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The effect of alcohol price on dependent drinkers' alcohol consumption

Carolyn Falkner, Grant Christie, Lifeng Zhou, Julian King

ABSTRACT

AIMS: To investigate the current purchasing behaviours of a group of dependent drinkers and their potential response to future increases in the price of alcohol.

METHODS: 115 clients undergoing medical detoxification completed an anonymous survey about their daily alcohol consumption, its cost, their response to potential price increases and strategies previously used when unable to afford alcohol.

RESULTS: Mean and median number of standard drinks consumed per day was 24, at a median cost of \$25 NZD (95%CI \$22, \$30). Thirty-six per cent (95%CI 26%, 46%) of the group bought alcohol at \$1 or less per standard drink, and the median number of drinks consumed per day (30) by this group was significantly higher ($p=0.0028$) than the rest of the sample (22.5). The most common strategy used if no money was available to purchase alcohol was to forgo essentials. If facing a potential price rise, 77% (95%CI 69%, 85%) would switch wholly or partially to a cheaper product and 13% (95%CI 8%, 21%) would cut down their drinking.

CONCLUSIONS: Although the majority of our group would be financially impacted by an increase in the minimum price per standard drink, any potential impacts would be most significant in those buying the cheapest alcohol (who also drink the most), suggesting that minimum pricing may be an important harm minimisation strategy in this group. A minimum price per standard drink would limit the possibility of switching to an alternate cheaper product and likely result in an overall reduction in alcohol consumption in this group. Stealing alcohol, or the use of non-beverage alcohol, were seldom reported as previous strategies used in response to unaffordable alcohol and fears of such are not valid reasons for rejecting minimum pricing to reduce general population consumption.

The general population decreases its use of alcohol in response to an increase in price and it is generally accepted that the magnitude of this reduction varies between population subgroups.¹⁻⁴

Dependent drinkers (those experiencing physiological withdrawal symptoms on reduction or cessation of alcohol) are a small but important subgroup, with 1.3% of the New Zealand population fulfilling criteria for alcohol dependence in the previous year.⁵ Unfortunately, these drinkers are seldom investigated in general household surveys and very little is known about their response to an increase in the price of alcohol. If they do take part in research, they are usually classified within a 'heavy drinking' category, which generally describes a level of alcohol use that falls well below the volumes they actually consume.⁶ Information about the price

sensitivity of these dependent drinkers is sparse.^{2,3,6} While some studies have shown significant reductions in alcohol-related disease mortality following tax increases,⁴ other review studies have produced more mixed results.⁶

Many governments have considered instituting mechanisms which will increase the price of alcohol and thus reduce total per capita consumption. A minimum price per litre of alcohol is already currently operative in some countries, including the majority of Canadian provinces, and such measures are thought to reduce overall consumption of alcohol substantially.^{1,7} New Zealand is one of several countries currently investigating a minimum price per standard drink, with a recent New Zealand Ministry of Justice Report modelling three hypothetical minimum pricing options; \$1.20, \$1.10 and \$1.⁸

Recent work by Holmes et al has looked at the impact of potential minimum unit pricing policies in the UK on various population groups.⁹ Using the Sheffield Alcohol Policy Model, these authors postulated that under a minimum pricing regime, the largest changes in consumption would likely occur in harmful drinkers in the lowest quintile of income, as these are the drinkers most likely to be buying the cheapest alcohol.⁹ A minimum pricing regime is thought to result in a reduction in consumption in this group because it raises the price of all types of cheap alcohol and thus limits opportunities for heavy drinkers to 'switch' from their preferred alcohol to an alternative cheaper product.¹⁰

This finding is consistent with studies of historical sales data in Sweden, which showed the biggest reduction in alcohol consumption was achieved when the price of lowest quality alcohol was increased, as quantity, rather than quality, of beverage was sacrificed.¹¹

Concerns that policies such as minimum pricing may result in dependent drinkers turning either to crime, substances which are more harmful, or more dangerous non-beverage alcohol, have not been borne out by the available evidence,^{8,12,13} with Black et al finding that such behaviour occurred rarely in their study of Edinburgh's dependent drinkers, and Stockwell et al reporting many positive coping responses to less affordable alcohol in their group of homeless drinkers in British Columbia, Canada.^{14,15}

