Patterns of drinking in Aboriginal and Torres Strait Islander peoples as self-reported on the Grog Survey App: a representative urban and remote sample

Indigenous Australian drinking patterns

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Abstract (max: 250 words)

Background

Measuring self-reported alcohol use is challenging in any population, including when episodic drinking may be common. Drinking among Indigenous Australians has been shown to vary greatly within and between communities. However, most survey methods assume 'regular' patterns of drinking. National estimates have also been shown to underestimate alcohol use among this group. This paper describes drinking patterns in two representative community samples (urban and remote).

Methods

Indigenous Australians (aged 16+ years) in two South Australian sites were recruited to complete the Grog Survey App. The App is a validated, interactive tablet-based survey tool, designed to help Indigenous Australians describe their drinking. Drinking patterns were described using medians and interquartile ranges; gender and remoteness were compared using Wilcoxon rank-sum tests. Spearman correlations explored the relationship between drinking patterns and age. Logistic regressions tested if beverage or container preference differed by remoteness or gender.

Results

Three-quarters of participants (77.0%, n=597/775) were current drinkers. Median standard drinks per occasion was 7.8 (78 grams), 1.3 drinking occasions per month (median). Three-quarters of current drinkers (73.7%) reported a period without drinking (median: 60 days). Remote drinkers were more likely to drink beer. Improvised containers were used by 40.5% of drinkers.

Conclusions

Episodic drinking with extended 'dry' periods and from non-standard drinking containers was common in this representative sample of Indigenous Australians. The diversity of container use and beverage preference, by gender and remoteness, illustrates nuances in drinking patterns between communities. It shows the importance of community-level data to inform local strategies addressing alcohol misuse.

BACKGROUND

Alcohol has been linked to poorer mental health (1), acute injuries and chronic diseases (2). Globally, alcohol is also the leading risk factor for premature death and disability in younger people (aged 15 to 49 years) (2). This is particularly relevant for Aboriginal and Torres Strait Islander (Indigenous) Australians, who are younger than their non-Indigenous counterparts (median age of 23 versus 38 years) (3). Indigenous Australian communities have described alcohol as a longstanding concern (4). Indigenous Australian men and women are 4.7 and 6.1 times more likely to die from conditions caused by alcohol than their non-Indigenous counterparts (5). This increased burden of disease and injury stems from the effects of colonisation (6), which have resulted in ongoing experiences of discrimination, intergenerational trauma, socio-economic inequality, and disconnection from culture and country (6).

To reduce and ultimately ameliorate health inequities related to alcohol, accurate estimates of local drinking patterns among Indigenous Australians are crucial to inform appropriate and effective local resource allocation for prevention and treatment efforts. Most studies show that Indigenous Australians are more likely to abstain from drinking than their non-Indigenous counterparts (7, 8). But those who do drink are more likely to exceed recommended Australian guidelines (current, at time of writing) for single occasion and lifetime risky drinking (8, 9) (4+ standard drinks per occasion; 2+ standard drinks per day) (10). However, the accuracy of available national estimates has been questioned, as they do not account for the high rates of alcohol-related diseases (e.g. liver cirrhosis) (11, 12). Furthermore, national estimates may not be representative of individual Indigenous Australian communities which are highly heterogeneous (13) (both within and between communities) with unique strengths and challenges (14).

Collecting self-report data on alcohol consumption is difficult in any population (15). Most existing survey tools ask respondents to describe how much they drink and how often. But

this relies on comfort with reading and mental arithmetic (i.e., for the respondent to quantify how much alcohol they have consumed in Australian 'standard drinks'; each 10g of ethanol). The Australian government provides pictorial aids to show the volume of commonly used drinking containers such as a wine glass (100-150mL), can of beer (385mL) or 'nip' of spirits (30mL) (16). However, these 'standard drink' charts are of limited utility in contexts where sharing of drinks and non-standard containers are common (e.g., alcohol consumed from a repurposed container, like an empty soft drink or juice bottle, kitchen glass, plastic cup) (17, 18). 'Usual' drinking or 'retrospective diary' methods to assess alcohol consumption are ill-suited for measuring patterns of alcohol use in populations where episodic drinking can be common, such as in Indigenous Australians (18). Furthermore, past experiences of racism (19, 20), worries about child removal, concerns about being targeted by police (19), feelings of 'shame' related to drinking (20), or being labelled as a 'drunk' (21) may result in inaccurate responses in interviews or surveys (12). All these factors mean that standard self-reported survey tools may not be culturally appropriate to elicit accurate responses about self-reported alcohol use (18).

