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Parental supply of alcohol as a predictor of adolescent alcohol consumption patterns: A prospective cohort

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ABSTRACT

Background: Recent research has not supported the idea that parental supply of alcohol to adolescents prevents later alcohol-related harm. Yet the specific role of parental supply in shaping patterns of drinking over time remains unclear. This study investigated the role of parental supply of alcohol in patterns of drinking across adolescence, and assessed whether that role remained consistent over time.

Method: Using a longitudinal cohort of 1927 adolescents (mean age 12.9 years), recruited in 2010 and 2011 from schools across Australia and followed up annually until 2016, we assessed three outcomes using mixed-effect negative binomial regression: frequency of consumption, typical quantity consumed, and overall alcohol consumption in the year (frequency * quantity). Child, parental, familial, and peer confounders of adolescent alcohol consumption were measured and adjusted for in the analyses.

Findings: Parental supply was associated with greater overall consumption in earlier adolescence: Grade 7–8 (incidence rate ratio [IRR]: 3.61; 95% CI: 2.55, 5.12; no supply IRR: 1.00), Grade 8–9 (IRR: 4.84; 95% CI: 3.66, 6.39; no supply IRR: 1.44) and Grade 9–10 (IRR: 8.33; 95% CI: 6.28, 11.05; no supply IRR: 4.75). Alcohol consumption continued to increase in later adolescence regardless of whether parental supply occurred.

Conclusions: Parental supply of alcohol was associated with increased alcohol consumption by their children during early adolescence. While parental supply appears to have less impact on drinking in later adolescence, there was no evidence to suggest it is protective. Parents should be advised to avoid supplying children with alcohol, particularly in early adolescence.

1. Introduction

Adolescent drinking is associated with a range of negative health outcomes, including injury and non-communicable disease (Patton et al., 2012) and is the primary cause of disability-adjusted life years among those aged 10–24 years (Mokdad et al., 2016), making it an important contributor to the burden of disease in this population (GBD 2016 Risk Factors Collaborators, 2017; Mathews et al., 2011). Parental supply of alcohol to adolescents is relatively common, with more than 20% of adolescents in Australia (White and Williams, 2016), England (Statistics Team NHS Digital, 2017), and the United States (Vidourek et al., 2017) reporting they are supplied alcohol by their parents.

It is a common belief that supplying alcohol to adolescents at home in a safe, supervised, and moderate way is likely to reduce risky

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drinking behaviour (Donovan and Molina, 2008; Gilligan et al., 2012; Jackson et al., 2012; Jones et al., 2015), despite a lack of robust evidence supporting this view. In fact, there is emerging evidence to the contrary. A 2014 review of cross-sectional and cohort studies found that parental supply was associated with increased alcohol consumption in adolescent offspring, although lack of control for confounding factors (such as parent alcohol consumption and peer influences) and relatively short follow-up (maximum of two years) were cited as limitations (Kaynak et al., 2014). Similarly, recent reviews found associations between alcohol use and parental supply of alcohol (Sharmin et al., 2017b), and parental rules and permissiveness about alcohol (Sharmin et al., 2017a), with both noting the need for increased control for confounding. Recent research following adolescents over six years and adjusting extensively for known confounders showed higher odds of subsequent binge drinking (> 40 g of alcohol on a single occasion), alcohol-related harms, and symptoms of alcohol use disorder when parental supply of alcohol had occurred (Mattick et al., 2018). Additionally, adolescents whose parents have supplied alcohol are more likely to subsequently obtain alcohol from non-parental sources (i.e. other supply), which is particularly concerning given that other supply is associated with an even greater risk of adverse health outcomes compared to parental supply alone (Mattick et al., 2018). However, whether the role of parental supply on adolescent drinking patterns changes as a function of age remains unclear. To date, no studies have examined whether parental supply has less of an influence on the drinking patterns of older adolescents compared to younger adolescents. Although preliminary evidence suggests that any parental supply is likely to result in harm, limitations in study design calls for further research in order to properly address the misconceptions regarding its benefits, and to clarify whether the harms associated with parental supply are dependent on the age of the adolescent.

