

The impact of a hypothetical designated driver program on intended alcohol-related behavior: an RCT

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SUMMARY

This study was aimed to assess, using vignettes, the impact of a hypothetical 'designated driver' (DD) initiative on level of intended alcohol consumption. A secondary aim was to assess whether using any form of transport where someone else drove was associated with level of intended consumption. A total of 390 individual sports club members from 72 clubs in New South Wales, Australia, completed a telephone survey. Individuals were randomized into one of two groups: one receiving a hypothetical vignette where the sports club members drank in a setting that provided a DD program; and the other receiving a vignette where the setting in which sports club members drank did not have a DD program. Individuals in both groups were asked to estimate the amount of alcohol they would be likely to consume and the time over which they would consume alcohol, and to indicate the likely

means of traveling home afterwards. No difference in the amount of alcohol intended to be consumed between those in the DD and the non-DD group was identified. However, secondary analysis identified that, after controlling for group allocation, greater alcohol consumption was reported by individuals who used transport that relied on someone else to drive them home. DD programs implemented in community sports clubs may not affect intended alcohol consumption by club members. However, using someone else to drive home was associated with greater alcohol consumption. To mitigate against this risk, licensed premises that implement safe transport strategies should consider the use of additional strategies to moderate alcohol consumption that may be inadvertently encouraged. Trial registration: (Australian Clinical Trials Registry) ACTRN12611000831987.

Key words: alcohol consumption; designated driver programs; intention; community sports clubs

INTRODUCTION

Throughout the world, a considerable cause of alcohol-related harm is alcohol-impaired driving of a vehicle, often referred to as drink-driving (WHO, 2007). Designated driver (DD) programs are one commonly applied strategy aimed at assisting individuals not to drive when alcohol impaired, or be an occupant of a car driven by an alcohol-impaired driver (Ditter *et al.*, 2005;

Martineau *et al.*, 2013). Such programs usually require an individual within a group to abstain from alcohol and drive other group members home after a drinking episode. The so-called 'designated driver' is assigned the role before any alcohol consumption occurs (Winsten, 1994; Fell *et al.*, 1997).

DD initiatives are often supported by licensed premises through the provision of free non-alcoholic beverages or food for the DD (Loxley

et al., 2004). Such initiatives hold wide appeal and have become increasingly popular for both licensees and patrons of drinking establishments as they are a cheap and easy strategy to implement and demonstrate pro-social concern by all parties (DeJong, 1992; Loxley *et al.*, 2004). DD programs have been supported by the alcohol industry (DeJong, 1992), the media (Winsten, 1994), advocacy groups (MADD, 2011), community sports clubs (Rowland *et al.*, 2012c) and local government authorities (BCC, 2006).

Despite their broad appeal, systematic reviews have indicated that there is insufficient evidence that DD programs reduce the prevalence of alcohol-impaired driving (Ditter *et al.*, 2005; Martineau *et al.*, 2013). Furthermore, data from a number of representative community surveys from the USA suggest that DD programs may increase overall levels of alcohol consumption by intended passengers of a DD (Austin, 2012). In contrast, other studies of college students (Gieck, 2010; Raimondo, 1998), patrons drinking in bars (Harding *et al.*, 2001) and passengers traveling in cars following a drinking session (Lange *et al.*, 2006) suggest that consumption does not increase for intended passengers of a DD. Another study found that DD programs (referred to as safe rides) were associated with increased drinking for high-risk drinkers (Caudill *et al.*, 2000).

Several methodological shortcomings associated with the previously cited studies limit the ability to ascertain whether DD initiatives contribute to harm by increasing the amount of alcohol consumed by passengers of a DD. First, the previous studies have relied on retrospective self-report behavior to determine the amount of alcohol consumed and modes of transport used, possibly limiting the accuracy of the recalled data. Second, most of the reported studies involved cross-sectional (non-experimental) descriptive surveys limiting the capacity for causal attribution between participation in DD programs and level of alcohol consumption. Third, the ability to overcome the latter shortcomings through the use of conventional randomized controlled trial designs is constrained by ethical concerns associated with the allocation of individuals to participate in a behavior that is potentially injurious (NHMRC, 2007).