To address these limitations, the Grog Survey App (herein referred to as the 'App') was developed to help Indigenous Australians describe what and how much they drink (22). The App has been shown to be accurate (23) and acceptable (24) in remote, regional and urban Indigenous Australian communities. Participants are asked in detail about their last two drinking occasions, and the dates of their third and fourth most recent drinking occasions (in the last 12 months) (25). This approach may provide more accurate estimates of alcohol consumption as it does not assume a 'regular' pattern of drinking. The App also allows individuals to describe their drinking using non-standard drinking containers, to indicate when drinks are shared (i.e., show the group size and an individual's share of what the group drank using a visual slider), and to indicate length of a dry patch (i.e., a period of time without drinking in the last 12 months).

Just one study (also using the App) has reported on the use of non-standard drinking containers in urban and remote/regional Indigenous Australian communities (26). However, a stratified sample that over-sampled dependent drinkers was recruited, so findings are not representative of drinking among Indigenous Australian population more generally To build on this earlier paper, in the current study we collected data using the App from two representative community samples of Indigenous Australians (27), one urban and one remote. We report on drinking patterns, including container use. We also describe the links between patterns of drinking and demographic characteristics such as age, gender and remoteness.

METHODS

Aboriginal leadership and ethics

The App study was co-conceived by an Indigenous Australian health professional (SW) and a non-Indigenous researcher (KL). The App was co-designed with the Australian Drug and Alcohol Council of South Australia (SW, JP), Indigenous and non-Indigenous Australian health professionals, researchers and community members from remote through to urban settings (22). An iterative consultation process was used during development. Ethical approval was obtained from the Aboriginal Health Council of South Australia (Ref: 04/15/621) and, as this study was part of a larger survey of alcohol consumption, from Metro South Health Human Research Ethics Committee in Queensland (Ref: HREC/16/QPAH/293). Two authors are themselves Aboriginal (SW, JP).

Setting

Two communities in the Australian state of South Australia, one situated in an urban location and one in a remote location, took part in this study. Community names are withheld to preserve their anonymity. There were no restrictions on the sale or purchase of alcohol in either community.

The urban community was located in Adelaide, the capital city of South Australia (SA). Around 2% of the total adult population (aged 16+ years) in the urban community are Aboriginal and/or Torres Strait Islander (3). The remote community was classified as 'very remote Australia' (by the Australian Standard Geographical Classification – Remoteness Area) (28). In the remote community, more than half of the adult population (n=57, 53%; aged 16+ years) were Aboriginal and Torres Strait Islander (3).

Eligibility

Community members in both sites were invited to participate in the study if they were aged 16+ years and self-identified as being Aboriginal and/or Torres Strait Islander. Participants were required to be currently residing in the community (as defined by an "Indigenous location" created by the Australian Bureau of Statistics) (3), except where they did not have a permanent residence (e.g. living in a hostel, living rough, homeless or 'couch surfing').

Recruitment

Urban

A representative community sample of Indigenous Australian adults was recruited, equivalent to more than one third (37.9%, n=706) of the target population (27). A quota-based convenience sample was stratified by age, gender and socioeconomic status to match the 2016 Australian Bureau of Statistics Census of Population and Housing (3). The sampling frame and recruitment strategy included a mix of service-based data collection events and public events that were planned, for example, shopping centres, local festivals/events or unplanned, for example, ad hoc visits to local parklands, skateparks, beaches (27). The methods to determine a representative sample have been described in detail in a separate paper (3).

Remote

Due to its small population, all eligible adults in the remote site were sought (n=69). Three (out of the four) field research assistants were Indigenous Australian, and were well known to local community members (one resided in the remote site). This greatly assisted us to invite eligible community members to take part in the study. The recruitment strategy was agreed upon with local stakeholders (e.g. community council, clinic, school). This strategy included surveys at community barbeques, and at locations near the council office, supermarket and at other commonly accessed public spaces.

