Effectiveness of a brief intervention with and without booster session for adolescents hospitalized due to alcohol intoxication

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Abstract

Background: The Hart-am-LimiT (HaLT) project is a brief intervention program for adolescents hospitalized due to alcohol intoxication in Germany.

Objective: To test whether a booster session has an impact on participants' drinking behavior compared with the standard HaLT program.

Methods: On the morning after their admission due to alcohol intoxication, 411 adolescents in the Federal State of Bavaria were interviewed between October 2008 and January 2010 and socio-demographic data and information on previous drinking behavior were recorded (t1). Eleven to 25 months (M = 16.4) after their hospital treatment, 106 adolescents completed an online questionnaire (t2).

Results: Subgroup analysis (ANOVA with repeated measurements) indicated that adolescents who took part in the booster session did not increase episodic heavy drinking (EHD; t1: M = 1.68 EHD d; t2: 1.59 EHD d) in contrast to the non-participating group (t1: M = 1.08 d EHD; t2: 2.66 d EHD; F = 4.383, p = 0.039).

Conclusion: Considering the study's limitations (e.g. no randomization, low response rate, etc.), the results indicate a positive effect of a booster session following a brief intervention for adolescents who have been treated in hospital due to alcohol intoxication. Adolescents should therefore be motivated and encouraged to participate in booster sessions.

Introduction

Excessive drinking among adolescents is an alarming phenomenon across Europe and North America. Seventeen percent of European adolescents report having been drunk during the last 30 days (Hibell et al., 2012) and hospital admissions due to alcohol intoxication are rising among children and adolescents (Slovak Republic: Kuzelova et al., 2009; Croatia: Bitunjac & Saraga, 2009; the Netherlands: Bouthoorn et al., 2011; Germany: Wurdak et al., 2013). In Germany, more than 26,000 children, adolescents and young adults were treated in hospital due to alcohol intoxication in 2011 (Federal Statistical Office, 2013). This constitutes an increase of more than 170% compared with the year 2000 (Federal Statistical Office, 2011). Since only a small percentage of adolescents are actually admitted to hospital due to alcohol intoxication (Kraus et al., 2013), the estimated number of unreported cases is even higher.

Acute alcohol intoxication can lead to hypothermia, hypoglycemia, injuries and coma (Lamminpa¨a¨, 1995) and constitutes a significant risk of adverse psychological, social and physical health consequences, including academic failure, unplanned pregnancy, sexually transmitted diseases, suicide attempts, violence and accidents (Gmel et al., 2003). Unfortunately, drunkenness is difficult to recognize among adolescents as they suffer less from observable effects of alcohol (e.g. impairment of motor function) than adults (Wurdak et al., 2012), and more from cognitive impairment (Scheel et al., 2013).

To curb risky drinking behaviors and to reduce the level of alcohol intoxication among adolescents, a number of prevention measures have been introduced in Germany (e.g. raised taxes on alcopops (Müller et al., 2010), drink driving limit of 0.0 g% for novice drivers (Holte et al., 2010) and media campaigns (Federal Centre for Health Education, 2013)).

Another example is the Hart-am-LimiT (HaLT) project, a brief intervention program for adolescents hospitalized due to alcohol intoxication. The project was implemented in Germany in 2007 (Müller et al., 2009; Villa Schöpfflin, 2009). There are currently more than 80 participating hospitals in the Federal State of Bavaria, where approximately 5300 adolescents took part in the HaLT program between 2007 and 2012.

HaLT consists of a preventive bedside intervention young people receive before being discharged from hospital the morning after admission. The interview is usually conducted...
by a social worker and includes going over events the day before and circumstances that might have led to hospital admission and treatment. In addition, information on the effects of alcohol is provided (Stürmer & Wolstein, 2011) and motivational interviewing (MI) strategies (Rollnick & Miller, 1995) are used in order to enhance the adolescents' motivation to reduce risky drinking behavior (e.g. strengthening patients' motivation to change by working with their ambivalence in an accepting and person-focused way).

In addition to this interview, all participants in the HaLT program are invited to take part in a one-and-a-half day HaLT group intervention (booster session, BOOST) to enhance skills for dealing with risk and self-efficacy and including outdoor activities. During this booster intervention, participants are asked about their reasons for drinking alcohol and discuss ways of drinking responsibly in future (Stolle et al., 2009). Participation in BOOST is voluntary.

