

The impact of drinking pattern on alcohol-related violence among adolescents: An international comparative analysis

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Abstract

Introduction and Aims. *Drinking pattern seems to be an important mediator of the alcohol–violence association. Aggregate level studies have demonstrated that the alcohol–violence association is stronger in countries where intoxication occurs relatively more frequent to the overall drinking. However, this has not been tested against empirical data at the individual level or with respect to violence among young people. Thus, the aim of the present study was to test whether the association between alcohol consumption and prevalence of alcohol-related aggression in young people would be stronger in countries where intoxication is relatively more prevalent.* **Design and Methods.** *The data comprised school surveys (pupils at age 16) from 13 countries in the European School Survey Project on Alcohol and Other Drugs 2003. The countries were divided into high, medium and low levels of intoxication rate.* **Results.** *The prevalence of alcohol-related aggression varied considerably across countries, and was significantly higher in drinking cultures where intoxication is relatively more prevalent.* **Discussion and Conclusions.** *The findings of this study suggest that challenges for prevention of acute alcohol-related harms in young people may be larger in countries where adolescents to a larger extent drink to intoxication. From a prevention point of view it also seems warranted to direct more future studies into the area of potential for preventing intoxication and drunkenness, not in the least among young people.* [Bye EK, Rossow I. The impact of drinking pattern on alcohol-related violence among adolescents: An international comparative analysis. *Drug Alcohol Rev* 2010;29;131–137]

Key words: drinking patterns, aggression, adolescent, European School Survey Project on Alcohol and Drugs data, comparative.

Introduction

Young people are frequently involved in violent behaviour; for instance a recent study from the US showed that one-third (35%) of senior high school students reported to have been involved in violent incidents in the preceding year [1]. Among the main risk factors for violent behaviour is alcohol consumption, and numerous studies have shown that alcohol and violent behaviour are associated, that is the risk of being involved in violence increases with alcohol intake [2–5]. Correspondingly, a significant proportion of violent incidents involve one or more participants who have been drinking (see [6] for a review).

Not only the amount of alcohol consumed but also the drinking pattern is of importance for the risk of various alcohol-related harms, such as aggressive behaviour and violence [7–9]. This is of particular relevance for adolescents, who are more likely to engage in

heavy episodic drinking and thus increased likelihood of experiencing adverse consequences, such as violence [10]. There is now a growing body of studies that demonstrate the relationship between drinking pattern, that is frequency of intoxication or heavy episodic drinking, and social harm and consequences [7,9,11–13]. When it comes to violence, drinking pattern has also shown to be an important predictor. Drinking to intoxication or drinking five or more drinks per occasion is found to increase the likelihood of aggressive behaviour significantly [2,4,5,8,9,14,15].

Alcohol-related aggression is known to vary greatly by culture [16], and many of the abovementioned studies emphasise that the magnitude of the association varies between different drinking cultures [17–19]. Although there has been some convergence in the consumption of alcohol in Europe, studies show that there still exist significant differences in drinking patterns [20–22]. Several studies have demonstrated a

significant variation in the number of drunkenness occasions, showing that a significantly higher proportion of drinking occasions resulted in intoxication among students in the northern European countries, compared with those in the southern European countries [23,24]. Consequently, we would expect more violence related to the overall consumption in countries or cultures where intoxication is relatively more prevalent.

However, few studies have empirically tested the cross-cultural differences in the association between alcohol consumption and various social consequences. The hypothesis that alcohol consumption is more strongly associated with violence in cultures where intoxication is relatively more prevalent has mainly been tested in studies based on time series analysis of aggregate level data. For instance, Lenke [25] showed that the association between alcohol consumption and violence resulted in more assaults and crimes as a result of given increase in alcohol consumption in countries where intoxication is relatively more prevalent. Moreover, Rossow [17] found a stronger association between alcohol consumption and homicides in northern as compared with southern Europe, which may be attributed to differences in the drinking cultures and drinking patterns. In other words, in a drinking culture where drinking often leads to intoxication as opposed to drinking cultures where intoxication is less prevalent, a 1 L increase in per capita consumption would imply a larger increase in violence. Similar results have been reported by Rossow [26] from Canadian provinces and by Bye [27] from eastern-European countries. Thus, studies at the aggregate level show fairly consistently that the magnitude of the alcohol–violence association is contingent upon drinking pattern.