Additionally, the extant literature provides some evidence that heavy drinking and harms relating to alcohol consumption may be addressed by reducing parental supply of alcohol to minors. However, examination of the patterns of drinking behaviours in this population has been limited to relatively coarse measures, including whether an adolescent has consumed any alcohol (Wadolowski et al., 2015a), or much higher risk outcomes, such as alcohol use disorder symptomatology (Mattick et al., 2018). Thus, it remains unclear what specific role parental supply of alcohol has on patterns of adolescent alcohol consumption, namely frequency of consumption and typical quantity consumed on a drinking occasion. Examining these patterns of alcohol behaviours may reveal more subtle consequences of parental supply that are subclinical but nonetheless harmful.

The current study uses data from the ongoing Australian Parental Supply of Alcohol Longitudinal Study (APSALS) cohort, which has been followed up annually since 2010 (mean age 12.9) and is thus able to capture the long-term impact of parental supply and account for known confounders including parental, familial, and peer factors. We sought to examine whether: 1) parental supply of alcohol is associated with the overall amount of alcohol consumed by adolescents; 2) parental supply of alcohol is differentially associated with frequency of drinking compared to quantity typically consumed while drinking; and 3) associations between parental supply and later drinking remain consistent over the course of adolescence, from ages 12 to 18.

2. Material and methods

2.1. Participants and procedure

The study employs the APSALS cohort (registered at ClinicalTrials.gov: NCT02280551), comprising 1927 parent-adolescent dyads who opted to participate from Grade 7 classes in private independent (49%), Catholic (12%), and government (39%) schools in Australia in 2010–2011 and followed up annually. Recruitment methods are described in detail elsewhere (Aiken et al., 2017; Mattick et al., 2017). The cohort demographics were similar to the Australian population in terms of sex distribution, household composition, racial background, and parental education, although lower socioeconomic groups were somewhat under-represented (Aiken et al., 2017; Mattick et al., 2017). In each annual wave, participants were sent questionnaires assessing drinking behaviours, and a range of constructs related to alcohol uptake and drinking patterns in adolescence. Participants completed questionnaires either via paper hardcopy, or online. To minimise misreporting, questionnaires were sent to each adolescent and parent separately via mail or email with links for online completion.

Analyses for this study use data collected from adolescents over six years (2010–11 to 2015–16; secondary school grades 7 to 12). Of the 1927 dyads recruited into the study, 86% (n = 1629) were retained at Grade 12 (see Supplementary Fig. A1 for flow chart of cohort retention). All adolescents who completed at least two consecutive waves were included in the current study (n = 1811). The study was approved by the UNSW Sydney Research Ethics Committee and ratified by the universities of Tasmania, Newcastle, Queensland and Curtin University. Reporting is in accordance with STROBE guidelines (von Elm et al., 2007) (see supplementary Table A1 for checklist).

2.2. Measures

2.2.1. Outcomes

Frequency of alcohol consumption ('never', 'less than once a month', 'monthly but less than weekly' and 'weekly or more frequent') and typical quantity consumed in standard drinks ('sip or taste', '1-2 drinks', '3-4 drinks', 5–6 drinks', '7-10 drinks', '11–12 drinks',' 13 or more drinks', one standard drink = 10 g) in the past 12 months were obtained via self-report. The three primary outcomes used in the study were: 1) overall alcohol consumption, calculated by multiplying frequency by quantity of alcohol consumption with the midpoint used where responses referred to ranges (e.g. 1.5 for '1-2 drinks'); 2) frequency of alcohol consumption; and 3) typical quantity consumed on a drinking occasion.

2.2.2. Exposure variable

The exposure variable of primary interest was parental supply of any alcohol in the past 12 months, as reported by the adolescent in each wave. Supply of alcohol was coded dichotomously (no/yes), with sips and full drinks both considered as an instance of supply.

2.2.3. Confounding variables

A further source of alcohol exposure—other supply—included alcohol supply from other adults, friends, siblings, or self-supply, compared with adolescents reporting no supply from these sources. Parental supply and other supply were not mutually exclusive (that is, adolescents could receive alcohol from one, the other, or both). The relationship between parental supply and other supply in this cohort has been described elsewhere (see Appendix H of Mattick et al., 2018).