The use of hypothetical vignettes has been suggested to be one method of overcoming the limitations of studies that examine potentially harmful behaviors or rare events where assignment to an intervention is unethical or unfeasible; such as

behaviors like drink-driving, which may cause injury, harm or possibly death of self and/or others (Hughes and Huby, 2002). Vignettes simulate key elements of a real-life behavior and require the individual to imagine themselves in a situation where the behavior being researched is likely to take place and are then asked to indicate what their likely behavioral response to the hypothesized situation would be. Such research assesses behavioral intention, an accepted measure of behavior in its own right (Godin and Kok, 1996; Kasprzyk and Montano, 2007). Vignette-based studies lend themselves to the conduct of fully controlled designs with random allocation, thus providing a means of drawing conclusions about cause and effect of DD programs on behavioral intentions (McKeganey *et al.*, 1995; Hughes and Huby, 2002).

Settings in which DD studies have been conducted in the past include licensed bars (Harding, *et al.*, 2001). In a number of countries, sports clubs and events have been associated with high levels of alcohol consumption by members and spectators (Duff *et al.*, 2005; Poortinga, 2007; Rowland *et al.*, 2012a). As individuals commonly travel to and from such clubs in cars, a need and an opportunity exist to reduce drink-driving and associated injuries and loss of life associated with this setting (Rowland *et al.*, 2012b; Snow and Munro, 2000). No previously reported studies have examined the effect of DD programs on the intended or actual alcohol consumption of sports club members or spectators.

To address limitations of past research, a randomized controlled trial was undertaken to assess using vignettes, the impact of a hypothetical 'designated driver' initiative on level of intended alcohol consumption. A secondary aim was to assess whether using any form of transport where someone else drove was associated with level of intended consumption.

METHODS

The trial was prospectively registered with the Australian and New Zealand Clinical Trial Registry (ACTRN12611000831987) and was approved by the University of Newcastle Human Research Ethics Committee (H-2008-0432).

Design and setting

A randomized control trial (RCT) was conducted with 387 individuals who belonged to 72

community sports clubs. Figure 1, identifies the 'participant flow' and randomization process.

Club recruitment

Lists of clubs were obtained from sporting associations, local councils, web searches and telephone directories. Clubs were located in the Hunter New England and Sydney regions of the state of New South Wales, Australia. The study area included major cities and rural communities encompassing approximately 75% of the population of New South Wales and 25% of Australia's overall population (ABS, 2006, 2005).

Member recruitment

A quasi-randomized procedure was used to select club members to participate in the study. Eligible and consenting clubs were asked to provide a list of up to 20 members who had most recently celebrated a birthday. Sporting club members were eligible to participate in the study if they satisfied

the following criteria: (1) were over 18 years of age and (2) had been a member of a community sporting club between the period 2009 and 2011. Participating members may have had various roles at their clubs, such as players, coaches, club committee members, club volunteers and spectators. Respondents provided information through a computer-assisted telephone interview (CATI). When providing consent, respondents provided a telephone number and a time that was convenient to call them. The CATI was conducted by trained telephone interviewers.

Randomization and concealment

The study was part of a broader study: half were randomized into this study ($n = 394$), and half ($n = 412$) into another focusing on social capital in community sports clubs. Participants assigned to this study were then further randomized into two groups—half were randomized to a scenario that included a DD program, and the other half randomized to a scenario that did not. Randomization