Whether the alcohol–violence association is stronger in drinking cultures where intoxication is relatively more prevalent has, however, not been tested against empirical data at the individual level, nor specifically with respect to violence among young people. To our knowledge, only one general population study has performed comparative analyses of the association between alcohol consumption and social harm at the individual level. The results indicated that volume of intake had a stronger impact on the likelihood of experience at least one harm in Northern European countries compared with Central- and Southern European countries, whereas the link between volume of drinking and adverse consequences was weaker in Southern European countries [28]. However, this study did not analyse alcohol-related violence specifically. Hence, to what extent there is a cultural variation regarding the association between alcohol-related violence and drinking pattern at the individual level still remains unanswered.

The present study is motivated by the above-mentioned aggregate studies from Europe [17], prov-

inces of Canada [26] and different eastern-European countries [27], where the findings showed that the level of intoxication is significant regarding the associations between alcohol consumption and violence. However, as drinking to intoxication is a particular prominent feature of the drinking pattern among young people, one could assume that associations between alcohol consumption and violence in the youth population would display less variability across countries and drinking cultures. The present study is based on data from approximately the same countries as the European Comparative Alcohol Study (ECAS) study (see [29] for more details) to see if we would find the same gradient in the association between alcohol and violence as found in earlier studies at the aggregate level. Moreover, as young people tend to be more vulnerable with respect to alcohol-related harms and as violent behaviour occurs more frequently among young people, studies of associations between alcohol consumption and violence may be of particular interest within this population group. The availability of data from the European School Survey Project on Alcohol and Drugs (ESPAD) thus provided a unique opportunity to compare associations between alcohol consumption and alcohol-related aggression based on individual level data among young people. The aim of the present study was to test the hypothesis that the association between alcohol consumption and prevalence of alcohol-related aggression in young people would be stronger in countries where intoxication is relatively more prevalent.

Methods

The present analyses are based on data from ESPAD. The ESPAD study was conducted for the third time in 2003 (also conducted in 1995, 1999), and the target population in each of the 35 countries was students born in 1987, that is the age group studied turned 16 during the year of data collection (see [30] for more details of the sampling procedures, sample size etc). In a comparative study of 14 western European countries (the ECAS study), the countries were grouped into three regions that were assumed to represent differences in drinking cultures with respect to drinking into intoxication [17]. We wanted to include countries that covered different levels of intoxication, and based on the ECAS study and the calculated intoxication rate based on the ESPAD 95 and 99 study [24], we decided to use approximately the same countries as in the ECAS study. Thus, data from the ESPAD 2003 database for the following 13 countries were used: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Malta, the Netherlands, Norway, Sweden and UK. The response rate varied between 81% and 93% for the selected countries. The countries

Table 1. Average number of drinking and intoxication occasions in the past 12 months, proportion of students involved in fights in general and fights after drinking, and ratio of intoxication occasions per drinking occasions by selected European School Survey Project on Alcohol and Drugs countries (drinkers past 12 months)

Level of intoxication rate	Subjects in present study	Drinking occasions (D)	Intoxication occasions (I)	Ratio I/D	Involved in fights (%)	Fights after drinking (%)
High						
Finland	2532	11.3	8.1	0.7	45	12.1
Norway	2649	11.0	6.0	0.5	39	9.4
Sweden	2411	10.0	5.9	0.6	55	11.8
Medium						
Austria	2119	21.8	6.9	0.3	45	7.2
Belgium	1940	18.1	3.0	0.2	44	3.8
Denmark	2318	21.6	10.9	0.5	41	16.0
Germany	4636	16.1	3.8	0.2	49	4.1
The Netherlands	663	23.8	3.6	0.2	44	3.6
UK	1784	19.3	8.4	0.4	60	11.8
Low						
France	1751	10.8	1.4	0.1	48	3.0
Greece	1698	15.7	1.4	0.1	61	1.2
Cyprus	1650	12.8	0.9	0.1	45	2.7
Malta	3007	18.1	2.1	0.1	62	3.8

were divided into three groups with different level of intoxication: (i) high: Finland, Norway, Sweden; (ii) medium: Austria, Belgium, Denmark, Germany, the Netherlands, UK; and (iii) low: France, Greece, Cyprus and Malta. Only those who reported drinking in the past 12 months were included in the analyses. Net sample sizes are shown in Table 1.

