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PEDIATRICS | RESEARCH ARTICLE

Single episode of alcohol intoxication in adolescents has no long-term psychosocial effects

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Abstract: Long-term sequelae of frequent and excessive alcohol use by adolescents are well investigated, but knowledge about the consequences of a single episode of alcohol intoxication (SEAI) is scarce. In this study forty adolescents participated (22 M, 18 F, mean age 15.2 years old), who had been admitted to hospital with an alcohol intoxication. Two-and-a-half years after the intoxication incident they filled out questionnaires about their current alcohol consumption, use of other substances, psychosocial functioning and health-related quality of life. A control group was matched for age, gender and level of education, but there was no history of serious alcohol intoxication. They filled out the same questionnaires as the SEAI group. Results revealed no significant differences between the SEAI group and the controls, except that the SEAI group used more tobacco. The conclusion from this study is that a one-time only alcohol intoxication in adolescents not results in an increased risk on alcohol or substance abuse, psychosocial problems, or diminished health-related quality of life.

Subjects: Education - Social Sciences; Psychological Science; Health Psychology; Developmental Psychology; Mental Health; Child & Adolescent Psychiatry & Clinical Psychology; School Psychology; Health & Society

Keywords: single episode of alcohol intoxication; adolescents; matched-case control group; substance use; psychosocial wellbeing; quality of life

1. Introduction

Over the last decade the number of adolescents admitted to European hospitals because of alcohol intoxication has increased significantly (Bitunjac & Saraga, 2009; Kraus et al., 2013; Van Hoof, van

ABOUT THE AUTHORS

Maartje A. Thijssen carried out this study in the context of her post-master degree in Clinical Psychology at Tergooi Hospitals. She obtained a Master's degree in Health Psychology and Clinical Psychology from the University of Utrecht in 2005. Since that time she has been working with psychosomatic patients in different healthcare organisations. At this moment she works as a clinical psychologist and psychotherapist at BovenIJ Hospital in Amsterdam, the Netherlands. The study was performed at Tergooi Hospital under supervision of Gerly de Boo, PhD, clinical psychologist and Frans B. Plötz, M.D., PhD, paediatrician.

PUBLIC INTEREST STATEMENT

Over the last decade the number of adolescents admitted to European hospitals because of alcohol intoxication has increased significantly. Young people who drink alcohol frequently and excessively can be exposed to many negative consequences. This study investigates if a single episode of alcohol intoxication in adolescents results in long term negative effects. We found that participants who were admitted to hospital because of a single episode of alcohol intoxication experienced no negative psychosocial consequences 2,5 years after the incident, apart from the fact that they smoked more tobacco at follow-up compared to participants of the same age, gender and level of education without a hospital admission because of alcohol intoxication.

der Lely, Pereira, & Van Dalen, 2010). This raises concerns since frequent and excessive alcohol use at a young age is a major risk factor contributing to disability adjusted life-years in adolescents and it is associated with alcohol use disorders later in life (Gore et al., 2011; McCambridge, McAlaney, & Rowe, 2011). Many studies indisputably link alcohol misuse among adolescents to negative psychosocial effects, such as accidents, violence, aggression, delinquency, family conflicts, addiction, depression, suicidal tendencies, poor school performance and impaired cognitive functioning (Fernández-Artamendi, Secades-Villa, Fernández Hermida, Garcia Fernandez, & Garcia-Rodriguez, 2013; Miller, Naimi, Brewer, & Jones, 2007; Verdurmen, Monshouwer, van Dorsseleer, ter Bogt, & Vollebergh, 2005; Wells, Horwood, & Fergusson, 2004; Windle & Windle, 2006). Consequently, many healthcare interventions and social efforts have been initiated to reduce alcohol consumption and alcohol-related harm among adolescents (De Goeij et al., 2016).