The effectiveness of bedside interventions using MI strategies has been demonstrated in several studies (Carey et al., 2007). For example, 13- to 17-year-old adolescents with problematic alcohol use reduced their drinking and episodic heavy drinking (EHD) frequency after an MI intervention in the emergency department (compared to standard care; Spirito et al., 2004). Young adults (18 and 19 years of age) reported fewer alcohol-related injuries and problems after receiving a short MI intervention in emergency care (Monti et al., 1999). After 12 months, 18- to 24-year-old MI participants indicated fewer drinking and EHD days than patients who only received personalized feedback (Monti et al., 2007). Adolescents (14–21 years of age) treated in the emergency department due to risky drinking also showed more willingness to give up drinking and to be careful about drinking situations when they took part in the MI condition program compared to the standard assessed control group (Bernstein et al., 2010).

To our knowledge, the effect of booster sessions on alcohol consumption among adolescents who have been admitted to hospital due to alcohol intoxication has not been tested. Generally, booster sessions are recommended to maintain the positive effects of prevention programs, especially as the outcomes of most programs are likely to decrease over time (Nation et al., 2003). Brief interventions with booster sessions were successful among adults with a history of hazardous alcohol consumption, who were admitted to the emergency department due to injuries: after one year they reported fewer negative consequences associated with alcohol and a smaller number of alcohol-related injuries compared to patients who received standard care (Longabaugh et al., 2001).

All of the abovementioned studies were conducted in the US. Since age restrictions for alcohol consumption and purchase are different in the US compared with most European countries, and since patients in Germany are treated as inpatients rather than in the accident and emergency department if they are diagnosed with alcohol intoxication (Bernstein et al., 2010; Monti et al., 1999, 2007; Spirito et al., 2004), previous results cannot easily be transferred to Germany or other European countries. Overall, the number of studies on the effects of prevention projects for adolescents suffering from alcohol intoxication is small, probably because of the difficulty in obtaining adequate sample sizes.

The objective of this study was to test in a multi-center study whether a booster session (BOOST) has an impact on drinking behavior in HaLT participants at follow-up. As frequency of drinking and drunkenness sharply increase with age (Currie et al., 2012; Kuntsche et al., 2006) in all countries, we expect that participation in BOOST leads to a less steep increase in alcohol use over time than in the intervention group without BOOST.

Methods

Procedure

Data were collected at two different points in time (Figure 1). There was an average time lapse of 16.4 months between the interview (t1) and the online-questionnaire (t2; follow-up) (SD = 3.3). t1- and t2-data were linked through patient codes.

Between October 2008 and January 2010, 793 adolescents participated in the HaLT program in the Federal State of Bavaria after being admitted to hospital due to alcohol intoxication. Adolescents were interviewed in the hospital and socio-demographic data (age, gender, type of schooling (Table 1)), information on previous drinking behavior (frequency of alcohol consumption, EHD and drunkenness), and alcohol level at admission were recorded by a visiting social worker (t1).

Out of this sample, adolescents were excluded if (a) information on age, gender, patient code or on at least one consumption variable could not be recorded during the

Figure 1. Data collection.

11-25 months

HaLT patients
interview and
data collection in the hospital; n=793
analytical sample
invitation to participate in the follow-up data collection; n=411

BOOST (voluntary)

HaLT sample
follow-up data
collection (online); n=106 (non BOOST: n=65, BOOST: n=41)
Table 1. Socio-demographic characteristics and drinking behavior of the analyzed HaLT sample (n = 106).