Data collection

Data collection was conducted from July to October 2019 by a team of 12 research assistants (n=9 in the urban site, and n=4 in the remote site; total n=9, Aboriginal). The Aboriginal research assistants included drug and alcohol professionals (n=2), health practitioners (n=4), students enrolled in PhD (n=1) or medicine (n=1), and a research administrative assistant (n=1). Non-Indigenous research assistants included two project officers (MF) and a study investigator (KL). Face-to-face training in study methods and survey administration was provided to all research assistants in June 2019 (by KL and KC). Participants were asked to complete the survey once and received a supermarket voucher ($20 in urban site; $25 in remote site, to reflect higher cost of living).

Grog Survey App

All data were collected using a tablet computer-based application ('Grog Survey App'). The App asked questions on demographics, alcohol consumption, alcohol dependence (ICD-11), harms to self or others, treatment access, and feedback on using the survey. On survey completion, immediate tailored feedback on each participant's answers was provided in a confidential manner via the App based on a World Health Organization-adapted alcohol brief intervention (Alcohol Awareness Kit) (17).

App administration

Each participant was provided with headphones and set up with a survey on an iPad by a research assistant. The research assistant then sat a short distance away to ensure privacy but was on hand to assist if required. Images and voiceovers used throughout the survey were matched to the gender of the participant, for comfort and cultural appropriateness (22). Participants selected their identity as part of the login process (it was not assigned by the research assistant). Participants then could listen to survey questions delivered in a male or female voice speaking in English or a local Indigenous Australian language.

Alcohol consumption

The App uses a modified Finnish method (25) combined with Timeline Followback (29) to collect a detailed alcohol history (23). Participants described in detail what they consumed during their last two drinking occasions (in the last 12 months). They also provided the date of their third and fourth most recent drinking occasions (in the last 12 months) (25). Participants then selected the type of alcohol consumed and the container they drank from, which includes a choice of non-standard containers like soft drink bottles. Sliders were used to indicate fullness of the container, and if a non-alcoholic mixer was added. If participants were drinking in a group, they were prompted to report the size of the group and their share of the group's consumption. Participants were asked about the length of their longest period of no drinking in the last 12 months.

Analyses

All analyses were performed using R version 3.6.2 . Participants who did not consume alcohol in the last 12 months were classified as past drinkers, and those who have never consumed alcohol in their lives were classified as lifetime abstainers. Demographic data were compared between remote and urban samples using chi-squared (χ^2) tests. Medians and interquartile ranges were used to describe drinking patterns. Medians were compared across gender and remoteness using the Wilcoxon rank-sum test. Spearman correlations explored the relationship between drinking patterns and age (as a continuous variable).

Univariate logistic regressions tested whether males and females, or remote and urban drinkers (predictors) were more likely to consume different beverages, or drink from different containers (outcome). We used binary variables to represent whether a participant consumed a particular beverage type or used a container type.

RESULTS

Demographics

A total of 775 participants were recruited (52.9% female; Table 1). Mean age was 38 years (SD = 16.1; urban = 37.8, remote = 40.0). Nearly three-quarters of participants (73.0%, n=566/775) had completed at least Year 10 (secondary school) (urban, 75.2%, n=531/706 versus remote, 50.7%, n=35/69, χ^2 (df = 1) = 17.9, p < 0.001). Nearly six in 10 participants (58.8%, n=456/775) had completed further education or training (urban, 60.3%, n=426/706 versus remote, 43.5% n=30/69) and this varied by remoteness χ^2 (df = 1) = 6.70, p = 0.01. There was no difference in the proportion of participants employed in the urban and remote sites χ^2 (df = 1) = 3.62, p = 0.06. Median weekly income was $400-599 across both sites.

Table 1: Participant characteristics by remoteness

Variable	Remote (n=69)		Urban (n=706)	
	n	**%**	**n**	**%**
Aboriginal and/or Torres Strait Islander status	68	98.6	691	97.9
Aboriginal	0	0.0	2	0.3
Torres Strait Islander	1	1.4	13	1.8
Both				
Age				
16-24	12	17.4	188	26.6
25-44	28	40.6	276	39.1
45-64	25	36.2	191	27.1
65+	4	5.8	51	7.2
Female	38	55.1	372	52.7