However, studies about psychosocial consequences of single episodes of alcohol intoxication (SEAI) are scarce and report inconclusive results. Kuttler et al. observed a pronounced psychosocial burden among adolescents due to alcohol intoxication and various developmental hazards in the six months after hospitalisation (Kuttler, Schwendemann, Reis, & Bitzer, 2016). Other studies suggest that adolescents who were treated in hospital for alcohol intoxication are a heterogeneous group and do not sufficiently indicate alcohol problems (Boutshoorn, van Hoof, & van der Lely, 2011; Kraus et al., 2013; Van Hoof et al., 2010). De Boo et al. observed no substantial negative consequences in relation to family life, home rules, friendships, school functioning, psychosocial wellbeing and health-related quality of life among 24 adolescents and their parents 2.7 years after the intoxication (De Boo, Thijssen, Lasham, & Plötz, 2016). Fairlie et al. (2010) suggest that especially adolescents who were treated in hospital for a single heavy drinking episode in combination with a history of alcohol misuse are at significant risk of both substance use and other problem behaviours, and therefore likely need additional care. However, almost all studies failed to include a matched control-group to be able to draw more definite conclusions about the consequences of SEAI.

The first aim of this study is to confirm our previous findings in a larger sample group by expanding the SEAI group with a second cohort (admissions from 2012 up until 2014). The second aim is to investigate whether the SEAI group is comparable to the matched-control group with respect to alcohol consumption, use of other substances, psychosocial problems and health-related quality of life at follow-up. If there are no differences found, the positive results from our earlier study will be confirmed (De Boo et al., 2016).

2. Method

2.1. Participants

All adolescents (≤ 18 years) who were admitted to the paediatric ward of Tergooi Hospitals, a large district general hospital in the Netherlands, because of an SEAI in the period 2011 until 2015 were invited for participation. This study includes the results of the 24 adolescents and parents from our first cohort (De Boo et al., 2016). Patients who were treated in the emergency department without needing to be hospitalised, patients with hospitalisations in the past because of alcohol intoxication and patients who were also intoxicated by other substances besides alcohol (demonstrated by a drug-screening test at admission), were excluded from the study.

Initially, all admitted patients and their parents separately received a letter, explaining the purpose and procedure of the study. In this letter they were also informed about their rights and the financial reward for the patient's effort which was a €25 voucher. An informed consent form was included as well. Next a telephone call was made to all patients by the researcher to answer potential questions and in case of interest, to plan an appointment to complete the three questionnaires (see instruments). Patients whose telephone number was not correct and patients who did not respond within the first six weeks, were sent a reminder in which they were requested to contact the researcher by email or telephone. If no reply was sent, the patient was categorised as a non-respondent.

2.2. Control group

The control group was recruited in the same area where the SEAI group lives (Gooi and Vechtstreek, the Netherlands) and matched for age, gender and level of education (at follow-up). Exclusion criteria were a history of hospital admissions due to alcohol intoxication and /or a history of alcohol or other substance. All control patients were checked for hospital admission related to alcohol at the administration office and during an interview they were asked explicitly about this topic. The majority of the participants in the control group (70%) were recruited in the local community and a minority (30%) were personally approached by colleagues. In case of interest, they received the same letter that was used for the SEAI group with additional information about the purpose and procedure of the study and their rights. They also received the three questionnaires, an informed consent form and the €25 voucher for their participation.

2.3. Ethical procedure

The scientific Review Committee of Tergooi Hospitals reviewed the application of ethical approval for this study and concluded that formal ethics approval was not required (correspondence CCMO; 08-07-2013 and CTS; 06-10-2014). Written informed consent was obtained from all participants and for participants under age 16 the parents signed an informed consent for their child's participation as well.

2.4. Instruments

Participants in both groups completed three standardized questionnaires. The first questionnaire gathered demographic data and information about substance use by a Dutch paediatric screening list specifically for alcohol intoxication (Van Hoof et al., 2010). The questionnaire consists of four parts but only part 1 and part 2 were used in this study (part 1: general and demographic information about the adolescent: gender, age, family structure, patient number, and date of birth and part 2: alcohol use and other substance use patterns, including regular alcohol use and other (illicit) drugs). Data from this questionnaire fulfilled at admission was kept in a national database and was retrieved for this study. These same questionnaire was repeated at follow-up.