In this study, we aimed to investigate issues related to affordability of alcohol in a group of dependent drinkers attending an inpatient detoxification service. We investigated the amount spent per day on alcohol and explored key drivers behind choice of alcohol product in dependent drinkers. We aimed to understand better the impact any future price increases might have on the purchasing behaviour of our sample, including which strategies dependent drinkers have previously used when alcohol was unaffordable. We also asked about strategies they believed they might use if alcohol became unaffordable in the future, albeit that questions relating to hypothetical future behaviours are able to provide estimates of possible behavior change only.^{16, 17}

Methods

The study population comprised a prospective sample of 115 alcohol-dependent clients (experiencing significant physiological withdrawal symptoms on alcohol cessation) admitted for medicated detoxification at an addiction service inpatient unit (IPU) between May 2013 and February 2014. The 11-bed IPU is part of a regional community alcohol and drug service (CADS) in Auckland, New Zealand and is a mixed-gender specialist detoxification unit.

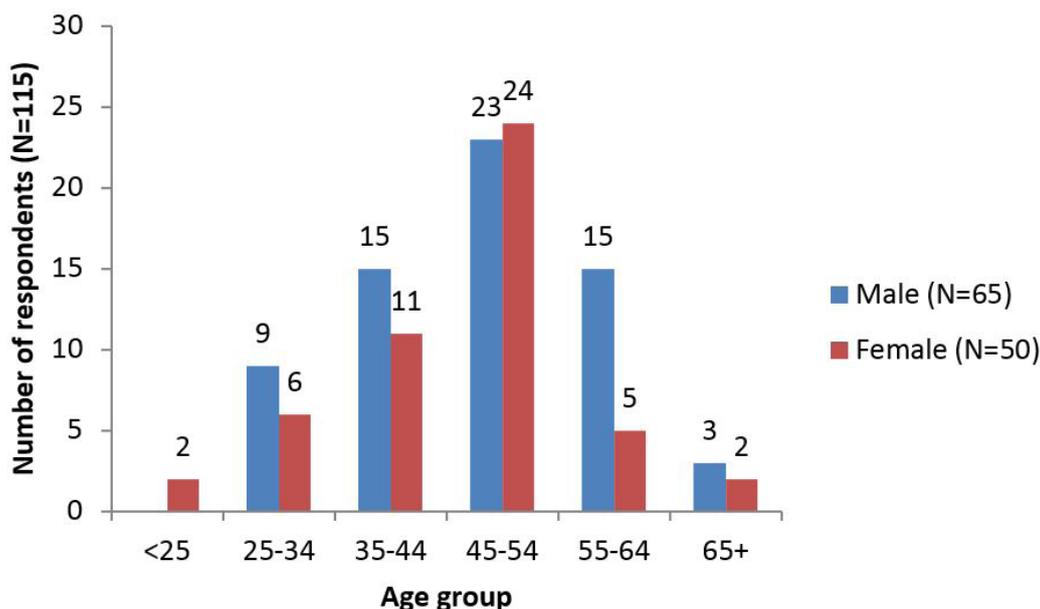
Participants were diagnosed as alcohol dependent by an addiction medicine specialist, applying DSM IV criteria as part of the assessment process.¹⁸ Excluded were clients aged 17 or younger, clients with co-existing other substance abuse or dependence, clients who were too intoxicated or physically unwell to complete the research at the time of admission and those with significant cognitive impairment.

Eligible clients were invited to participate on the first day of their detoxification by the lead researcher, following their routine medical admission to the unit. Participants self-completed an anonymous pencil and paper questionnaire. Completed questionnaires were deposited by participants in a closed box. Participants were permitted to have questions clarified by the lead researcher, but no specific assistance was given.