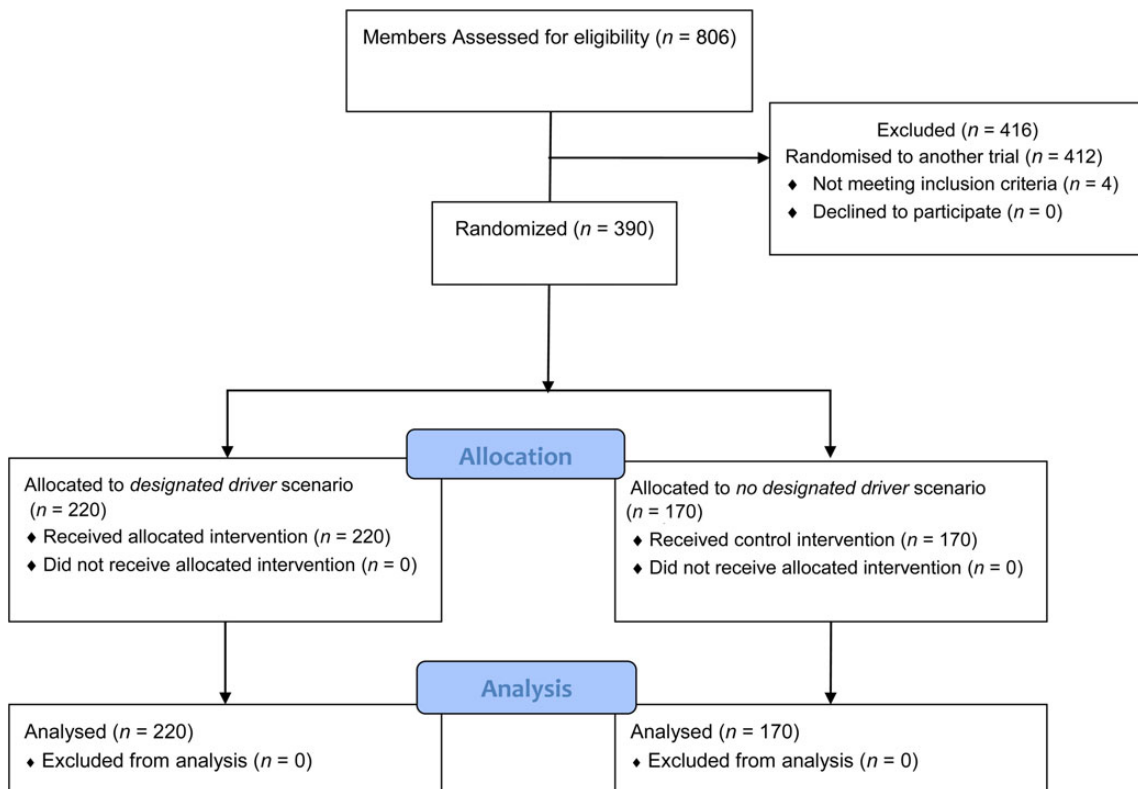


Fig. 1: Participant flow subject selection and allocation procedure.

was done via a computer program, and data collectors were not blind to the group to which participants had been allocated. However, participants were unaware as to which group they were allocated, and therefore, were blind to allocation.

Vignettes

Participants in Group 1 were asked to imagine themselves drinking alcohol after playing a sports game with their community sports club. The following was read to them

I would like you to imagine that your sporting team has just played and won a competition game. After the game you and other club members decide to celebrate at a local licensed venue. The venue has live music, and sells meals but is not within walking distance from where you live. *A fellow member of the club agrees to be designated driver.*

Participants in Group 2 were asked to also imagine him or herself in the same scenario, but were not told that a member of the club agreed to be a DD. Following the hypothetical scenario, participants in each group were asked if they would consume alcohol. Participants reporting that they would consume alcohol were then asked: (i) how much alcohol they intended to drink, (2) over what period of time they intended to drink alcohol and (3) their intended method of transport home/away after they had consumed alcohol there. Respondents were not given prompts around the type of transport they may use to get home.

Measures

For the preceding questions on alcohol, respondents were given examples of an Australian Standard drink. The following was read out to each respondent:

When we are asking questions about the number of drinks, we are referring to 'standard drinks'. A standard drink is equal to:

- 1 middy of full strength beer
- 1 schooner of light beer
- 1 small (100 ml) glass of wine
- 1 pub-sized nip of spirits (30 ml)

How much alcohol respondents intended to consume was measured with the following question:

'Over this period, how many standard alcoholic drinks do you think you would consume?'