The second questionnaire assessed emotional and behavioural problems using the Dutch version of the Youth Self Report (YSR) for adolescents, which consists of 112 items and is a widely used self-report questionnaire, which consists of eight clinical syndrome subscales (anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviour and aggressive behaviour) and three summary scales (internalizing problems, externalizing problems and total problems). Problem items can be added up to eight syndromes and three broader band scales: internalizing problems (containing the syndromes: anxious/depressed, withdrawn/depressed, and somatic complaints), externalizing problems (containing the syndromes: rule-breaking behaviour and aggressive behaviour), and total problems (containing all problem items). In this study, the broader band scales are reported. Raw scores are transformed into T-scores, which are compared to norm tables, indicating whether scores fell within a normal, sub-clinical, or clinical range. The psychometric qualities of the YSR have been proven to be valid in ample research (Achenbach et al., 2008).

Finally, the third questionnaire which was used, set up by the Paediatric Quality of Life Inventory (PedsQL), assessed (perceived) quality of life. This self-report questionnaire contains four subscales: physical, emotional, social and school functioning. A psychosocial health scale score (emotional, social and school) and a total score (all subscales) were computed. A score of 100 represents the best quality of life possible; a score of zero indicates the worst quality possible. The results were compared to assembled data (self-reports from healthy Dutch adolescents) (Varni, Seid, & Kurtin, 2001). The PedsQL has adequate psychometric qualities (Limperg, Haverman, van Oers, Maurice-Stam, & Grootenhuis, 2014). One master student Clinical Psychology from Utrecht University conducted the interviews. She was trained by the first author to conduct and score the interview according to a standardized procedure.

2.5. Statistics

Demographic and interview information are presented in this study by descriptive data. Pearson chi-square tests were used to analyse differences in gender distribution between the SEAI and the “refused to participate” group. Independent sample t-tests were used to analyse all other group differences. Multiple logistic regression was used to investigate if smoking behaviour influences the outcome on all other subscales measuring substance use, psychosocial functioning and health-related quality of life for both the SEAI and the control group. The significance level was set at a two-tailed α .05. Statistical analyses were conducted using IBM SPSS statistic software version 22 (IBM Corp, Armonk NY).

3. Results

3.1. Descriptives

In the period from 2011 to 2014 (cohort 1 and 2) a total of 113 patients were admitted to the paediatric ward with a main diagnosis of alcohol intoxication (Figure 1). A number of patients from this group were excluded from this study. Seven patients were excluded because of multiple intoxications upon admission, one was excluded because of previous repeated hospital admissions due to alcohol intoxication, and 21 patients were not traceable or did not respond to the invitation to participate in the study. A total of 44 patients refused participation out of which 26 explained that they had no interest and they were fine now and had not experienced any negative consequences of the alcohol incident, and 11 refused because of lack of time, also reporting no negative consequences. A minority, namely seven patients, refused to participate because they did not want to be remembered of the incident because it still had negative impact in their lives. We found no significant differences between adolescents who participated in the study and those who refused, with regard to age during admission ($M = 15.2$, $SD = 1.3$, $M = 15.3$, $SD = 1.1$), blood alcohol concentration ($M = 1.7$, $SD = .4$, $M = 1.8$, $SD = .5$) and gender distribution ($\chi^2(2) = 1.6$, $p > .05$).

Figure 1. Flowchart data assembly SEAI group.