Alcohol-related violence

The students were asked 'Have you ever had any of the following problems?' followed by a list of consequences which included 'Scuffle or fight because of my alcohol use'. Those who responded 'Yes' were categorised as having experienced alcohol-related violence.

Alcohol consumption

The following questions on alcohol consumption from the ESPAD 2003 questionnaire were applied: frequency of drinking and intoxication in the preceding 12 months (mid-points for response categories '0', '1-2', '3-5', '6-9', '10-19', '20-39' and '40 or more') and beverage-specific amounts of alcohol in the most recent drinking occasion. The latter were added and multiplied with the drinking frequency to compute a proxy for annual alcohol consumption in litres of pure alcohol.

Statistical analyses

Previous comparative studies of alcohol consumption and violence based on aggregate level data [17,25-27] have presented national or state-wise associations

between changes in per capita consumption and changes in rates of violence. The interpretation of the parameter estimates has been that a 1 L increase in per capital alcohol consumption is followed by an x% change in violence rates in that population. However, when applying individual level data we cannot assume that the parameter estimates for the associations between alcohol consumption and alcohol-related fights may reflect differences in drinking patterns, as seems to be the case at the aggregate level. The reason for this is that in the ESPAD dataset the absolute risk of alcohol-related violence varies significantly across countries and is highly correlated ($r = 0.94$) with the average intoxication frequency, and hence the relative change in risk associated with alcohol consumption is probably not very sensitive to differences in drinking patterns. Thus, in order to assess associations between alcohol consumption and alcohol-related violence that would better reflect the previous aggregate level approaches, ratios of alcohol-related violence per litre of pure alcohol were calculated for each country. Correspondingly, ratios of alcohol-related violence per 100 drinking occasions and per 100 occasions of intoxication were also calculated. In addition we calculated the proportion of adolescents who had been in an alcohol-related fight among those who had been in any kind of fight. The estimates from the individual countries were pooled into three groups to provide comparable estimates between the assumed different drinking patterns in the three groups.

In order to test whether the pooled ratios of fights per drinking and intoxication occasions differed between the three groups of countries (high, medium, low

intoxication rate), a 'fast' method of estimating standard errors of the means observed in each group of countries was applied [31]; assuming a Poisson distribution of the number of students reporting fights and a normal distribution of overall number of drinking occasions and intoxication occasions per country. Likewise, a lognormal distribution was assumed for the number of litre alcohol consumed per person.

Results

Of the total sample, 7% of the students reported having experienced fights after drinking, with the highest prevalence in Denmark (16%) and lowest in Greece (1.2%). The involvement in fights in general varied between 62% (Malta) and 39% (Norway). Table 1 displays the average number of drinking and intoxication occasions and the proportion of fights after drinking for each country. The ratio of intoxication frequency to drinking frequency showed that the Finnish students reported to have been intoxicated in approximately seven out of 10 drinking occasions, while the corresponding figure for all the countries with low intoxication rate was one out of 10. This result equals the results from the ESPAD 95 and 99 surveys [24, 30].

One way to 'translate' the empirical approach in the previous aggregate level studies on alcohol consumption and violence across drinking cultures onto the ESPAD data was by calculating the number of alcohol-related fights per 100 drinking occasions. If the overall number of drinking occasions reflects the total alcohol consumption among the respondents fairly well, we would—on the basis of previous aggregate level studies—expect that the ratio of alcohol-related fights per 100 drinking occasions is closely associated with drinking pattern and positively correlated with average intoxication frequency.

