



Full length article

Long-term outcomes after adolescent in-patient treatment due to alcohol intoxication: A control group study



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ABSTRACT

Background: The long-term psychosocial development of adolescents admitted to in-patient treatment with alcohol intoxication (AIA) is largely unknown.

Methods: We invited all 1603 AIAs and 641 age- and sex-matched controls, who had been hospitalized in one of five pediatric departments between 2000 and 2007, to participate in a telephone interview. 277 cases of AIA and 116 controls (mean age 24.2 years (SD 2.2); 46% female) could be studied 5–13 years (mean 8.3, SD 2.3) after the event. The control group consisted of subjects who were admitted due to conditions other than alcohol intoxication. Blood alcohol concentration on admission was systematically measured in the AIA but, owing to the retrospective study design, not in the control group. Subtle alcohol intoxication could therefore not be entirely ruled out in the control group. Long-term outcome measures included current DSM-5 alcohol use disorders (AUD), drinking patterns, illicit substance use, regular smoking, general life satisfaction, use of mental health treatment, and delinquency.

Results: AIA had a significantly elevated risk to engage in problematic habitual alcohol use, to exhibit delinquent behaviors, and to use illicit substances in young adulthood compared to the control group. Severe AUD also occurred considerably more often in the AIA than the control group.

Conclusions: In the majority of AIAs, further development until their mid-twenties appears to be unremarkable. However, their risk to develop severe AUD and other problematic outcomes is significantly increased. This finding calls for a diagnostic instrument distinguishing between high- and low-risk AIAs already in the emergency room.

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1. Introduction

Alcohol use among adolescents is widespread in most countries in the western world. In Europe, evidence for this notion comes from the European School Survey Project on Alcohol and Other Drugs (ESPAD), where an average of 79% of participating 15 and 16-year-old students reported alcohol use in the past 12 months and 57% in the past 30 days (Hibell et al., 2012). These numbers

raise concerns since alcohol use is one of the major risk factors contributing to disability-adjusted life-years (DALYs) in adolescents (Gore et al., 2011). Particularly, heavy use of alcohol in adolescence is associated with alcohol use disorders (AUD) later in life (McCambridge et al., 2011). Adolescence appears to be an important period in the development of AUD since the first symptoms of AUD typically appear before the age of 20 (Behrendt et al., 2008). Against this background, the increasing number of adolescents admitted to in-patient treatment with alcohol intoxication (AIA) since the 2000s has gained attention in Germany (Kraus et al., 2013a; Meyer et al., 2008), as well as in other European countries (Bitunjac and Saraga, 2009; Kuzelová et al., 2009; Van Hoof et al., 2010). In Germany, for example, the number of AIA aged 10–20 years rose from 101 out of 100,000 individuals in the year 2000–333 out of

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100,000 individuals in 2012 (Statistisches Bundesamt, 2014). From a healthcare perspective, the important question arises whether an alcohol-related hospital admission in adolescence already indicates habitual problematic alcohol use. AIA might be at an elevated risk for future AUD. Alternatively, cases of AIA may reflect mere “accidental events,” caused by a lack of experience with alcohol and patients overestimating their alcohol tolerance, which does not necessarily imply that they are at increased risk for developing AUDs.

In the literature on AIA, several cross-sectional studies with U.S. samples found higher rates of quantity and frequency of alcohol use, including binge-drinking, and alcohol-related problems in AIA compared to control groups (Barnett et al., 2003; Fairlie et al., 2010; Spirito et al., 2001), suggesting an elevated risk of further alcohol-related problems for these adolescents. These studies also found a higher prevalence of other problematic behaviors, such as illicit substance use and smoking (Barnett et al., 2003; Fairlie et al., 2010; Spirito et al., 2001), externalizing and internalizing problems (Fairlie et al., 2010), and delinquent behavior in intoxicated persons compared to their peers (Spirito et al., 2001). In contrast, previous studies in Europe suggested that AIA were not habitual heavy drinkers (Bouthoorn et al., 2011; Van Hoof et al., 2010). These studies, however, did not include control groups. In a German study, Kraus et al. (2013a) compared current drinking habits of AIA with drinking data of another study representative for the general population and found that affected adolescents consumed alcohol less often, but in larger amounts per occasion. Unfortunately, data on long-term outcomes in AIA concerning AUDs and other psychosocial outcomes until adulthood are lacking.