<table>
<thead>
<tr>
<th></th>
<th>BOOST (n = 41)</th>
<th>Non-BOOST (n = 65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (female)</td>
<td>34.1 (14)</td>
<td>50.8 (33)</td>
</tr>
<tr>
<td>Secondary school „Mittelschule“a (n_{boost} = 39; n_{non-boost} = 58)</td>
<td>23.1 (9)</td>
<td>25.9 (15)</td>
</tr>
<tr>
<td>Secondary school „Realschule“a (n_{boost} = 39; n_{non-boost} = 58)</td>
<td>28.2 (11)</td>
<td>34.5 (20)</td>
</tr>
<tr>
<td>Secondary school „Gymnasium“a (n_{boost} = 39; n_{non-boost} = 58)</td>
<td>48.7 (19)</td>
<td>39.7 (23)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>M (SD)</th>
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<tbody>
<tr>
<td>Age (t1, hospitalization)</td>
<td>14.8 (1.4)</td>
<td>15.6 (1.3)</td>
</tr>
<tr>
<td>Age (t2, online survey)</td>
<td>16.2 (1.2)</td>
<td>16.9 (1.4)</td>
</tr>
<tr>
<td>Frequency of alcohol consumption (last 30 days) (n_{boost} = 40; n_{non-boost} = 64)</td>
<td>3.5 (3.8)</td>
<td>3.0 (3.3)</td>
</tr>
<tr>
<td>Frequency of EHD (last 30 days) (n_{boost} = 41; n_{non-boost} = 63)</td>
<td>1.7 (2.9)</td>
<td>1.1 (1.8)</td>
</tr>
<tr>
<td>Frequency of drunkenness (last 12 months) (n_{boost} = 39; n_{non-boost} = 62)</td>
<td>4.7 (8.9)</td>
<td>4.8 (10.3)</td>
</tr>
</tbody>
</table>

aThere are three types of secondary school in Bavaria (Germany) that differ in years of schooling and demands. The highest demands are in the “Gymnasium” (years 5 to 12) followed by “Realschule” (years 5 to 10) and “Mittelschule” (years 5 to 9).

To participate in the booster session (BOOST; yes/no), prevention interview (n = 157), (b) they were younger than 14 at follow-up (to keep the sample age homogeneous; n = 6) or (c) the home address was missing or incorrectly indicated (n = 56). This resulted in a sample of n = 574.

To guarantee confidentiality throughout the study, dispatch of the information letters and questionnaires and analysis of the responses were kept organizationally separate. Thus, information letters were sent by social workers from the participating centers and data analysis was carried out by university staff, who were not aware at any point of the complete name, address or contact details of the participants. This procedure of recontacting the participants was time-consuming and due to budget restrictions and to keep the time and effort involved in data collection comparable for every participating center, we generated random samples in the major cities (Munich & Nuremberg) with the highest numbers of cases (n = 163 were excluded).

The resulting 411 adolescents comprised our analytical sample. They received a letter in the post-summarizing the study procedure, providing a personal password and inviting them to fill in an online questionnaire (2; follow-up). The response rate among the adolescents who were invited to participate (n = 411) was 26% (n = 106; HaLT sample).

As an incentive for completing the online questionnaire, we provided online vouchers worth 10 Euros (e.g. for fashion, media, books or cosmetics; purchase of alcoholic beverages excluded by pre-selected online shops). Participants therefore needed to disclose their e-mail address, which was kept separately and deleted after mailing of the vouchers. The study was approved by the ethics committee of the University of Bamberg.

Measures

Socio-demographics

To complete the online questionnaire, adolescents had to register on a website with their personal password which they had received by post. Once they had given their consent, they were asked about gender, age and type of schooling. Additionally, adolescents were asked whether they had participated in the booster session (BOOST; yes/no).

Drinking behaviors

Participants were requested to indicate their drinking behavior based on items adopted from the ESPAD questionnaire (Hibell et al., 2009; Kraus et al., 2008). Numerical responses were requested to questions on frequency of alcohol consumption (“During the last 30 days: On how many days have you had any alcoholic beverage to drink, e.g. beer, wine/sparkling wine, mixed drinks, alcopops or spirits?”), frequency of EHD (“During the last 30 days: On how many days have you had five or more alcoholic drinks, e.g. beer, wine/sparkling wine, mixed drinks, alcopops or spirits?”) and frequency of drunkenness (“During the last 12 months: On how many occasions (if any) have you been intoxicated from drinking alcoholic beverages, so that you e.g. staggered when walking, were not able to speak properly, or could not remember anything the next day?”).

Data analysis

To analyze the changes in drinking behavior among adolescents who took part in the HaLT program, we used t-tests for dependent samples to compare the drinking behavior of the HaLT sample at t1 and t2. In addition, frequencies and descriptive statistics of adolescents’ self-assessments of alcohol consumption were calculated.