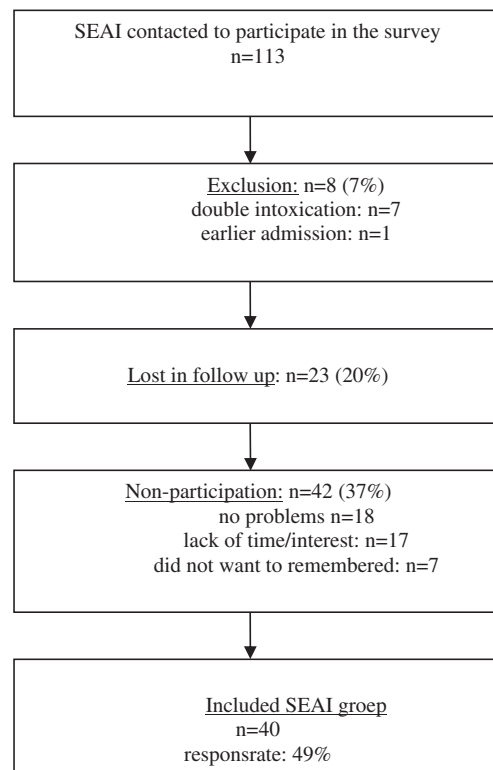


Table 1. Differences in substance use patterns between SEAI and control group

	SEAI	Control	SEAI vs. control	
	N = 40	N = 40	t(d38)	p
Recent alcohol use	4.6 (3.3)	3.7 (3.2)	1.2(78)	.23
Other drugs use ^a	.8 (1.1)	.5 (0.7)	1.4(78)	.20
Number cigarettes per week	20.7 (28.0)*	4.3 (11.0)*	3.5(78)	.001*
Age at first alcohol use ^b	14.0 (1.1)	14.5 (1.1)	-2.0(75)	.05
Frequently use since ^c	15.5 (.9)	15.0 (3.6)	.8(70)	.40

Note: Data presented as Mean and SD scores.

^aTotal of hash/cannabis, cocaine, amphetamine, mushrooms, ecstasy.

^bSEAI: N = 39, control: N = 38.

^cSEAI: N = 37, control: N = 35.

*p < .05 significant difference.

Forty adolescents (22 M, 18 F) were included in the SEAI group. Mean age was 15.2 years old (SD = 1.3) at the moment of admission (t = 1) and 17.6 years old (SD = 1.3) at follow-up (t2). There were no significant differences in mean age between boys and girls. The mean follow-up time was 2.5 years (29.7 months). The mean age in the control group was 17.4 years (SD = 1.3), which is not significantly different from the mean age of the SEAI group at follow-up. There was no difference in age between boys and girls in the control group.

3.2. Substance use patterns in SEAI vs. matched-control group

The only significant difference between the SEAI group and the control group during follow-up with respect to substance use, was tobacco consumption (M = 20.7, SD = 28.0, M = 4.3, SD = 11.0, p < .05). Within the SEAI group there were more smokers than in the control group (45% vs. 22.5%) and the smokers in the SEAI group also consumed more cigarettes in comparison to the smokers in the control group at follow-up. No differences were found for other substance use patterns between the SEAI and the control group, even when corrected for tobacco use by multiple logistic regression. In both groups 57.5% never used other illicit drugs and for the remaining 42.5% hash and cannabis were the most frequently used additional drugs (38.6% in both groups). Finally, it revealed that the SEAI group started drinking at a younger age (Table 1).

3.3. Psychosocial functioning in SEAI group vs. matched-control group

Mean scores for emotional and behavioural problems for all YSR scales are presented in Table 2. There were no significant differences between the SEAI and the control group at follow-up, even

Table 2. Differences in psychosocial functioning (YSR-scores) between SEAI and control group

	SEAI	Control	SEAI vs. control	
	N = 40	N = 40	t(d38)	p
Internalizing	47.9 (9.3)	48.7 (10.2)	-.7	.72
Anxious/depressed	52.5 (4.0)	46.2 (10.9)	-.4	.68
Withdrawn/depressed	52.9 (4.3)	54.3 (6.1)	-1.2	.24
Somatic complaints	55.3 (7.2)	53.0 (5.2)	1.7	.10
Social problems	52.9 (4.0)	52.3 (2.9)	.7	.46
Thought problems	53.4 (4.1)	52.9 (4.8)	.5	.60
Attention problems	55.0 (4.8)	54.3 (5.6)	.6	.55
Externalizing	50.4 (8.7)	46.2 (10.9)	1.9	.06
Rule breaking behavior	57.0 (5.4)	55.5 (5.9)	1.2	.23
Aggressive behaviour	51.9 (3.9)	51.8 (3.0)	.1	.95
Total	49.1 (9.1)	47.7 (7.6)	.8	.45

Note: Data presented as Mean and SD scores.