The survey included questions collecting demographic information, source (but not amount) of income and years of dependent drinking. Subsequent questions explored daily alcohol consumption, potential behaviour following a hypothetical increase in price, and past behaviours used when faced with no funds. All survey questions were multi-choice, apart from two questions which required amount and price of alcohol to be specified. These questions were adapted from those in studies by Black and Stockwell.^{14,15}

Participants were asked to note the amount and type of alcohol consumed on an average day prior to their admission. Amount of alcohol consumed per day was later converted to the number of standard drinks consumed per day using the Health Promotion Agency guidelines.²⁰ Participants

Figure 1: Age and gender distribution.



were asked to nominate the amount spent on alcohol for the day and thus a cost per standard drink was also calculated for each participant. If clients gave a range of alcohol used, the upper end of the range was taken, as it is generally accepted that only 40–60% of total alcohol sold is generally captured in surveys²¹ and alcohol intake is underreported across all drinking subgroups (although studies do disagree on which sectors of the population are more likely to underreport).²²⁻²⁴

Standard descriptive statistics were used to summarise the characteristics of the sample. Shapiro-Wilk and Kolmogorov-Smirnov tests were used for normality testing. Quantiles were provided for non-normally distributed continuous variables, with 95% confidence intervals. For primary binomial outcomes, proportions were calculated with exact confidence limits. Kruskal-Wallis test was used for two group comparisons of a continuous variable when t-test was not appropriate. The data was collated in Excel and analysed using SAS 9.3.

The study was conducted as an audit or related activity according to the National Ethics Advisory Committee guidelines for observational studies.¹⁹

Results

One hundred and fifteen clients took part in the survey. A further 9 eligible clients refused to participate (response rate 93%, 115/124).

Fourteen clients who presented during the study period were excluded: 8 due to physical unwellness; 5 due to intoxication; and 1 due to language issues as the questionnaire was self-completed and required a basic level of English reading comprehension. Four clients re-presented during the study period and were excluded from participating a second time.

Multiple choice questions were fully completed by all 115 participants; however two questions requiring free responses about amounts and cost of alcohol were not completed in sufficient detail by 22/115 participants and could not be included in the final analysis for this section. This set of 22 was no different to the main group with respect to demographic data.

Demographics

The sample was 57% (65) male with 40% (47) of the sample aged 45–54 (see Figure 1). Eighty-five percent (98) identified as New Zealand European and 9% (10) Māori. Only 15% (17) were in fulltime employment; 63% (73) derived at least some of their income from a social security benefit. Fifty-seven percent (66) of the sample had been drinking at a dependent level for at least 6 years and 40% (46) for 11 years or more.

Type and amount of alcohol consumed

61.7% (71) of clients reported using at least some wine and 47% (54) used exclusively wine. 10% (12) used exclusively beer and 13% (15) exclusively spirits.

Table 1: Cost per standard drink.

	Whole sample (n=93)	Social security group (n=60)	Non social security group (n=33)
Mean cost/standard drink	\$1.34	\$1.12	\$1.73
Upper Quartile	\$1.50	\$1.25	\$1.67
Median	\$1.17	\$1.08	\$1.25
Lower Quartile	\$0.91	\$0.88	\$1.00

Table 2: Number buying alcohol at or below given price points.

	Whole sample	Social security group	Non social security group
Number buying at ≤ \$1.20/standard drink	48/93 (52%)	35/60 (58%)	13/33 (39%)
Number buying at ≤ \$1.10/standard drink	43/93 (46%)	31/60 (52%)	12/33 (36%)
Number buying at ≤ \$1.00/standard drink	33/93 (36%)	23/60 (38%)	8/33 (24%)

A question about the amount of alcohol used was poorly answered, with 21 clients not providing sufficient information. However, there was enough data to calculate the number of standard drinks consumed per day for 82% (94) of respondents. The mean and median number of standard drinks consumed in a typical 24-hour period prior to admission was 24 (equivalent to 3 bottles of wine approximately) (95% CI for median, 20.4, 24.0), which equates to 168 units a week. Eighty-four percent (79/94) of the sample consumed 16 or more standard drinks per day and 31% (29/94) of the sample drank 30 or more standard drinks per day. There was no statistically significant difference in the amount consumed by males versus females (Kruskal-Wallis test, $p=0.07$).

Cost per day and cost per standard drink

The mean daily cost of alcohol was calculated for 114 clients at \$29.03, range \$3 to \$100. As the distribution was non-normal, median cost was calculated at \$25 (95% CI, \$22, \$30).