How long respondents intended to consume alcohol was measured with the following question:

'How long do you think that you would celebrate with your team? Please estimate units of hours, e.g. 0.25, 1, 2, 3.'

How respondents intended to get home was measured with the following question:

How do you think you would get home from this celebration?

- (i) Drive myself
- (ii) With the designated driver (mentioned in the scenario)
- (iii) Lift from member/friend/relative who may have drunk alcohol
- (iv) Lift from member/friend/relative who had not drunk alcohol
- (v) Use a taxi
- (vi) Walk
- (vii) Use public transport
- (viii) Ride a push bike
- (ix) Other
- (x) Don't know
- (xi) Refused

Primary outcome analysis

As presented on the Australian Clinical Trials Registry (ACTRN12611000831987), the primary trial outcome was the amount of alcohol respondents intended to consume (as measured in Australian standard drinks).

Secondary analysis

A secondary analysis was undertaken to examine whether mode of transport home was associated with intended alcohol consumption and intended time to consume alcohol. A variable called 'transport home with someone else driving' (THSED) was created by merging the following response categories: 'Lift from member/friend/relative who had not drunk alcohol', 'use a taxi' or 'use public transport'. All secondary analysis controlled for group allocation (control or intervention), age, gender and whether a respondent was a player at the sports club.

Chi-square tests were used to compare demographic differences between the groups, and differences in the primary and secondary measures. Multivariate regression was used to assess whether the availability of a DD program or other modes of transport home was predictive of intended consumption and intended time to consume alcohol. All analyses were done using Stata, version 12.

Sample size

Based on previous work done with community sports clubs (Rowland *et al.*, 2012b), it was determined that the study would require approximately 150 individuals per group to have 80% power to detect a difference of 1.2 standard drinks between the groups, at an α level of 0.05.

RESULTS

Participants

A total of 390 participants participated in the study; 170 (43.59%) were in the DD group, and 220 (56.41%) were in the non-DD group (see Figure 1). Four respondents were excluded as they could not be contacted. Table 1 outlines the statistical distribution of the variables; none of the demographic variables differed significantly between the two groups. The majority of the sample was male (81%) [$\chi^2(1, n = 390) = 1.48$;

$p > 0.05$]; and close to half (47%) were players of the sport with which the club was associated [$\chi^2(1, n = 390) = 0.30$; $p > 0.05$]. The age range for the sample was 18–79 years, with a mean age of 36.29 years ($t = -0.43$; $p > 0.05$). There was a similar proportion of individuals with an annual income greater than \$AUS 31 200 [$\chi^2(11, n = 380) = 8.94$; $p > 0.05$]. The level of education attainment was similar for both groups [$\chi^2(5, n = 390) = 1.89$; $p > 0.05$].

Aim 1: amount of alcohol intended to be consumed

The mean number of intended standard drinks for those in the DD group was 5.81, and the mean number of intended standard drinks for those in the non-designated driver (NDD) group was 5.98. However, the difference in the mean number of intended drinks between the two groups was not significantly different ($t = -0.730$; $p > 0.05$) (Table 2).

Table 1: Demographic distribution of sample

Variable	No DD program	DD program	Total
Gender (male): % (<i>n</i>)	78.64 (173)	85.53 (142)	80.77 (315)
Age			
Range	18–79	18–69	18–79
Mean	36.63	37.17	36.87
SD	12.23	12.11	12.16
Annual individual income (gross): % (<i>n</i>)			
\$ 83 200 or more	29.77 (66)	32.72 (54)	21.05 (108)
\$ 52 000–\$ 83 199	29.30 (63)	31.52 (52)	20.26 (115)
\$ 31 200–\$ 51 999	20.93 (45)	18.18 (30)	19.74 (75)
\$1–\$31 199	16.28 (35)	13.34 (21)	13.01 (38)
Nil or do not know	3.73 (8)	4.24 (6)	3.95 (15)
Educational attainment: % (<i>n</i>)			
Year 9 or less	2.27 (5)	1.76 (3)	2.05 (8)
Year 10	10.00 (22)	11.76 (20)	10.77 (42)
Year 11/12	20.91 (46)	17.06 (29)	19.23 (75)
TAFE	35.91 (79)	37.65 (64)	36.67 (143)
Uni. undergraduate	30.91 (68)	31.76 (54)	31.28 (122)
Player % (<i>n</i>)	45.45 (100)	48.24 (82)	46.67

TAFE, tertiary and further education (not university level, but higher than secondary school).