To test the hypothesis as to whether BOOST has an impact on drinking behavior, BOOST participants were compared with adolescents who did not participate (non-BOOST) based on age, gender, type of schooling and alcohol level at hospital admission. We used analysis of variance (ANOVAs) with repeated measurements to compare changes in the frequency of alcohol consumption, EHD and drunkenness among both groups. In a second step, variables where we found any differences between the two groups (age, gender, type of schooling or alcohol level), were included in the ANOVA as covariates. We used the 5% error level as significance threshold. To approximate a normal distribution and to reduce the impact of extreme values, we recalculated the ANOVA with log-transformed alcohol use variables (Kuntsche et al., 2014; Tabachnick & Fidell, 2001).
Table 2. Drinking variables of BOOST participants and non-BOOST participants.

<table>
<thead>
<tr>
<th></th>
<th>BOOST</th>
<th>Non-BOOST</th>
<th>F (p)* df = 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of alcohol consumption (30 days)</td>
<td>t1 3.5 (3.8)</td>
<td>t1 3.0 (3.3)</td>
<td>2.8 (0.097)</td>
</tr>
<tr>
<td>(nboost = 40; non-boost = 64)</td>
<td>t2 3.7 (3.7)</td>
<td>t2 4.8 (6.0)</td>
<td></td>
</tr>
<tr>
<td>Frequency of EHD (30 days)</td>
<td>t1 1.7 (2.9)</td>
<td>t1 1.1 (1.8)</td>
<td>4.4 (0.039)</td>
</tr>
<tr>
<td>(nbooster = 41; non-boost = 63)</td>
<td>t2 1.6 (2.1)</td>
<td>t2 2.7 (4.1)</td>
<td></td>
</tr>
<tr>
<td>Frequency of drunkenness (12 months)</td>
<td>t1 4.7 (8.9)</td>
<td>t1 4.8 (10.4)</td>
<td>0.7 (0.389)</td>
</tr>
<tr>
<td>(nbooster = 38; non-boost = 62)</td>
<td>t2 7.1 (10.5)</td>
<td>t2 10.6 (22.6)</td>
<td></td>
</tr>
</tbody>
</table>

*The F-values model the interaction effects of time (consumption variable at t1 and t2) and group (BOOST and non-BOOST).

Results

Sample description

Participants who completed baseline and follow-up questionnaires (n = 106) did not differ from the non-response sample (n = 305) regarding age (t2, t = 1.190; p = 0.235), gender (Chi² = 0.995; df = 1; p = 0.758), alcohol level at hospital admission (t = 0.382; p = 0.703), frequency of alcohol consumption (t = 0.376; p = 0.707), EHD (t = -0.343; p = 0.732) or drunkenness (t = -0.056; p = 0.955). Only those with secondary school qualifications ‘Gymnasium’ (years 5 to 13; Table 1) were over-represented at follow-up (U = 9867.5; p ≤ 0.001). See Table 1 for socio-demographic data and drinking behavior of the analyzed HaLT sample.

As expected, comparisons of the frequency of alcohol consumption, EHD and drunkenness prior to the intervention (t1) and at follow-up (t2) showed that – on average – adolescents from the HaLT sample had increased their drinking behaviors during the 16 months following hospital treatment (frequency of alcohol consumption: t = -2.193, p = 0.031; frequency of EHD: t = -2.302, p = 0.023; frequency of drunkenness: t = -2.854, p = 0.005).

Effect of the booster session

Analysis indicated that BOOST adolescents did not increase frequency of alcohol consumption, EHD and drunkenness as strongly as the non-BOOST group (Table 2). Results reach significance in terms of EHD. The effects for frequency of alcohol consumption and drunkenness are consistent, but not significant.

There were no differences between patients from the two groups (BOOST, non-BOOST) regarding gender (Chi² = 2.815; p = 0.093), type of schooling (U = 702.00; p = 0.312), alcohol level (t = 0.093; p = 0.926), frequency of alcohol consumption (t = -0.777; p = 0.439), EHD (t = -1.310; p = 0.193), and drunkenness (t = 0.078; p = 0.938) at hospital admission. As they were younger than adolescents in the non-BOOST group (t = 3.078; p = 0.003), age was included in the ANOVA as a covariate variable in a second step; differences became even more marked (frequency of alcohol consumption: F = 3.668; p = 0.058; EHD: F = 5.253; p = 0.024). Recalculating the ANOVA with log-transformed variables we found similar results (can be obtained from the authors on request), which underline the robustness of our findings.