A range of other potential confounders identified from a literature review of factors that influence parental supply of alcohol to minors were also included in analyses (Deans et al., 2008). These variables included: *parental factors* (overall alcohol use (Donovan and Molina, 2011; Swendsen et al., 2012), alcohol accessible at home without parental knowledge (Swendsen et al., 2012), alcohol-specific rules (van der Vorst et al., 2005; Haske Van Der Vorst et al., 2007), monitoring (Swendsen et al., 2012), responsiveness/demandingness/consistency (Alati et al., 2010; Donovan and Molina, 2011), religiosity (Donovan and Molina, 2011)); *family factors* (one- or two-parent household (Alati et al., 2010), family conflict/positive relations (Ary et al., 1999), family alcohol problems (Kuperman et al., 2013), older siblings (Fisher et al., 2007)); *child factors* (sex, age in years, or part thereof, at time of survey completion (Fisher et al., 2007; Swendsen et al., 2012), money to purchase alcohol (Swendsen et al., 2012), tobacco use (Kuperman et al., 2013), externalising (Kuperman et al., 2013; Swendsen et al., 2012),

internalising (Crum et al., 2008; Kuperman et al., 2013), problems socialising (Achenbach, 1991)); and *peer factors* (peer substance use, and peer disapproval of alcohol/tobacco use (Fisher et al., 2007; Kuperman et al., 2013; Swendsen et al., 2012). Full details of the variables included are presented elsewhere (Aiken et al., 2017; Mattick et al., 2017).

2.3. Statistical analysis

Descriptive statistics are presented on the drinking behaviour of the sample, including frequency and quantity of alcohol consumption. Primary analyses were conducted using mixed effect (random intercept) negative binomial regression (to account for within-respondent correlation) to determine the relationship between parental supply of alcohol and the three primary outcomes, with results presented as incidence-rate rations (IRR). Parental supply from one year was used to model the outcomes in the following year, while adjusting for covariates. Thus, the model included five paired time periods (Grade 7–8, Grade 8–9, Grade 9–10, Grade 10–11, Grade 11–12), with variables from the earlier wave predicting the outcomes in the next wave. Confounding variables were selected based on past research (Deans et al., 2008; Kaynak et al., 2014).

To examine whether the associations between parental supply and drinking changed over time, or remained constant, an interaction between parental supply and time period was also included in all three adjusted models. As a secondary analysis, we also examined drinking in the final wave (Grade 12) using negative binomial regression to explore associations with parental supply of alcohol in earlier waves, considering supply in each wave separately, and adjusting for supply in previous waves. Thus, a series of negative binomial models were conducted, one for each wave of supply, with the model for each wave adjusting for previous but not subsequent supply. Additionally, a final negative binomial model was conducted with parental supply entered as a categorical, 6-level variable (0–5 years of supply) to investigate any potential 'dose-response' relationship based on the number of waves in which parental supply of alcohol was reported. Because the confounder variables were measured at the same time as exposure, it is possible that these variables are mediators, not confounders. As a sensitivity analysis, we ran an alternative set of models using confounders from the previous wave. Because this was not possible for baseline exposure, this model included one fewer wave than the primary analysis.

In line with recommendations to use more conservative thresholds for statistical significance to improve reproducibility of research, a p-value criterion of 0.005 was selected (Benjamin et al., 2018). All analyses were performed using Stata 14.1 (StataCorp, 2015).

The primary analysis was conducted using available case analysis. In order to test for bias due to missing data, a sensitivity analysis was conducted using multiple imputation. Details of the missing data and the methods used for multiple imputation are included in Supplementary appendix B.

3. Results

In Grade 7, 15.2% of adolescents reported receiving alcohol from parents. This increased steadily over the course of the study, with 56.7% reporting parental supply in Grade 12. Other supply was initially less common, with 9.3% reporting obtaining alcohol from others in Grade 7. However, other supply showed a much sharper increase over time, with 70.8% reporting supply from others by Grade 12. Around 2% of adolescents in Grade 11 and 30% in Grade 12 had reached the Australian legal age of alcohol purchase. Sociodemographic characteristics of the sample can be seen in Table 1.

3.1. Patterns of alcohol consumption

In early adolescence, those who received alcohol from their parents tended to drink less frequently than those who received alcohol from other sources, with 5.8% of those who received alcohol from parents in Grade 7 saying they drank at least weekly, compared with 8.5% of those who received alcohol from other sources (see Table 2). They also reported drinking smaller overall quantities, with 77.0% of those supplied by parents only consuming sips, compared to 60.5% of those supplied by others. This pattern remained across the early waves of the study, however by Grade 12, those supplied by parents drank more frequently than those supplied by others. There was a moderate but significant correlation between frequency of consumption and typical quantity consumed, which was relatively consistent over the course of the study (ranging from 0.35 to 0.42, Supplementary Table C1).