Where does the participant usually live?				
Town or city	22	31.9	629	89.1
Aboriginal community	47	68.1	39	5.5
Parkland or scrub[*]	0	0.0	10	1.4
Outstation[†]	0	0.0	1	0.1
Other	0	0.0	27	3.8
Highest level of school completed				
Year 12	8	11.6	157	22.2
Year 11	16	23.2	181	25.6
Year 10	11	15.9	193	27.3
Year 9	10	14.5	64	9.1
Year 8	10	14.5	44	6.2
Year 7	9	13.0	19	2.7
Year 6	2	2.9	5	0.7
Less than Year 6	3	4.3	43	6.1
Further educational attainment				
Training[‡]	30	43.5	335	47.5
University	0	0.0	78	11.0
Both university and training	0	0.0	13	1.8
No further education	39	56.5	280	39.7
Employment				
Full time	17	24.6	147	20.8
Part-time or other[§]	13	18.8	75	10.6
Unemployed	39	56.5	484	68.6
Individual weekly income ($)				
< 200	10	14.5	137	19.4
200 – 399	15	21.7	193	27.3
400 – 599	22	31.9	156	22.1
600 – 799	9	13.0	80	11.3
800+	13	18.8	140	19.8
Primary language spoken at home				
Indigenous Australian	16	23.2	45	6.4
English	51	73.9	651	92.2
Other	2	2.9	10	1.4
Drinking status[¶]				
Current drinker	43	62.3	554	78.5
Past drinker	13	18.8	99	14.0
Lifetime abstainer	13	18.8	53	7.5

Money spent on grog on each drinking day[II] ($AUD)				
0 – 25	34	49.3	327	46.3
26 – 50	11	15.9	165	23.4
51 – 75	2	2.9	101	14.3
76 – 99	7	10.1	59	8.4
100+	15	21.7	54	7.6

[*] Traditional Aboriginal homelands

[†] homeless or living rough

[‡] TAFE (Technical and further education), apprenticeship, training through "Community Development Program" (the Australian Government's remote employment and community development service)

[§] Part time work, casual work, "Work for the Dole"/"Community Development Program" which helps job seekers develop skills and experiences

[II] in Australian dollars

[¶] Drinking status: current drinker defined as those who consumed alcohol in the last 12 months, past drinker defined as those who have not consumed alcohol in the last 12 months but have done in their lifetime, lifetime abstainers are those who have never consumed alcohol in their lives

Patterns of drinking

More than three-quarters (77.0%, n=597/775) of all participants across both sites were current drinkers (consumed alcohol in the last 12 months). Nearly eight in ten participants (78.5%) in the urban sample were current drinkers compared to just over six in ten (62.3%) of the remote sample χ^2 (df = 2) = 12.62, p = 0.002. One in seven (14.5%; n=112/775) were former drinkers, and just under one in ten (8.5%; n=66/775) had never had a drink. Participants in the remote sample were more likely to be lifetime abstainers than in the remote sample (18.8%; n=13/69 vs 7.5%; n=54/706). There was no difference by remoteness for past drinkers. Men (81.4%) were more likely to drink than women (73.2%); χ^2 (df=2) = 8.09, p-value = 0.02). As people got older, drinking was less likely to occur (p < 0.001, rho = -0.184).

Median standard drinks consumed per occasion was 7.8 (IQR = 10.0). Median number of drinking occasions per month was 1.3 (IQR = 3.2). Men were more likely than women to drink more during each drinking occasion (10.0 versus 6.4 standard drinks respectively; p < 0.001), and also to have had more drinking occasions each month (men = 2.2 versus

13

women = 0.7; p < 0.001) (Table 2). For people that drank in a group (n=515/597, 86.2%), the median group size was 4 (IQR = 5). Median group size decreased with age (p < 0.001, rho = -0.211) and was lower in the urban site (p = 0.025) (Table 3).

Table 2: Drinking patterns by gender and remoteness

Variable	Male (n=297)		Female (n=300)		Sig	Remote (n=43)		Urban (n=554)		Sig
	n	IQR	n	IQR		n	IQR	n	IQR	
Median standard drinks per occasion	10.0	13.1	6.4	7.7	<0.001*	9.1	8.4	7.7	10.3	0.407
Median drinking occasions per month	2.2	4.2	0.7	2.0	<0.001*	2.4	3.6	1.3	3.1	0.191
Median daily consumption	0.7	1.5	0.2	0.5	<0.001*	0.8	1.3	0.3	1.2	0.077
Median group size	4	4	4	6	0.007*	5	2.5	4	5	0.025*
Median duration of dry patch	60	129	90	226.5	0.003*	42	112	90	189.0	0.048*
Sig = Wilcoxon rank sum test * p < 0.05										