Table 2: Outcome measures for the DD and NDD group

	No DD program, <i>M</i> (<i>SD</i>)	DD program, <i>M</i> (<i>SD</i>)	Total, <i>M</i> (<i>SD</i>)
Outcome measures			
Mean alcohol consumption (standard drinks)	5.98 (4.84)	5.81 (4.53)	5.91 (4.71)
Mean time consumed alcohol (hours)	3.45 (2.16)	3.41 (2.17)	3.43 (2.16)

Aim 2: intended consumption using any form of 'transport home with someone else driving'

Table 3 outlines the modes of transport that respondents from both groups reported that they would intend to use. Close to half (44%) of the respondents from the DD group reported that they would use the DD as a means of getting home. A total of 37% of the DD group indicated that they would intend to either obtain a lift with someone else who had not consumed alcohol (16%) or take a taxi home (21%). For the NDD group, the greatest proportion, 42%, reported that they would take a taxi home.

When all forms of THSED were combined, a significantly greater proportion of individuals in the DD program group (82.11%) intended to use THSED compared with individuals in the NDD program (73.11%) $\chi^2(1, n = 386) = 3.87$; $p < 0.05$) (Table 3).

Table 4 outlines the results of the regression analysis. Controlling for potential confounders and group allocation (DD program), THSED was associated with increased intended consumption by 2.34 drinks and reduced intended length of time of consumption by 0.58 h. Age ($B = -0.09$)

was significantly associated with intended consumption. Being female was associated with lower intended consumption by approximately two standard drinks ($B = -2.17$), but was not significantly associated with intended time over which alcohol was consumed. Whether a respondent was a player or not was not significantly associated with intended consumption or intended time over which alcohol would be consumed (Table 4).

DISCUSSION

This is the first experimental study to examine whether a hypothetical DD program has impact on intention to consume alcohol. In keeping with previous systematic reviews (Ditter et al., 2005; Martineau et al., 2013), we did not find evidence which indicated that having a DD program increased intended consumption. However, we did identify that using a strategy which promotes someone else driving home may be associated with increased amounts of alcohol consumed by passengers. To mitigate against this risk, licensed premises that implement safe transport strategies

Table 3: Responses for both groups for *hypothetical vignettes*

	Total % (n)	No DD program % (n)	DD program % (n)
Mode of transport			
With DD	25.06 (97)	N/A	44.29 (97)
Drive myself	16.02 (62)	18.45 (31)	14.16 (31)
Lift other drinker	0.78 (3)	1.19 (2)	0.46 (1)
Lift other (not drink)	22.48 (87)	30.36 (51)	16.44 (36)
Taxi	30.23 (117)	42.26 (71)	21.00 (46)
Walk	2.58 (10)	3.57 (6)	1.83 (4)
Public transport	0.52 (2)	1.19 (2)	0.00 (0)
Ride push bike	0.26 (1)	0.00 (0)	0.46 (1)
Other	1.81 (7)	2.98 (5)	0.91 (2)
Do not know	0.26 (1)	0.00 (0)	0.46 (1)
THSED		73.81 (124)	82.11 (179)

Table 4: Regression model predicting whether THSED is associated with intended consumption and intended time over which alcohol is consumed

	Intended consumption β (95% CI)	Intended time consumed alcohol β (95% CI)
THSED	2.34 (1.44, 3.25)***	0.58 (0.15, 1.01)**
DD program	-1.05 (-1.96, -0.15)*	-0.21 (-0.64, 0.21)
Age	-0.09 (-0.14, -0.04)**	-0.05 (-0.08, -0.03)***
Female	-2.17 (-3.33, -1.00)***	-0.17 (-0.72, 0.39)
Player	-0.91 (-0.40, 2.23)	0.44 (-0.18, 1.06)
Constant	11.64 (8.39, 14.89)***	5.34 (3.80, 6.88)***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

should consider the use of additional strategies to moderate alcohol consumption that may have been inadvertently encouraged.