Similar to the patterns for frequency and quantity separately, differences in overall consumption per drinking occasion declined over the waves of the study. Consequently, the mean number of standard drinks consumed in a year by those who received alcohol from parents was lower than those who received alcohol from other sources in earlier years of adolescence, but was similar in later adolescence.

Table 1
Socio-demographic characteristics of the sample at baseline.

		n (%) / Mean (SD)
Child characteristics		
Age		13·0 (0·5)
Sex	Male	413 (49·1%)
	Female	428 (50·89%)
Family Characteristics		
Two parent household	Yes	664 (79·0%)
	No	177 (21·0%)
Family positive relations		2·9 (0·5)
Relative socioeconomic disadvantage of area of residence[a]	Low	156 (18·6%)
	Medium	186 (22·2%)
	High	495 (49·1%)
Household income	Up to $34,000	68 (8·2%)
	$35,000 to $80,000	215 (25·9%)
	$81,000 to $180,000	400 (48·2%)
	$181,001 or more	147 (17·7%)
Parent Characteristics		
Parental religiosity at baseline[a]	Not important/A little important	635 (76·0%)
	Pretty important/Very important	201 (24·0%)
Parent born in Australia[a]	No	203 (24·3%)
	Yes	634 (75·7%)
Parent employment at baseline[a]	Employed (full-time/part-time)	698 (83·4%)
	Unemployed (in workforce)	98 (11·7%)
	Unemployed (not in workforce)	41 (4·9%)

3.2. Overall alcohol consumption

Without adjusting for other variables, parental supply of alcohol in a given wave was strongly and positively associated with overall number of drinks consumed in the subsequent year when compared to no parental supply (IRR: 7.69; 95% CI: 6.48, 9.12). When the results were adjusted for other covariates and potential confounders, a strong (though reduced) association remained between parental supply of alcohol and number of drinks consumed in earlier years of adolescence, with the association moderated by time (Fig. 1 and Supplementary Table C2). The overall number of drinks consumed by adolescents supplied by their parents increased steadily over time, however parental supply itself, compared to no supply, was positively associated with increased alcohol consumption only in Grade 7–8 (IRR: 3.61; 95% CI: 2.55, 5.12; no supply IRR: 1.00), Grade 8–9 (IRR: 4.84; 95% CI: 3.66, 6.39; no supply IRR: 1.44), and Grade 9–10 (IRR: 8.33; 95% CI:

Table 2
Number of drinks consumed in year and frequency of drinking by type of supply.

Frequency, quantity and mean number of standard drinks			Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Parental supply has occurred in wave[a]	Typical frequency of drinking	Less than once a month	70.1%	73.8%	74.3%	67.7%	58.1%	37.0%
		Monthly but less than weekly	24.1%	21.1%	22.2%	28.2%	35.5%	47.7%
		At least weekly	5.8%	5.1%	3.5%	4.1%	6.5%	15.4%
	Typical quantity consumed on drinking occasion	Sips only	77.0%	81.9%	67.9%	46.0%	22.6%	10.8%
		1-4 standard drinks	21.7%	14.0%	15.4%	34.5%	43.9%	45.9%
		5-10 standard drinks	1.4%	3.2%	14.2%	14.8%	27.2%	34.5%
		≥11 standard drinks	0.0%	0.9%	2.5%	4.8%	6.3%	8.8%
	Mean (sd) number of standard drinks consumed in a year		13.1 (51.7)	29.5 (204.8)	45.3 (249.7)	75.6 (380.3)	81.1 (189.7)	156.4 (269.5)
Other supply has occurred in wave[a,b]	Typical frequency of drinking	Less than once a month	66.1%	67.9%	68.9%	64.6%	57.5%	38.0%
		Monthly but less than weekly	25.4%	24.2%	26.8%	30.4%	36.1%	48.3%
		At least weekly	8.5%	7.9%	4.3%	5.0%	6.4%	13.8%
	Typical quantity consumed on drinking occasion	Sips only	60.5%	63.7%	51.3%	33.6%	17.1%	9.0%
		1-4 standard drinks	36.7%	25.9%	20.2%	39.7%	44.6%	44.3%
		5-10 standard drinks	2.8%	6.5%	23.8%	20.5%	30.7%	37.5%
		≥11 standard drinks	0.0%	3.9%	4.7%	6.2%	7.7%	9.3%
	Mean (sd) number of standard drinks consumed in a year		21.4 (65.2)	61.2 (276.4)	65.8 (264.7)	84.7 (368.9)	92.7 (212.8)	151.4 (258.3)