Table 3: Percentage of drinkers who consumed various types of alcohol, and the odds of those beverages being consumed in remote and urban areas (total n = 597 drinkers; logistic regression)

| Type of alcohol	% who consumed	Remote OR (95% CI)	Urban OR (95% CI)	Sig
Beer	39.2	3.32 (2.23 – 4.95)	0.30 (0.20 – 0.45)	<0.001*
Spirits	37.5	0.34 (0.17 – 0.63)	2.93 (1.59 – 6.05)	0.001*
Pre-mix	36.9	1.42 (0.91 – 2.17)	0.70 (0.46 – 1.09)	0.109
Wine	16.6	0.08 (0.00 – 0.34)	13.17 (2.91 – 232.70)	0.011*
Cider	16.4	0.64 (0.27 – 1.31)	1.57 (0.77 – 3.77)	0.263
Port or Sherry[†]	9.0	-	-	-
Cocktail	3.0	0.71 (0.03 – 3.47)	1.41 (0.29 – 25.44)	0.739
Sig = logistic regression p value * p < 0.05 [†] Only urban drinkers consumed port or sherry				

Preferred beverage type

Men were more likely than women to drink beer, port and sherry (beer: OR = 2.77, p < 0.001; port or sherry: OR = 1.85, p = 0.006). While women were more likely to drink ready-to-drink spirits (OR = 1.75, p <0.001), spirits consumed from the bottle (OR = 1.29, p = 0.035), cider (OR = 1.75, p = 0.001), and cocktails (OR = 2.69, p = 0.044). Drinking of wine did not vary by gender.

Participants in the remote site were more likely than those in the urban site to drink beer (OR = 3.32, p < 0.001). Wine and spirits were preferred by urban drinkers (wine: OR = 13.17, p = 0.011; spirits consumed from the bottle: OR = 2.93, p = 0.001). Consumption of port and sherry were not reported by remote drinkers.

Figure 1 Odds of preferred beverage types by remoteness
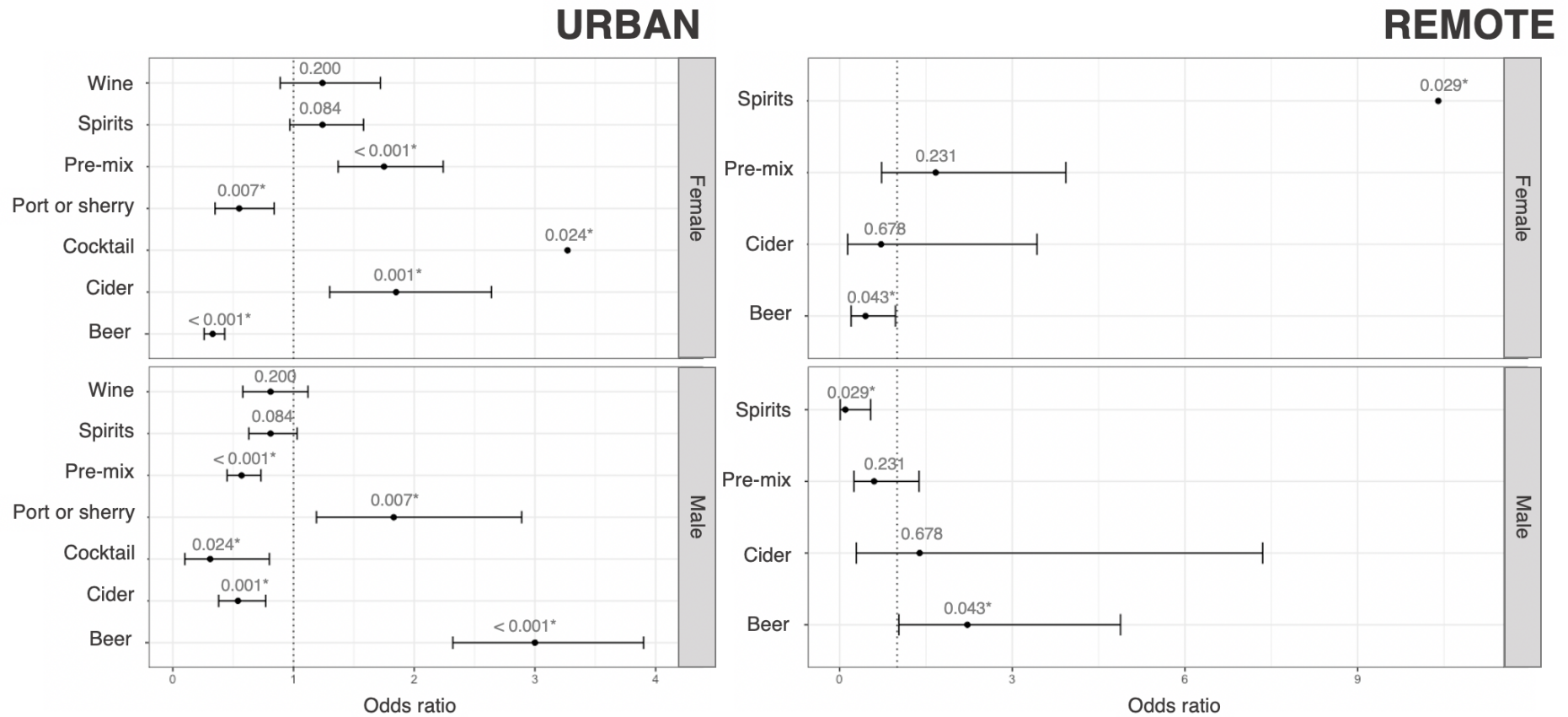
- Significance value p < 0.05, significant values denoted by a *