Discussion

This study aimed to test whether a booster session has an impact on the drinking behavior of adolescents admitted to hospital due to acute alcohol intoxication and participating in the HaLT intervention.

This hypothesis was confirmed for frequency of EHD. The effects for frequency of alcohol consumption would have been significant at the 10% error level. The development of the frequency of drunkenness points in the same direction, but does not reach significance due to the small sample size and large variances. Despite the age-related increase in alcohol consumption over time occurring in the entire HaLT sample, adolescents who had taken part in the one-and-a-half day group intervention (BOOST) did not increase EHD and drinking frequency in contrast to the non-BOOST group. Concerning the frequency of drunkenness, the increase was less steep among the BOOST group than in the non-BOOST group but the difference in effect was not statistically significant, probably due to the rather small sample size.

These results extend findings of previous brief intervention studies among adults who have engaged in heavy drinking and are admitted to emergency departments (Longabaugh et al., 2001) by demonstrating that booster sessions are also helpful in emergency room brief interventions with intoxicated adolescents. The impact of BOOST on alcohol consumption at follow-up might be due to enhancement of self-efficacy, which was shown to be negatively associated with the intention to drink alcohol, drinking behavior and problematic alcohol use (Aas et al., 1995; McKay et al., 2012; Rabaglietti et al., 2011).

Study limitations and strengths

Part of the effect could be due to selection effects since participants were not randomized, i.e. participation in BOOST was voluntary. However, adolescents in the BOOST group did not differ from the non-BOOST group regarding gender, type of schooling and alcohol consumption variables.

The rather small sample size is due to the fact that the number of young people admitted to hospital due to acute alcohol intoxication in Germany is low – albeit on the rise (Federal Statistical Office, 2011, 2013). For example, in Bavaria, in 2009, only 0.22% of all adolescents aged between 10 and 20 were treated in hospital due to alcohol intoxication (Wurdak et al., 2013).
The response rate of 26% is rather low. However, it is comparable to other online surveys asking students about their drinking behaviors (e.g. Kuntsche et al., 2008; McCabe et al., 2006). In addition, those who completed baseline and follow-up did not differ from drop-outs regarding age, gender and alcohol consumption variables. Moreover, adolescents probably do not want to be reminded of their alcohol intoxication and hospital admission by participation in a follow-up survey.

The difference in data collection methods (i.e. personal interview at t1 with a higher potential of social desirability bias than the online questionnaire at t2) may have contributed to the higher alcohol use at t2. However, as the data collection methods were the same in both groups, it is unlikely that they explain the difference between the BOOST and the non-BOOST group over time.

When comparing the changes of frequency of drunkenness, alcohol consumption and EHD from hospital admission to follow-up, alcohol consumption rose among HaLT participants in general. Across countries, the frequency of both drinking and drunkenness strongly increases with age (Currie et al., 2012; Kuntsche et al., 2006). Given that an average of 16 months had elapsed between the prevention interview and follow up, it is not surprising that adolescents report more drinking days and cases of intoxication when they are one and a half years older.

Among the strengths of the study is the long follow-up period (11–25 months) since most previous studies used six or 12 months at maximum (Bernstein et al., 2010; Monti et al., 1999, 2007; Spirito et al., 2004).

Conclusion

The results of this study indicate a positive effect of a booster session following a bedside intervention for adolescents who have been treated in hospital due to alcohol intoxication. This suggests that booster sessions are worth the additional effort and cost. As only 39% of adolescents decided to take part in the booster session within our HaLT sample, further intervention studies should focus on motivating and encouraging adolescents to participate in booster sessions.

Acknowledgements

The authors would like to thank the team at the Bayerische Akademie für Sichth- und Gesundheitsfragen and Susanne Eggers and Gemma Brown for their support with the translation and revision of the manuscript. They also extend their sincere thanks to all those who participated in the study.

Declaration of interest

The authors report no conflicts of interest.

The study was supported by research grants from the Federal Ministry of Environment and Health (Bavaria) and the University of Bamberg. The authors are not in receipt of funding from the alcohol industry.

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