[a] The categories of "parental supply" and "other supply" are not mutually exclusive; adolescents could be supplied by more than one of these two sources, and the analyses of the impacts of parental supply adjusted for other supply (and the other covariates) when estimating odds ratios/associations and vice versa.
[b] Includes self-supply.

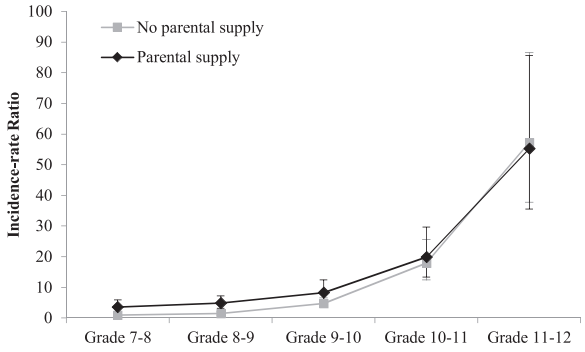

Fig. 1. Changing association between parental supply of alcohol and overall alcohol consumption over time – results of mixed effects negative binomial regression.
Model adjusted for other covariates (see Supplementary Table S4): Parental average alcohol use, home access to and availability of alcohol, parental alcohol specific rules, parental monitoring, authoritative parenting: demandingness, authoritative parenting: responsiveness, parenting consistency, parental religiosity at baseline, parent born in Australia, two parent household family conflict, family positive relations, relative socioeconomic disadvantage of area of residence, household income, child has money to buy alcohol, smoking, YSR: Externalising, YSR: Anxious/depressed, YSR: Withdrawn/depressed, age, sex, peer use of alcohol and/or tobacco, peer disapproval of alcohol and/or tobacco use.

6.28, 11.05; no supply IRR: 4.75). While the overall consumption continued to increase in later time periods, this occurred regardless of whether adolescents were supplied alcohol by their parents.

3.3. Frequency and quantity of drinking

Unadjusted analyses showed that parental supply of alcohol compared to no parental supply was positively associated with both frequency of drinking (IRR: 3.44; 95% CI: 3.10, 3.83), and typical number of standard drinks consumed on a drinking occasion (IRR: 1.16; 95% CI: 1.10, 1.22), although the strength of association for the latter is relatively weak. Similar to overall drinking volume, when other covariates were adjusted for, parental supply was positively associated with significantly higher drinking frequency only in earlier time periods, with those supplied by their parents reporting more frequent drinking when compared to those who were not supplied alcohol by their parents in Grade 7–8 (IRR: 3.39; 95% CI: 2.68, 4.30; no supply IRR: 1.00), Grade 8–9 (IRR: 2.15; 95% CI: 1.78, 2.60; no supply IRR: 0.93), and Grade 9–10 (IRR: 2.25; 95% CI: 1.85, 2.73; no supply IRR: 1.46), but not Grade 10–11 nor Grade 11–12 (Fig. 2 and Supplementary Table C3). In contrast, while the typical quantity consumed on a drinking occasion increased over the study period, there was no association with parental supply in any of the waves (Fig. 3 and Supplementary Table C3).

