,12]. Compared to the general Australian population (15%) [8], and in general health (13%) and mental health (51%) community clients from the same health district [7,19] the prevalence was markedly high. Compared to participants from the mental health client sample [19], the current study participants were more likely to be male, of Aboriginal or Torres Strait Islander origin, have low levels of education and reside in regional or remote areas. Such factors are associated with a higher prevalence of smoking in Australia [8]. These findings reinforce that smoking is a significant health risk for people with substance use problems that warrants continued attention within substance use treatment settings [14,38].

Table 5. *Adjusted odds ratios and 95% confidence intervals for associations between client characteristics and interest in changing health risk behaviours*

	Quit smoking		Increase vegetable consumption		Increase fruit consumption		Increase physical activity	
	Adjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Gender		0.11		0.16		0.03		0.14
Male	0.6 (0.3–1.1)		0.7 (0.4–1.2)		0.5 (0.3–0.9)		0.5 (0.2–1.3)	
Female	1.0		1.0		1.0		1.0	
Aboriginal or Torres Strait Islander origin		0.39		0.07		0.04		0.42
Yes	1.4 (0.7–2.7)		1.8 (0.9–3.6)		2.4 (1.0–5.4)		0.6 (0.2–2.8)	
No	1.0		1.0		1.0		1.0	
Age		0.42		<0.001*		0.05		0.23
18–34	1.7 (0.7–4.7)		4.4 (1.3–14.8)		2.9 (0.9–9.1)		3.4 (0.6–18.9)	
35–54	1.9 (0.7–4.9)		8.0 (2.5–25.4)		1.4 (0.5–4.1)		4.3 (0.8–23.3)	
55+	1.0		1.0		1.0		1.0	
Employment status		0.83		0.78		0.92		0.93
Employed	1.1 (0.6–2.1)		1.1 (0.6–2.1)		1.1 (0.5–2.3)		1.1 (0.3–3.7)	
Not employed	1.0		1.0		1.0		1.0	
Education level		0.31		0.09		0.07		0.59
Some high school or less	0.8 (0.3–1.9)		0.3 (0.1–0.9)		0.3 (0.1–0.9)		0.6 (0.1–3.2)	
Completed high school	1.0		1.0		1.0		1.0	
Higher education[b]	1.3 (0.5–3.7)		0.4 (0.1–1.0)		0.3 (0.1–0.9)		0.4 (0.1–2.5)	
Geographic location		0.12		0.17		0.23		0.43
Major cities	0.6 (0.3–1.1)		1.5 (0.9–2.6)		0.7 (0.3–1.3)		1.6 (0.5–4.9)	
Regional/remote	1.0		1.0		1.0		1.0	
Index of disadvantage		0.96		0.15		0.33		0.70
Lower NSW half [≤991]	1.0		1.0		1.0		1.0	
Higher NSW half [>991]	1.0 (0.5–1.9)		0.6 (0.4–1.2)		0.7 (0.4–1.4)		1.2 (0.4–3.4)	
Service type		0.21		0.61		0.03		0.96
Counselling	0.8 (0.4–1.4)		1.4 (0.8–2.4)		0.4 (0.2–0.8)		1.4 (0.4–4.3)	
Stimulant treatment	0.3 (0.1–1.1)		1.0 (0.2–3.9)		0.2 (0.1–1.2)		1.2 (0.2–9.7)	
Court diversion	1.4 (0.5–4.2)		0.8 (0.3–2.0)		0.4 (0.1–1.2)		N/A	
Pharmacotherapy	1.0		1.0		1.0		1.0	
No. of health risk behaviours		0.46		0.15		0.29		0.61
1	0.5 (0.2–1.5)		0.7 (0.3–1.9)		0.5 (0.2–1.6)		0.7 (0.1–4.6)	
2	0.9 (0.5–1.7)		1.5 (0.9–2.7)		0.6 (0.3–1.2)		0.6 (0.2–1.8)	
3	1.0		1.0		1.0		1.0	

*Significant at *P* < 0.01 in logistic regression analysis.
[b]Trade certificate, university degree or higher.
CI, confidence interval; OR, odds ratio.

The prevalence of insufficient fruit and vegetable (89%) consumption was also consistent with a previous study reporting such prevalence in Italian substance use treatment settings (85%) and similar to that of the Australian general population (87%) and clients from general health (81%) and mental health (87%) community services from the same study region [7,11,19,36]. As with smoking, these findings indicate that insufficient fruit and vegetable consumption is a significant health risk for people with substance use problems.

In contrast to the previous literature, the prevalence of insufficient physical activity was lower than in both the general Australian community [36] and in substance use treatment settings (31% vs. 43% vs. 55% respectively) [10]. The prevalence of insufficient physical activity, however, was comparable to that of general community clients (28%) [7], but lower than mental health clients (47%), from the same health district [19]. Although unclear why this group was participating in more physical activity, the findings may reflect the use

of exercise as a component of substance use treatment [39], as recent studies have shown that regular exercise is potentially beneficial to both the general health and substance use outcomes for people with substance use problems [40,41]. Nonetheless, all behavioural risks within this population group were high, and warrant intervention to reduce future health burden.

The study found that more than 50% of substance use clients reported that they were seriously considering quitting smoking, increasing physical activity levels and consuming more fruit and vegetables. In addition, more than 85% of those with a behavioural risk considered it acceptable to be provided with preventive care from their substance use treatment clinicians. These findings are consistent with those from studies of general community (79–95%) and mental health (86%–97%) clients [7,19]. Commonly cited barriers to the provision of preventive care by clinicians is the belief that clients do not want to modify such health risk behaviours [15,42], or that clients do not find it acceptable to be provided with preventive care [18]. These findings challenge such perceptions and suggest that the provision of preventive care within routine substance use treatment appointments may be well received by clients and hence potentially effective.

Age was the only client characteristic independently associated with a health risk behaviour or interest in behaviour modification. Younger clients were found to be more likely to use tobacco, but also more likely to be interested in increasing their fruit and vegetable intake. This is consistent with the general population where younger people have a higher prevalence of smoking [36]. In addition, studies within the general population have shown that intent to increase fruit and vegetable consumption decreases between the ages of 18–34 years and 55 years and above [37]. This indicates that people with substance use problems over the age of 55 may require further care to increase their fruit and vegetable consumption to meet the recommended guidelines. The lack of further significant associations suggests that the high prevalence of behavioural risk factors and high desire to modify health risk behaviours is consistent across community substance use clients regardless of socio-demographic characteristics. Such findings support recommendations for routine provision of preventive health care in this setting.

The primary limitation of the study is its reliance on participant self-report of health behaviours. Previous research suggests that physical activity is overestimated [43], and fruit and vegetable consumption underestimated in self-reported measures of these behaviours [44]. Self-report is also susceptible to social desirability bias which may have influenced client's responses regarding interest to change health risk behaviours. Additionally, as the study was conducted in community substance use services in one geographical region of Australia, the generalisability of the study findings to substance users attending residential services, not receiving treatment, or located in other jurisdictions is unclear. A further limitation may be that the survey did not ask about e-cigarettes and vaping; however, this was not common practice in Australia at the time of data collection [45]. Nonetheless, the study adds to the limited research that has examined the health risk behaviours and attitudes to modifying them of people with substance use problems and provides useful information for policy makers and practitioners interested in addressing these risks. Future research should examine the motivation of people with substance use problems to modify their health risk behaviours, with a particular focus on the stages of change.

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