- Where no confidence interval is shown this is because it was too wide to fit on the graph (e.g. female spirit use in remote

  site)

Considering both gender and remoteness, men in the remote site were less likely than women in the remote site to drink spirits (OR = 9.53, p = 0.035). Urban men were more likely to drink beer, port and sherry than urban women (OR = 3.00, p < 0.001) (Figure 1).

Periods of not drinking alcohol at all ('dry patch')

Nearly three-quarters (73.7%; n=440/597) of current drinkers reported a period of time without drinking in the last 12 months. The likelihood of having a dry patch did not vary by remoteness (χ^2(df = 1) = 0.423, p = 0.516), gender (χ^2(df = 1) = 0.733 p = 0.392) or age (p = 0.691, rho = -0.016). The median dry patch duration was 60 days (IQR = 189 days). Women had longer dry patches (median: 90 days for women versus 60 for men, p = 0.004). Dry patch duration in the urban site was longer than in the remote site (median = 90 days vs. 42 days, p = 0.048).

Drinking containers

Two in five drinkers (40.7%) report using non-standard containers. Mugs (350 mL) and kitchen glasses (250-350 mL) were the most commonly used drinking containers, used by more than a third of drinkers (36.0%; Table 5). This was followed by cans and multipacks (each used by 33.5%). Mugs and kitchen glasses were nearly three times more likely to be used in the urban compared the remote site (OR = 2.62, p = 0.003). However, 'slabs' were six times more likely to be reported in the remote than in the urban site (OR = 5.79, p < 0.001; 'slabs' is a commonly used term for a multi-pack of beer containing 24 or 30 cans or bottles). Similarly, cans (of beer, cider or pre-mixed spirits) were three times more likely to be used in remote than the urban site (OR = 3.19, p < 0.001). Some containers were only used in the urban site, for example, glassware used in pubs/hotels; drinking from the bottle (cider, spirit, wine, port/sherry and methylated spirit); cocktail glasses; and casks of wine. Non-standard containers tended to be more commonly used in the urban site (repurposed

juice or soft drink bottles, OR = 3.03, p = 0.125; paper or plastic cups, only reported in urban site).

Table 4 Most popular drinking container, and the odds of them being used in remote and urban areas (total n = 597 drinkers; logistic regression)

Container type	% who consumed	Remote OR	Urban OR	p
Drinking glass or mug	36.0	0.38 (0.19 – 0.69)	2.62 (1.45 – 5.23)	0.003*
Can	33.5	3.19 (2.11 – 4.79)	0.31 (0.21 – 0.47)	< 0.001*
Multipack	33.5	0.83 (0.48 – 1.37)	1.20 (0.73 – 2.09)	0.492
Stubby or twist top	13.7	1.22 (0.56 – 2.37)	0.82 (0.42 – 1.78)	0.577
Slab	10.2	5.79 (3.34 – 9.74)	0.17 (0.10 – 0.30)	< 0.001*
Bottle (cider, RTD)	10.0	-	-	-
Spirits bottle[†]	7.7	-	-	-
Used bottle	7.4	0.33 (0.05 – 1.07)	3.03 (0.94 – 18.57)	0.125
Wine glass	7.0	0.21 (0.01 – 0.99)	4.66 (1.01 – 82.78)	0.129
Beer glass	4.5	-	-	-
Shot glass	4.4	0.45 (0.02 – 2.11)	2.24 (0.47 – 40.13)	0.429
Cask	3.0	-	-	-
Wine or port bottle	1.8	-	-	-
Longneck	1.8	-	-	-
Cocktail glass	0.8	-	-	-
Plastic cup	0.7	-	-	-
Jug	0.5	-	-	-
Paper cup	0.2	-	-	-
Metho bottle	0.2	-	-	-