Cost per standard drink was able to be calculated for 81% (93) of respondents. For the whole sample of 93 clients, mean cost per standard drink was \$1.34, and median cost per standard drink was \$1.17 (95% CI, \$1.04, \$1.25).

A significant difference (Kruskal-Wallis test, $p=0.02$) was found in the median cost per standard drink between the clients on a social security benefit (median \$1.08) and those not receiving a benefit (median \$1.25). See Table 1.

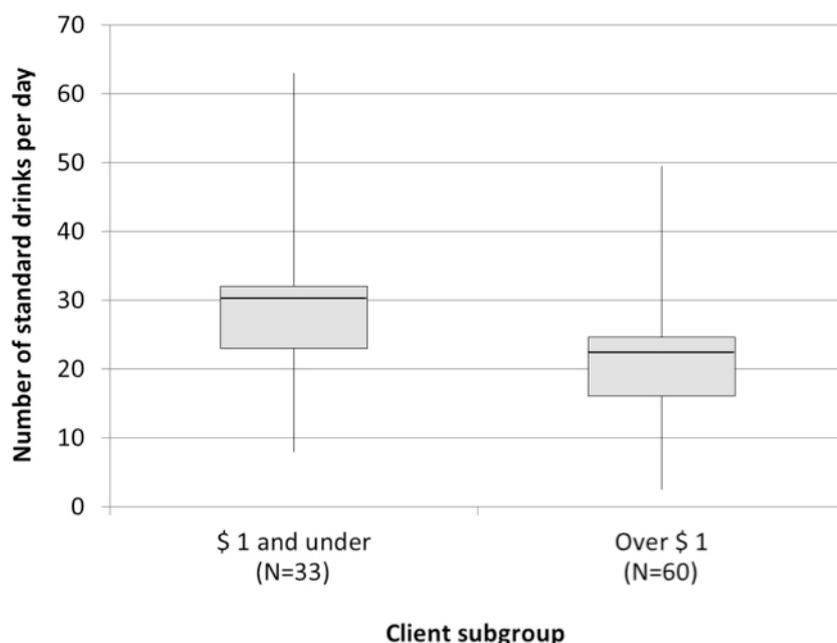
As outlined in Table 2, a large proportion of the sample bought alcohol at less than the \$1.20, \$1.10 and \$1.00 per standard drink hypothetical minimum price points nominated by the Ministry of Justice.⁷ In particular, 36% (95% CI, 26%, 46%) of the clients bought alcohol at less than or equal to \$1.00 per standard drink. Thirty-eight percent (95% CI, 26%, 52%) of the clients on a social security benefit bought at this price also.

Those spending a dollar or less per standard drink ($n=33$) drank a mean of 29 standard drinks and a median of 30 standard drinks per day. This was significantly more than those spending more than a dollar per standard drink, who drank a mean of 21.5 and a median of 22.5 standard drinks per day (Kruskal-Wallis test $P=0.0028$). See Figure 2.

Impact of price

Fifty-nine percent (68/115) of the whole group indicated that price was an important consideration when purchasing alcohol. Forty-six percent (53) and 44% (51) indicated that alcohol content and taste, respectively, were also important

Figure 2: Box and whisker plot showing number of standard drinks consumed per day in those spending a dollar or less per standard drink compared to those spending more than a dollar per standard drink.



considerations. Clients were able to choose more than one response to this question.

Strategies to sustain alcohol use in the face of hypothetical price increase

The survey explored what strategies dependent drinkers would use to sustain their alcohol use, if their usual drink of choice became unaffordable. Fifty-eight percent (67) indicated that they would switch to a cheaper product and 28% (32) indicated that they would combine their usual drink with something cheaper. Eighty-nine (77%, 95%CI, 69%, 85%) clients indicated either of the above two. Thirteen percent (15) indicated they would cut down their drinking substantially in order to continue drinking their preferred alcohol.

Strategies used previously when no money was available

The survey then asked if participants had ever faced the situation of having no money for alcohol on a particular day. Two-thirds (76 clients) had experienced this and reported using one or more strategies, including forgoing essentials 41% (31/76), borrowing alcohol 36% (27/76) and going without 25% (19/76). Thirty percent (23/76) reported some form of drug use as a strategy: 17% (13/76) had

used illicit drugs and 13% (10/76) had used prescription drugs. Other less common strategies are detailed in Figure 3. Strategies used appeared similar between those spending less than \$1 a day and the rest of the sample.