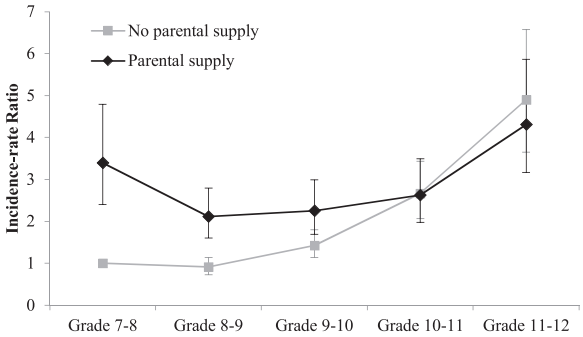

Fig. 2. Changing association between parental supply of alcohol and frequency of alcohol consumption over time – results of mixed effects negative binomial regression.
Model adjusted for other covariates (see Supplementary Table S5): Parental average alcohol use, home access to and availability of alcohol, parental alcohol specific rules, parental monitoring, authoritative parenting: demandingness, authoritative parenting: responsiveness, parenting consistency, parental religiosity at baseline, parent born in Australia, two parent household family conflict, family positive relations, relative socioeconomic disadvantage of area of residence, household income, child has money to buy alcohol, smoking, YSR: Externalising, YSR: Anxious/depressed, YSR: Withdrawn/depressed, age, sex, peer use of alcohol and/or tobacco, peer disapproval of alcohol and/or tobacco use.

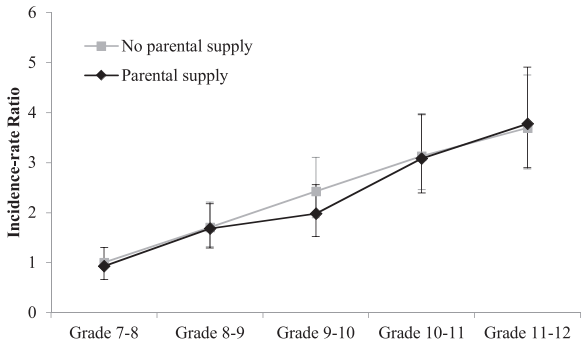

Fig. 3. Association between parental supply of alcohol and typical quantity consumed on drinking occasion over time – results of mixed effects negative binomial regression.
Model adjusted for other covariates (see Supplementary Table S5): Parental average alcohol use, home access to and availability of alcohol, parental alcohol specific rules, parental monitoring, authoritative parenting: demandingness, authoritative parenting: responsiveness, parenting consistency, parental religiosity at baseline, parent born in Australia, two parent household family conflict, family positive relations, relative socioeconomic disadvantage of area of residence, household income, child has money to buy alcohol, smoking, YSR: Externalising, YSR: Anxious/depressed, YSR: Withdrawn/depressed, age, sex, peer use of alcohol and/or tobacco, peer disapproval of alcohol and/or tobacco use.

3.4. Secondary analysis

Analysis of overall alcohol consumption in Grade 12 showed no evidence that early parental supply was associated with increased alcohol consumption, when previous supply was adjusted. Of all waves, only supply in Grade 11 was positively associated with overall consumption compared to no parental supply in Grade 12 (IRR: 2.09; 99.5% CI: 1.51, 2.89), as seen in Supplementary Table C4.

While there were significant positive associations between any number of waves of supply (i.e. > 0) and the overall consumption in Grade 12, compared with no supply at all, there was no evidence of a dose-response relationship between waves of supply and overall consumption of alcohol. That is, the strength of association was relatively stable regardless of the number of waves of supply, with fluctuations in the IRRs but no significant trend as the number of waves of supply increased, as seen in Supplementary Table C5.

3.5. Sensitivity analysis

Results of the sensitivity analysis using multiple imputation were consistent with the primary analysis (Supplementary Figs. C1–C3).[6] Results of the sensitivity analysis using confounders from the previous wave, rather than the same wave as the exposure, were very consistent with the primary analysis (Supplementary Figs. C7–C9). This suggests that the controlling variables included are in fact confounders, not mediators.

4. Discussion

This study presents a detailed examination of the association between parental supply and adolescent consumption of alcohol over the course of adolescence, adjusting for an array of confounding variables. Consistent with past research (Gilligan et al., 2012; Kaynak et al., 2014; Sharmin et al., 2017a), this study does not support the belief that parental supply of alcohol to adolescents provides protective benefits. Adolescents supplied alcohol by their parents reported greater of subsequent alcohol consumption in early adolescence than those who were not supplied by their parents. While this difference disappeared in later adolescence, parental supply was not associated with lower consumption of alcohol at any age. These age-specific associations between adolescent drinking and parental supply were likely due to increases in other supply during later adolescence, which had stronger associations with drinking than parental supply alone. Additionally, the rapid increase in consumption observed across the sample as they approached and entered adulthood regardless of supply likely lessened the association between parental supply and adolescent alcohol consumption.