Sig = logistic regression p value
* p < 0.05
†= 700 mL bottle or 1 L bottle of spirits
If no value is listed, only participants in the urban sample reported these container types being used

Women were more likely than men than to use mugs or kitchen glasses (OR = 1.36, p = 0.011), as well as wine glasses (OR = 2.90, p < 0.001). Meanwhile, men were more likely than women to drink from a repurposed plastic soft drink or juice bottle (OR = 1.81, p = 0.014) and nearly four times more likely than women to select wine casks as a drinking container (OR = 3.76, p = 0.008).

Discussion

We aimed to describe the drinking patterns of two Indigenous Australian communities, one urban and one remote. The data presented in this study improves upon previous national and single community surveys by providing detailed data on alcohol consumption, including dry periods and the use of non-standard drinking containers. This was done using an innovative survey tool that has been validated for use with Indigenous Australians, and found to be accurate (23) and acceptable (24) in remote, regional and urban Indigenous Australian communities (South Australia and Queensland). In both samples, we found episodic heavy drinking with long 'dry' periods to be the dominant drinking pattern. A large proportion of drinkers used non-standard containers such as repurposed plastic bottles, kitchen glasses and mugs.

The episodic consumption described in this study is in keeping with other single community surveys (30, 31) but are not described in national surveys of Indigenous Australians (11, 12). This is likely due to national surveys being reliant on questions that assume a regular pattern each time the person drinks (8, 9) (e.g. In the last 12 months, how often did you have an alcoholic drink of any kind?) (7). For example, the Australian National Drug Strategy Household Survey has used graduated-frequency items to ask about drinking since at least

2007 (7, 9, 32). Just one national survey used questions that accommodated episodic

drinking (from 1994, of Indigenous Australians in urban areas only) (33). In contrast, the

National Aboriginal and Torres Strait Islander Health Survey uses a one-week retrospective

diary (since at least 2004, according to available records) (8, 34). In the current study, the

average current drinker had 1.3 drinking occasions per month. But, when people did drink,

they consumed nearly double that of the current Australian guidelines (at time of writing) for

short-term risk of injury from alcohol (7.8 standard drinks versus 4 standard drinks per

occasion) (10). This highlights the importance of longer reference periods being used to

measure drinking patterns among Indigenous Australians. Many of the drinking occasions

reported in the current study would have been excluded if a one week retrospective diary

had been used, as has been shown in a previous study (35). Perhaps on account of these

differences, the proportion of current drinkers in our sample (77%) approaches that of the

general Australian population (79.1%) (9). In contrast, previous studies have reported a

higher proportion of lifetime abstainers among Indigenous Australians compared with other

Australians.

To our knowledge, this is the first study to analyse preferred beverages by gender and

remoteness. Past national surveys have described main types of alcohol usually consumed

by gender and age, but not for Indigenous Australians specifically. Previous community

surveys of Indigenous Australians have described preferred beverage in each community

(30, 31). In our study, we found that participants in the remote site preferred to drink beer,

and participants in the urban site preferred to drink spirits. This type of community-level data

will be important to inform prevention and treatment strategies that can be responsive to

local contexts, because drinking varies between and within heterogeneous communities

(13).

Current Australian health promotion resources advise on safer drinking levels using typical

drinking containers (e.g. wine glasses, shot glasses) (16). But this may be less appropriate

for people who tend to drink from non-standard drinking containers (e.g., repurposed soft drink or water bottles). This group accounted for four in 10 drinkers in the current study. This is the first Australian study to our knowledge that quantitatively describes which non-standard containers are used. Interestingly, non-standard containers tended to be more commonly used in the urban than the remote site. This may be mediated by the dominance of beer drinking in the remote site. Locally informed standard drinks charts which feature a mix of non-standard and standard containers may be more effective to help people reflect on their drinking, as well as helping clinicians to understand how much their clients drink.