The findings of this study support the notion that having a DD program may reinforce social norms directed against alcohol-impaired driving (Ditter *et al.*, 2005). It is possible that individuals in the DD group may have had a greater awareness of the need to use a mode of transport home that enabled them to arrive home safely, compared with individuals in the NDD group. It is also possible that a DD strategy may not change alcohol consumption; however, it may be helpful in creating a culture that promotes a social norm aimed at reducing alcohol-impaired driving.

In the light of this interpretation, settings where DD strategies are promoted may need to offset them with practices that also reduce the alcohol consumption of passengers, as a means of ensuring one risky behavior (drink-driving) is not replaced with another (high-risk drinking by others). Such responsible service of alcohol strategies could include ensuring that bar staff are trained in responsible service of alcohol (RSA), and RSA practices are enforced (Bryant and Williams, 2000; Ker and Chinnock, 2010), restricting the times and periods alcohol is sold (Duailibi *et al.*, 2007), selling drinks with lower alcohol content cheaper than full strength drinks and having substantial food available when selling alcohol (Fogarty, 2006; Gallet, 2007; Booth *et al.*, 2008). This latter suggestion is made because food other than snacks, when eaten while consuming alcohol, can slow down the metabolism of alcohol and therefore the amount of alcohol absorbed into the blood; it can also slow down the rate at which alcohol is consumed (Loxley *et al.*, 2004).

While this study is novel, its primary limitation is that it has used intention as an indicator of real world behavior. While intention is a strong predictor of behavior, environmental influences, habits and the prevalence of competing or opposite behaviors all moderate the extent to which intention predicts behavior (Kasprzyk and Montano, 2007). This study has demonstrated that there are associations between hypothetical intention and hypothetical consumption, and intended modes of transport home and consumption in the community sports club context. It is possible that different outcomes could be identified if the vignette used a different setting in the study such as, for example, a community festival. An RCT using a variety of hypothetical scenarios

may help in better understanding the influence of different settings on behavior and is worthy of exploration.

Further limitations of the study also need to be considered. Theoretically, those who belonged to the DD group made alcohol choices in the context of a 'safe' form of transport being available. Those in the NDD group only made their choice of transport after they had indicated how many drinks they had intended to consume. Thus, it is possible that intended consumption was affected by the mode of transport home for the NDD group. In contrast, for the DD group, the mode of transport home was associated with intended consumption. It is also possible that those in the DD group responded in a more socially desirable manner and chose 'safe rides' as a mode of transport home as it had already been suggested to them.

Future research should look at alternative manipulations of the vignette content that is presented to the respondents. One method of achieving this would be to have a vignette where the DD option is suggested, another vignette where it is suggested that the only mode of transport home is 'driving yourself' and a third option where no form of transport home is suggested. The sampling procedure for this study did not confirm whether respondents had a driver's license. It is possible that intention to drink affects only those who have a current driver's license and therefore using only respondents who have current driver's license may enhance the validity of the findings. Future research should give priority to assessing the impact of interventions that broadly promote safe transport strategies, not just those which promote DDs. To help validate the findings of this study, future research should explore how intentions compare with consumption and transport home last time they actually were at their club.

In conclusion, this is the first experimental study to have found that having a potential DD program in place is not associated with proxy measures of increased intended alcohol consumption. Further, we have identified that the intention of using transport where someone else drove an individual home was associated with greater intended consumption of alcohol by that individual (passenger). While the study has used a proxy for behavior, the findings provide a closer insight into the relationship between having a DD program and consumption. While DD programs in isolation may not reduce impaired driving,

settings such as community sports clubs that prevent individuals from driving home after consuming alcohol need to consider the use of additional strategies to moderate consumption that may be inadvertently encouraged.

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