This result was mirrored in the reported frequency of consumption, with those supplied by parents reporting more frequent alcohol consumption in earlier time periods, but not in later adolescence. In contrast, parental supply of alcohol showed no statistically significant association with the typical number of standard drinks consumed on a drinking occasion in any time period. This is consistent with previous research that has found that adolescents who are supplied alcohol by their parents tend to have increased frequency but not typical quantity of drinking (Dent et al., 2005; Lundborg, 2002). However, it is worth noting that while parental supply was not associated with greater quantity of alcohol consumption, neither was it associated with lower quantity of consumption. That is, parental supply may have led to an increase in overall consumption by increasing the frequency of drinking without decreasing the quantity consumed on each occasion. Nevertheless, the association appeared to dissipate in later adolescence as overall drinking increased.

Furthermore, even a single wave of supply by parents was associated with increased alcohol consumption in the final wave, regardless of when that supply occurred. However, this may be due to the increase in supply that occurred throughout the study. That is, only around 15% of participants received alcohol from their parents in Grade 7, compared with 44% in Grade 11. Thus, those who received alcohol from their parents in only a single wave were more likely to have been supplied in a later wave than an earlier one, which may mean that the association reflects recency. It may be that supply in a single wave led to increased alcohol consumption largely because parents who supplied alcohol in only a single year most commonly did so in later years when adolescents were more likely to be drinking irrespective of whether their parents provided alcohol to them. Regardless, there is no evidence to suggest that parental supply is beneficial at any stage of adolescence.

4.1. Strengths

Strengths of this study include a large sample size, longitudinal design, frequency and consistency of assessment, focus on parental supply measures, and separate parent/child surveys. A notable strength of this study is the control of confounding variables that have been identified from literature on parental supply and previous prospective cohort studies. Additionally, this is the first study to adjust for previous years of supply when analysing for drinking patterns in late adolescence/early adulthood.

4.2. Limitations

First, the APSALS cohort is a self-report, opt-in study recruited through school classrooms. Thus the sample is self-selected, and findings may not generalise to the population, especially with regards to alcohol consumption (Stockwell et al., 2004). However, overall alcohol consumption in the cohort is similar to estimates from Australian population surveys (Australian Institute of Health and Welfare, 2011; Wadolowski et al., 2015b; White and Bariola, 2012), and its demographic distribution is similar to the Australian population in key areas such as sex, age and household composition (Aiken et al., 2017; Mattick et al., 2018, 2017). Second, the legal age to purchase alcohol in Australia is 18 years. Thus, for an increasing proportion of the sample parental supply of alcohol in later waves occurred at an age when the adolescent could legally obtain alcohol themselves (around 2% of the sample was 18 in Grade 11, and around 30% in Grade 12). Last, while we have explored in greater detail the range of alcohol consumption in the outcome, we have not considered the amount supplied by parents

on each occasion (sips versus whole drinks, or larger volumes) (Wadolowski et al., 2015a,b).

4.3. Conclusions

The evidence suggests there are proximal associations between parental supply of alcohol and adolescent alcohol consumption, at least in early adolescence, and in later adolescence after adjusting for prior supply. Parental supply in early adolescence appears to increase alcohol consumption in early adolescence, even when supply occurs only in a single year of adolescence. While the influence of parental supply appears to be limited compared to supply from other sources, the findings of the current study do not support a protective effect. Thus, families should be advised that any supply of alcohol to adolescents, especially those aged 16 or younger, should be avoided as there is no benefit and is instead likely to increase how often adolescents drink. Policies and programs aimed at reducing adolescent alcohol use should note that parents are a particularly important point of intervention during early to mid-adolescence.

Role of funding source

Funding bodies had no role in study design, data analysis, data interpretation, data collection or writing of the article.

Contributors

PC, RPM and AA conceptualised the study. RPM, JN, KK, TS, and DH conceptualised the cohort. MW, AA, RB, and NM designed the data collection methods for the cohort. PC, AA, RPM and MW acquired the data. PC conducted the data analyses and drafted the manuscript with RPM. All authors provided substantial contributions to the interpretation of the results, and all critically revised the manuscript, and approved the final manuscript as submitted.

Declaration of Competing Interest

None to declare.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.drugalcdep.2019.06.031.

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