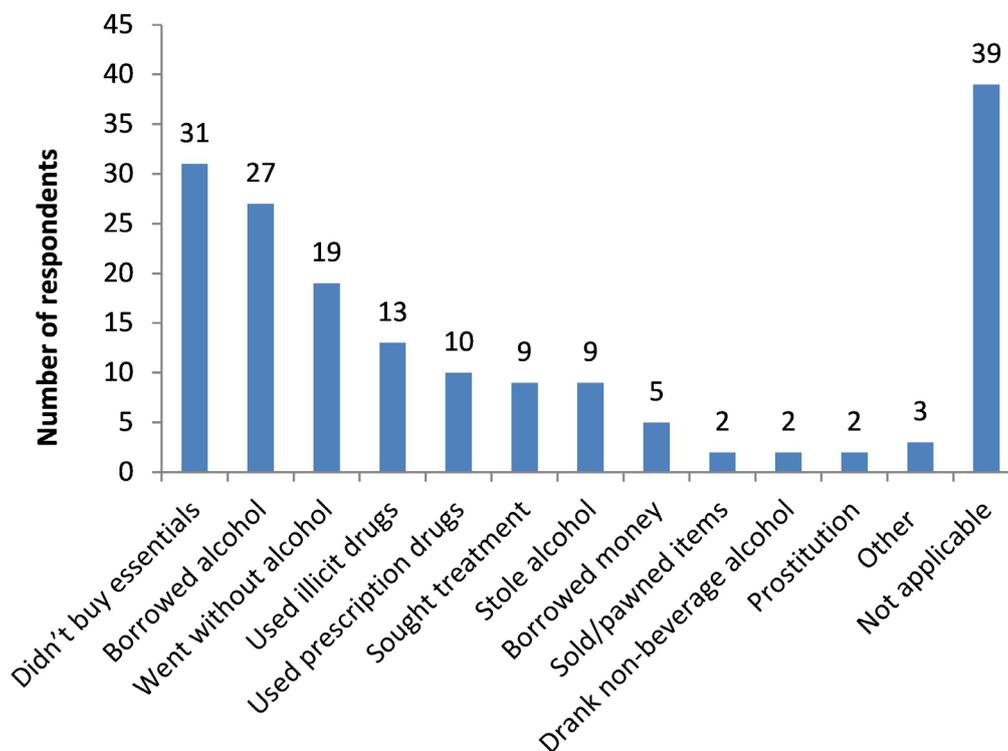
Thirty-four percent of the clients (39/115) had not faced the issue of having no money for alcohol before and 15 of these were in the social welfare benefit group.

Discussion

This study provides information about the amount and cost of alcohol consumed per day by a group of dependent drinkers in Auckland, New Zealand. The behaviours and attitudes of this group to a potential increase in the price of alcohol are investigated including strategies they have previously employed when unable to afford alcohol.

Our group of dependent drinkers consumed an average of 24 standard drinks per day, which is slightly more than the other comparable studies of dependent drinkers. For example, Black et al describe an average weekly consumption of 197.7 UK units in their Edinburgh sample.¹⁴ A UK unit contains 8g ethanol whereas a New Zealand unit is 10g, thus our New Zealand group drink the equivalent of 210 UK units per week.

Figure 3: Strategies used when no funds were available to buy alcohol.



Our group of dependent drinkers spend a considerable amount of money on alcohol, at a median cost of \$25 NZD per day. The median cost per standard drink for our study population as a whole was \$1.17 NZD, with a significant difference found between the median cost per standard drink in those on a social security benefit (\$1.08) compared to the remainder (\$1.25). Our results suggest that a \$1 minimum price per standard drink, such as that modelled in the recent New Zealand Ministry of Justice report, would affect at least 36% of our study population who are currently buying alcohol below this price point.⁸ At a minimum price of \$1.20, over half of our group of dependent drinkers would be impacted.