The prevalence data in this study offers a valuable opportunity to further improve our understanding of intermittent periods of abstinence ('dry' patches) (36). Gaining a better insight into dry patches challenges the stereotypes of Australia's Indigenous peoples which are sometimes portrayed in the media—as this data shows that many Indigenous Australian current drinkers reported long dry periods (in the last 12 months), and drink less regularly compared to the general population (9). Just one other Australian study has reported on 'dry' periods, but the authors of that study oversampled high risk drinkers, so their findings are likely not representative of the broader population (26). In our study, we found it was common for current drinkers to have periods of no drinking which lasted two to three months. Dry periods were twice as long in the urban sample relative to the remote sample (median 90 versus 42 days). This difference could reflect more alternatives to drinking available in urban site, compared to the remote site. Current Australian alcohol treatment guidelines (37) make no mention of 'dry patches' when assessing risky drinking among Indigenous Australians. It would be worthwhile for clinicians to ask clients about periods of no drinking as this can provide more context about when, and why some people drink. This could then improve understanding of the likelihood and severity of withdrawal, and of withdrawal options (38), given research showing that longer dry periods and short relapses may result in less severe withdrawal (39).

Implications for policy, practice and research

Our study showed that in these two communities, people drank episodically but above current recommended guidelines (10). Future surveys, both nationally and community-based, should use survey instruments that can adequately capture a range of drinking patterns, rather than assuming a regular pattern of drinking (12). In addition, study findings point to a need to reconsider how services are funded. In particular, more efforts are needed to improve screening and brief intervention in ways that suits local contexts. Preventive work is also needed to help communities address risky drinking, and to work with families, women and their partners around prevention of fetal alcohol spectrum disorder (40).

We found differences in the types of beverages consumed between the urban and remote community. Drinking choices might vary based on local culture, but could also be influenced by what is locally available to buy. Accordingly, communities' decisions about what is sold, and in what contexts, may be important in shaping local drinking cultures.

Understanding local beverage preferences is important in informing local health promotion strategies (41). Health promotion messages about safer drinking limits might be easier to understand if presented in locally consumed beverages (e.g. it takes 10 people to share a 'slab' of full strength beer for each person to remain within recommended limits) (17). Future research, using multi-methods studies, could investigate the differences between urban and remote drinking patterns, and on impact of alcohol restrictions on beverage preference, container type, and 'dry' periods.

Future studies could also explore if the use of non-standard containers might be linked to the location of consumption (private versus public). This information which could help improve health promotion and preventive efforts in urban and remote Indigenous Australian contexts.

Limitations

This study presents data from a cross-sectional survey in two discrete communities, so can only provide a snapshot of drinking during the times when the research team was present. Drinking patterns are not necessarily generalisable to Indigenous peoples elsewhere in Australia. It is possible, although unlikely given that a consistent team of research assistants known to community members in each site greeted each participant, that some participants may have completed the survey more than once. It was not possible to systematically collect data on attrition and refusals (e.g., refusals to take part in a survey or withdrawals from the survey part way through). A modification has since been added to the Grog Survey App to systematically collect this data. Information was not collected on place or purchase of consumption systematically, but only once to orient participants to the start of the alcohol consumption items (i.e. using Timeline Followback method). Lastly, participants may have had varying levels of comfort using tablet computer-based technology which may have affected their recording of survey answers. However, the App was found to be acceptable (24) for use in remote SA and urban Queensland communities. Place of consumption information was collected only once, to orient participants to the Timeline Followback method. Chi-squared tests were not reported on all demographic variables listed in Table 1 (e.g., age, employment status, Aboriginal status, Indigenous language spoken at home, and place of residence) which may impact study findings. However, for age, Spearman correlations were calculated to enable us to see the direction of possible associations. Also, our analyses by gender combined both remote and urban samples, despite differences in the sample population of the two sites. However, there was no difference in the median number of standard drinks per occasion, drinking occasions per month, and standard drinks per day by remoteness (Table 2) but there were when analysis was done by gender.

Conclusion

Episodic drinking to intoxication with extended 'dry' periods and use of non-standard drinking containers were common in this representative sample of Indigenous Australians. The diversity of container use and beverage preference, by gender and remoteness, illustrates

nuances in drinking patterns between communities. Our findings are important as they highlight how gathering reliable community-level data can inform strategies to address risky drinking, responsive to local contexts.

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