The results (Table 2) showed that the ratio of persons in alcohol-related fights per 100 drinking occasions varied significantly between the countries, with the lowest for Greece and the highest for Sweden. The ratio was also higher for the countries with the high level of intoxication rate compared with the others, although a clear systematic pattern of the ratios in the other countries could not be observed. However, when the ratios were pooled for the three groups, a significant intoxication rate gradient appeared; with the highest ratio in countries with high intoxication rate (1.0), followed by countries with medium intoxication rate (0.4) and with the lowest for countries with low intoxication rate (0.2). A similar pattern emerged when pooled ratios of persons in alcohol-related fights per litre of pure alcohol were compared for the three groups of countries; and again a distinct and significant intoxication rate gradient in the pooled estimates was observed

(Table 2). A significant intoxication rate gradient also appeared for the proportion of adolescents in alcohol-related fights among all adolescents who had been in a fight. However, there was no distinct gradient for the ratio of persons involved in alcohol-related fights per 100 intoxication occasions. We have also done the analyses separately for girls and boys, and the same pattern of gradients was found. In addition, we have also calculated these ratios applying the total sample of students (including abstainers), but as lifetime abstainers rates are fairly low (4–16%) this did not alter the results to any significant extent.

Discussion

The results showed a large variation in intoxication rate between the 13 countries, being highest in the northern European countries and lowest in countries from southern Europe. This corresponds to earlier research [24]. In this paper, we tested the hypothesis that the association between prevalence of alcohol-related violence and alcohol consumption would be stronger in countries where intoxication was relatively more prevalent as compared with countries with less intoxication. When pooling the estimates from the individual countries we found empirical support for the hypothesis with respect to both number of drinking occasions and litres of alcohol consumed, with a clear intoxication rate gradient in the magnitude of the association. Thus, these findings based on individual level data from adolescents are in line with the assumption that the magnitude of the association between alcohol and violence varies across countries with different drinking pattern, and thus corresponds with the findings from previous studies based on total population data at the aggregate level [17,25–27]. The finding of no systematic or significant variation in the association between alcohol-related violence and intoxication frequency further supported the assumption that drinking pattern is a significant mediator of the alcohol consumption–violence association.

However, there are several methodological considerations and limitations that must be addressed. Despite the similar measurement techniques and standardised questions used in the ESPAD study, it is possible that reliability as well as content validity may vary across countries. In particular, intoxication is not only a subjective state that may vary considerably between individuals, but the meaning may also vary considerably across countries and drinking cultures.

Another issue is the subjective ratings of alcohol-related harm. It has been suggested that it may be difficult for respondents to attribute an outcome measure (in this case, violence) to a particular exposure (in this case, alcohol consumption) and that

Table 2. Ratios of persons in alcohol-related fights per 100 drinking occasions; per 100 L pure alcohol; per 100 intoxication occasions and the proportion of persons in fights who were in alcohol-related fights

Level of intoxication rate	Ratio of persons in alcohol-related drinking occasions	Pooled ratio of persons in fights per 100 drinking occasions	Ratio of persons in alcohol-related fights per 100 L of pure alcohol	Pooled ratio of persons in alcohol-related fights per 100 L pure alcohol	Ratio of persons in alcohol-related fights per 100 intoxication occasions	Pooled ratio of persons in alcohol-related fights per 100 intoxication occasions	Proportion of persons in fights who were in alcohol-related fights	Pooled proportion of persons in fights who were in alcohol-related fights
High								
Finland	1.07		13.6		1.5		0.27	
Norway	0.85		8.0		1.5		0.22	
Sweden	1.17	1.03 ^{***a}	14.3	12.0 ^{***b}	2.0	1.7 ^{***c}	0.22	0.24 ^{***d}
Medium								
Austria	0.33		–		1.0		0.16	
Belgium	0.21		3.0		1.3		0.09	
Denmark	0.74		7.3		1.5		0.40	
Germany	0.25		3.0		1.1		0.08	
Netherlands	0.15		1.8		1.0		0.08	
UK	0.61	0.38 ^{***e}	5.7	4.2 ^{***f}	1.4	1.2 ^{***g}	0.20	0.17 ^{***h}
Low								
France	0.28		–		2.1		0.06	
Greece	0.08		1.2		0.9		0.02	
Cyprus	0.21		3.1		2.9		0.06	
Malta	0.21	0.19	2.5	2.3	1.9	2.0 ⁱ	0.06	0.05