Those most affected by a minimum price regime are likely to be people currently spending (or able to spend) the least on alcohol. Those in our sample who spent a dollar or less per standard drink on an average day also drink significantly more alcohol. Under any of the proposed minimum pricing regimes the cost of alcohol per day would increase the most for this group, suggesting it could be important as a harm minimisation measure.

Switching product in response to a price rise is a strategy that heavy drinkers use

and has been described in the literature.^{10,25} Seventy-seven percent of our group hypothetically favoured switching partially or completely to a cheaper product. Under a minimum pricing regime, the cost per standard drink would be at the same minimum price for all products and this strategy would be less likely to be employed. As noted elsewhere, there would no longer be a financial incentive to switch product, as drinkers would be unable to maintain the same level of consumption without increasing their costs.^{1,14} When asked hypothetically whether they would cut down their drinking in the face of a price rise, only 13% indicated that they would. However when reporting on strategies previously used (when they had no money for alcohol), 25% reported “going without”, effectively reducing their alcohol consumption albeit only till they next had money.

Although this study is not able to confirm whether an increase in price would change consumption in this group of dependent drinkers, it is likely that past strategies reported by the group (in response to limited funds) would be used again and more often, particularly if minimum pricing was introduced due to its effects of limiting switching. The strategies used

by our group when facing the situation of having no money for the day were in line with those found in Black and Stockwell; ie, forgoing essentials, borrowing alcohol and going without.^{14,15} Whilst the most common strategies are unsustainable for long, they sit in stark contrast to the perception of the general public and other authors, who have expressed concern about increased criminal activity or use of harmful substitutes.^{8,12,13} Of note were the infrequent reports of potentially dangerous or illegal behaviour; only 2 participants mentioned non-beverage alcohol (such as methylated spirits) as a strategy they have actually employed and stealing alcohol was used as a strategy by just 9 clients. There have been concerns expressed that home brewing activity may increase if a minimum pricing regime was instituted.⁸ None of our study participants indicated that they had used this strategy in the past, although longer-term strategies such as this were not investigated specifically.

Use of other drugs had been used as a strategy when alcohol became unaffordable by 20% of the total sample (and 30% of those who had previously been without funds), with 13 reporting illicit drug use and 10 reporting prescription drug use. Potential participants with comorbid drug use were excluded from this survey, thus our results may be an underestimation of this behaviour in the wider subset of dependent drinker. The *Alcohol Use 2012/13: New Zealand Health Survey* notes that 11% of the general population of New Zealanders had used a 'drug substance' (excluding tobacco) while drinking in the past year.²⁶

This survey contained one question which related to hypothetical future behaviour in the face of an unaffordable favoured product. As with other studies that include questions relating to hypothetical future purchasing behaviours, this study is only able to present estimates of possible behaviour change following increased alcohol cost.^{16,17} However, all of the other

questions related to either current or past behaviours, which are arguably more robust with the responses to these questions consistent with other literature.^{14,15}

The self-completed nature of this survey resulted in some question responses being incomplete. The intent was to allow clients the privacy to complete questions as truthfully as possible, however, more complete information may have been gained had the survey been conducted as an interview.

This was a single site study, thus whilst valid for this Auckland-based sample, it is unclear how generalisable these findings are to New Zealand's dependent drinkers as a whole. The ethnicity of the sample is not representative of the population of the Auckland region, with the European population over represented and other ethnicities under represented.

Conclusion

The results of this study indicate that dependent drinkers buy a large amount of predominantly inexpensive alcohol and would be financially impacted by any proposed increase in the minimum price per standard drink. Because this would severely restrict the ability of this group to switch to an alternate cheap alcohol product, it seems likely that a minimum pricing regime would result in an overall reduction in alcohol consumption in this group. Any potential impacts would be most significant in the subset currently buying the cheapest alcohol, which is also the group using the most alcohol, suggesting that such a regime may be an important harm minimisation strategy.

As has been shown in other literature, there is minimal evidence in this group of accessing non-beverage alcohol or of criminal activity to access alcohol when it becomes unaffordable. Fears of such behaviours are not valid reasons for rejecting a minimum pricing regime to reduce general per capita consumption at policy level.

Competing interests: Nil**Acknowledgement:**

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