Therefore, the aim of the present study was to investigate the long-term development of AIA into young adulthood, comparing them to a control group. We tested the following hypotheses: (I) AIA will develop AUD more frequently than their peers in young adulthood. (II) AIA will differ in terms of drinking habits in young adulthood compared to their peers. (III) AIA are at a greater risk than their peers for other adverse psychosocial outcomes. For this purpose, we conducted a retrospective cohort study examining young adults who underwent in-patient treatment due to alcohol intoxication in adolescence.

2. Methods

Data came from the retrospective component of the RISCA project (Risk and Protective Factors in the Context of Acute Alcohol Intoxication in Childhood and Adolescence; German: Risiko- und Schutzfaktoren nach Alkoholvergiftungen im Kindes- und Jugendalter). The study protocol was approved by the ethics committee of the Dresden University of Technology (Technische Universität Dresden).

2.1. Participants and recruitment

2.1.1. Adolescents admitted to in-patient treatment with alcohol intoxication (AIA). The AIA group included adolescent patients (age ≤ 17 years) with a main or secondary diagnosis of alcohol intoxication or toxic effect of alcohol (ICD-10 F10.0, T51.0, T51.9) who were admitted to one of five participating pediatric hospitals at three study centers in Germany between January 1st, 2000 and December 31st, 2007. At the study center Dresden, participants were recruited in the University Hospital Carl Gustav Carus, Municipal Hospital Dresden-Neustadt, and HELIOS Hospital Pirna. The other study centers were the Municipal Hospital Schwabing, Munich and the University Medicine Rostock, Rostock. At the study centers Dresden and Rostock, the participating pediatric hospitals cover in-patient treatment for all underaged patients in these

cities and no other pediatric emergency departments exist in the catchment area. The pediatric hospital at the study center Munich covers pediatric in-patient treatment for the northern part of the city only. Emergency in-patient treatment is accessible to anybody in Germany without restrictions, regardless of health insurance status. Information regarding diagnosis at admission and date of birth were derived from the patient administration system. Patients were eligible if their current age was at least 20 years and the alcohol-related in-patient treatment had occurred at least 5 years earlier. No patient was excluded.

2.1.2. Control group. The Control group included adolescents (age ≤ 17 years) who were admitted to the same pediatric hospitals during the same time period as described above. As for the AIA group, control group patients were eligible if their current age was at least 20 years and the hospital admission had occurred at least 5 years earlier. Since virtually all AIA were dismissed after 12–48 h, we chose the same duration of inpatient treatment as an inclusion criterion for controls to match for possible unspecific effects of long-term pediatric inpatient treatment. Exclusion criteria were hospital admission due to mental or behavioral disorders due to psychoactive substance use (ICD-10 diagnoses F10–F19), including alcohol intoxication or toxic effect of alcohol. Patients diagnosed with any chronic disorder were also excluded from the control group. Furthermore, if control patients were, according to their medical records, admitted to hospital due to alcohol intoxication at any previous time point, they were also excluded. The three most frequent diagnoses in the control group were gastroenteritis (13%), syncope and collapse (6%), and abdominal pain (5%).

We aimed to recruit AIA and controls at a ratio of 3:1, matching controls to the AIA cases by age, sex and year of admission. For this aim, we determined the distributions of age and sex in the AIA sample separately for each year of admission. Based on these distributions, we randomly drew from a list of all patients of the participating hospitals the medical records for the controls for each year of admission. All medical records of the control group were systematically reviewed to verify our in- and exclusion criteria. However, we were not able to completely achieve matching since there were too little cases fulfilling all in- and exclusion criteria. As a result, we recruited controls who were slightly younger than AIA cases (Mean age 15.1 (SD 1.5) vs. 15.5 (1.2)).

2.1.3. Study invitation. In a first step, the mailing addresses of eligible cases of AIAs and controls were drawn from the medical records. Subsequently, after requesting updated addresses from the local registration offices, a letter from the hospital where the subjects had been treated was sent out, inviting them to participate in a study on “Health development following hospital treatment in adolescence,” which would include a standardized telephone interview. The letter included detailed study information, a promise to pay 35€ for participation, and an informed consent form. If a subject was interested in participating, he/she sent back the signed informed consent form together with their contact details to the study center, using a prepaid return envelope. As an alternative, they were kindly asked to inform us that they had received the invitation, but rejected it. Once the study center received a written informed consent, study staff contacted the participants and scheduled an appointment for the interview. In case of non-response, a reminder letter was sent two weeks later.

2.2. Sample selectivity analysis

After the recruitment process, potential selectivity was investigated separately for the AIAs and controls sample by comparing interview participants and non-participants with respect to factors which were available for all patients and could be analyzed without

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