*** $P < 0.001$. ^aDifference between high and medium, $T = 16.48$. ^bDifference between high and medium, $T = 23.7$. ^cDifference between high and medium, $T = 6.44$. ^dDifference between high and medium, $T = 12.3$. ^eDifference between medium and low, $T = 9.58$. ^fDifference between medium and low, $T = 15.8$. ^gDifference between medium and low, $T = -4.86$. ^hDifference between medium and low, $T = 28.1$. ⁱDifference between high and low, $T = -1.79$, $P < 0.073$.

the respondents may exaggerate the impact of this exposure [32–34]. In a comparative perspective we may also be concerned that different norm climates for drunken comportment in various cultures may affect this measure differently. It has been suggested that people may be less likely to ascribe their problems to their drinking in countries where drinking occurs frequently and is socially accepted and vice versa that people more easily will attribute problems to drinking in cultures where regular drinking or drinking to intoxication is seen as a problem in itself [35]. It is also possible that attribution of violence to drinking is more under-reported in cultures where intoxication and intoxicated behaviour violate social norms and that there would be a greater acceptance of drunken comportment in countries where intoxication is relatively more prevalent and where alcohol consumption is characterised by infrequent ‘time-out’ behaviour. This would be in line with the findings of Kuendig and colleagues [36] who reported a marked difference between the Nordic countries and other European countries when investigating whether reporting of different alcohol-related adverse consequences (not violence) not only was influenced by consumption, but also had a strong cultural component through attribution process.

Another methodological concern relates to the different reference periods for alcohol consumption and alcohol-related violence. The latter had a life-time reference period, whereas the alcohol consumption variables reflected the past 12 months. As participation in physical fights tend to peak around the age of 16–17 years [37], it seems however likely that most of those reporting life-time alcohol-related fights would also have reported so for the past 12 months.

Young people are shown to be particularly vulnerable towards the harmful effects of alcohol intoxication. Thus, the findings of this study along with a series of previous studies addressing the impact of drinking pattern on harms, suggest that challenges for prevention of acute alcohol-related harms in young people may be larger in countries where drinking to intoxication is a prominent feature of the drinking pattern. There seems, however, to be few strategies that have a documented effect on reducing the extent of intoxication per se. Responsible beverage service programs seem promising in that respect, particularly in combination with stricter enforcement [38], although the findings from evaluation studies in this area are clearly mixed [39] and generally methodologically weak [40]. Strategies to reduce overall alcohol consumption among young people seem to have a larger potential to curb the extent of alcohol-related violence in this group. Such strategies would comprise stricter enforcement of minimum legal age in addition to the effective control policy measures that apply to the general population [24].

The present study is—to our knowledge—the first to address cross-cultural variation in the association between alcohol consumption and violence among young people, and the findings should therefore be sought replicated applying other data sources and various measures. From a prevention point of view it also seems warranted to direct more future studies into the area of potential for preventing intoxication and drunkenness, not in the least among young people. For instance, several studies have focused on where minors consume alcohol, and results from the 35 ESPAD countries showed that the adolescents most often consume alcohol in their own or in someone else’s home [30]. If this also applies to episodes of drunkenness, it seems that parents’ presence and monitoring may be important in preventing heavy episodic drinking, but this remains to be investigated.

Acknowledgements

This article includes data from the database produced within the European School Survey Project on Alcohol and Other Drugs (ESPAD), a collaborative European project coordinated by the Swedish Council for Information on Alcohol and Other Drugs (CAN). This article is written in the line with the rules for the use of the ESPAD database. The National Principal Investigators providing data for this study were: Karl Bohrn (Austria), Patrick Lambrecht (Belgium), Andreas Pavlakis (Cyprus), Svend Sabroe (Denmark), Salme Ahlström (Finland), Marie Choquet (France), Ludwig Kraus (Germany), Anna Kokkevi (Greece), Sharon Arpa (Malta), Karin Monshouwer (Netherlands), Astrid Skretting (Norway), Björn Hibell (Sweden) and Patrick Miller (UK). We are very grateful to our colleague Ellen J. Amundsen for providing us with the method for estimating the standard errors for the T-statistics in Table 2.

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