Table 3. Differences in health-related quality of life (PedsQL-scores) between SEAI and control group

	SEAI	Control	SEAI vs. control	
	N = 40	N = 40	t(df)	p
Physical	86.9 (14.3)	86.3 (15.3)	.9 (78)	.87
Emotional	78.5 (14.3)	78.8 (17.3)	1.0 (78)	1.0
Social	94.9 (8.9)	92.8 (11.2)	.9 (78)	.35
School	78.5 (13.6)	75.6 (17.0)	.8 (78)	.41
Psychosocial	85.0 (14.0)	82.3 (11.1)	1.0 (78)	.34
Total	85.0 (11.6)	83.7 (11.1)	.50	.62

Note: Data presented as Mean and SD scores.

when adjustments for smoking behaviour were made by multiple logistic regression. One trend that should be mentioned is that the SEAI group scored higher on externalizing behaviour than the control group, although none of the group means fell in the clinical problem range.

3.4. Present-day quality of life in SEAI vs. matched- control group

Compared to norms (Varni et al., 2001), means for the SEAI and the control group for all subscales on the PedsQL fell within the healthy range (Table 3). There were no differences between the SEAI and the control group on any of the subscales, even when corrected for smoking behaviour by multiple logistic regression. Reported general quality of life and physical, emotional, social and school functioning in specific, were not deviant from the general Dutch population-norm in both groups at follow-up.

4. Discussion

In this study we investigated alcohol and other substance use, psychosocial wellbeing and health-related quality of life after SEAI with an average follow-up period of 2.5 years. We found no differences in alcohol use patterns, psychosocial wellbeing and health-related quality of life compared to a matched-case control group, except that the SEAI group used more tobacco at follow-up. This suggests that an SEAI with hospital admission in adolescents without a history of alcohol misuse has no long-term psychosocial effects.

No significant difference in alcohol consumption at follow-up between the SEAI and the matched-control group could be determined, which lead to the conclusion that the increase in alcohol consumption between intoxication and follow-up reflects normal age-related drinking. Alcohol consumption among Dutch adolescents has become a habitual part of their social life (Van der Lely, 2016). In a sample study among Dutch adolescents in 2013, 10% had already consumed alcohol once at an average age of 11.2 years. This percentage rises quickly to 80% at age sixteen (De Looze et al., 2014). The only trend that was determined in this study that should be mentioned is that the SEAI group drank their first glass of alcohol at a slightly younger age than the control group did. This confirms earlier findings in which postponing any alcohol use among adolescents is recommended (Van Hoof et al., 2010). Furthermore, none of the participants had repeated admissions due to alcohol intoxication during the follow-up period.

We found that the distribution between users and non-users of tobacco at follow-up was double in the SEAI group as compared to the matched-control group. Furthermore, the tobacco users in the SEAI group were also heavier smokers. These findings are in line with other studies showing a positive correlation between the use of alcohol and of tobacco (Groß, Reis, Kraus, Piontek, & Zimmermann, 2016; Reis, Pape, & Häßler, 2009). The use of other illicit drugs was not different between the SEAI and the control group at follow-up. One point that should be mentioned is the possibility that the follow-up period of 2.5 years is too short to measure long-term alcohol or other drugs problems. For

example, Groß et al. showed heavier drinking and more alcohol-related problems (but no differences in regular smoking) in an alcohol consuming group as compared to a control group after an average follow-up period of 8 years (Groß et al., 2016).

With respect to psychosocial wellbeing the SEAI group scored slightly higher on externalizing behaviour than the control group. Smoking behaviour and heavy-drinking are possibly part of this behavioural tendency. It might be that not the alcohol misuse itself but also underlying personality traits which induce externalizing behaviour influence increased smoking and other risky behaviours. For example, a lack of perseverance, sensation seeking, negative and positive urgency and reward sensitivity are positively associated with alcohol use in adolescents (Stautz & Cooper, 2013). Different smoking behaviour among adolescents is also associated with personality and behavioural risk factors such as lower ego integration, more externalizing behaviour and lower educational aspirations (Brook et al., 2008).

Finally, there were no differences between the SEAI and the control group on all subscales measuring health-related quality of life. All scores fell in the normal range, which suggests that an SEAI does not necessary lead to longer term disturbances in quality of life, nor to negative effects physically, emotionally, socially and in school. As far as we know there are no other studies investigating the effects of adolescent drinking on quality of life. Because alcohol misuse among adolescents is associated with many negative psychosocial effects, these results are unexpected (Fernández-Artamendi et al., 2013; Miller et al., 2007; Verdurmen et al., 2005; Wells et al., 2004; Windle & Windle, 2006) and might indicate that youth engaging in frequent and heavy drinking are a different group, needing different treatment than youth that mistakenly underestimate the toxic effects of alcohol use.

4.1. Strengths and limitations

Strengths of this study are its longitudinal design, the inclusion of a matched-case control group to compare psychosocial outcomes with the use of standardized instruments.

Several limitations of the study should also be mentioned. Despite the expansion the sample-size is small but it could not be manipulated because it is a clinical sample. It remains therefore unclear if significant relations are absent or just not traceable. Secondly, approximately 39% of the SEAI group who were admitted refused to participate, of which 16% explicitly reported that they still experience difficulties related to the intoxication. This suggests a possible response bias. It is probably that “high-risk” adolescents, in which the intoxication was predictive of future negative psychosocial consequences, refused participation. Obviously, it is important to capture this possibly small but vulnerable group of adolescents, who need psychosocial interventions to prevent further problems. Thirdly, all data were based on self-report, and potentially these responses are not entirely accurate because they were given as social desirable answers. It is possible that some of the participants were engaged in more frequent and heavy drinking episodes but did not mention this honestly. This may also be true for the matched control group with respect to alcohol consumption in the past. However, there is no reason to assume that social desirability was different between both groups (e.g. equal conditions like rewarding, anonymity etc.). Finally, the hospital is located in a relatively prosperous part of the Netherlands, which might imply that we investigated a selected sample. Additionally, with one exception, all adolescents in our sample are native Dutch which limits the ability to generalize the findings to adolescents from different ethnic and cultural backgrounds. External validity might also be questioned because the reported use of cannabis in both groups (38,6%) is higher than the general Dutch population, which is reported 9.7% at the age 12–16 years (Trimbos-Instituut, 2016).

Future studies need to include control group studies with larger sample-sizes to replicate and expand current findings. Because of the lack of longitudinal data more research is needed, with repeated measures in different follow-up periods to clarify long-term psychosocial outcomes. In conclusion, this study emphasises that an SEAI with hospital admission in adolescence not necessary

results in an increased risk on alcohol or substance abuse, psychosocial problems or diminished quality of life in the longer term.

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Competing interests

The authors declare no competing interest.

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Authors contribution

MAT and GMB designed this study and interpreted the results. All authors helped to draft the manuscript. All authors read and approved the final manuscript.

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Ethical standards

The scientific Review Committee of Tergooi Hospitals reviewed the application of ethical approval for this study and concluded that formal ethics approval was not required (correspondence CCMO; 08-07-2013 and CTS; 06-10-2014). All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration its later amendments or comparable standards. The manuscript has not been published elsewhere.

Informed consent

Informed consent was obtained from all individual participants included in this study.

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