

Determinants of Binge Drinking among Adolescents in Denmark

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Abstract

Background and Objective: Binge drinking is a relatively common behavior among adolescents in Denmark. The aim of this study is to assess whether peer alcohol drinking, mothers' and fathers' attitudes toward alcohol drinking, and the adolescents' own financial situations (e.g., the presence of pocket money) predict binge drinking among adolescents in Denmark.

Methods: This study is based on the Danish data from the European School Survey Project on Alcohol and Other Drugs, which took place in 2011. This cross-sectional survey obtained data from 2765 adolescents who were in grade 9 in Denmark at that time. Logistic regression was used to assess the association between the outcome variable of binge drinking and the exposure variables of alcohol-drinking peers, pocket money, and mother's/father's approval of intoxication.

Results: The risk of binge drinking increased with the number of alcohol-drinking peers (trend test, $p < .0001$) and with the amount of pocket money spent (trend test, $p < .0001$). The association between the mother's approval of intoxication and binge drinking is complex. Boys had a higher risk of binge drinking (odds ratio, 2.2 [1.1-4.3]) if their mothers approved of their intoxication with alcohol; however, this association was not seen among girls (odds ratio, 1.0 [0.5-2.0]). There was no significant association between the father's approval of intoxication and binge drinking.

Conclusion: The proportion of alcohol-drinking peers and the amount of pocket money spent appear to be determinants of adolescent binge drinking. The mother's approval of intoxication appears to be a determinant for binge drinking among boys but not among girls. The father's approval of intoxication does not appear to be a determinant of binge drinking.

Keywords: Adolescents, binge drinking, alcohol, peers, pocket money, parent's attitudes, determinants

Introduction

Heavy alcohol drinking among adolescents is a large public health problem in Denmark. In general, Danish adolescents tend to drink a lot of alcohol, and only 7% of the Danish population never drinks alcohol (1).

Since 1995, substance use among Danish adolescents has been monitored every fourth year via the European School Survey Project on Alcohol and Other Drugs (ESPAD) (2), which also gathers data from adolescents in many other European countries. Results from the latest ESPAD survey demonstrated that Danish adolescents drink more than adolescents anywhere else in Europe, with 77% of 15-year-old Danish boys and 75% of 15-year-old Danish girls reporting that they had drunk alcohol during the month before the survey. The survey also showed that Danish adolescents drink

large quantities of alcohol at a time: they were found to have imbibed nearly twice as much alcohol during their last drinking sessions (9.7 cl of pure alcohol/6.5 units) as compared with the average of all of the European countries (5.1 cl of pure alcohol/3.4 units).

In Denmark, it is forbidden to sell alcoholic beverages to young people who are less than 16 years old. The National Board of Health recommends that children less than 16 years old drink no alcohol at all and that adolescents between the ages of 16 and 18 years not binge drink, which is defined as drinking more than 5 units of alcohol during one drinking session. These recommendations are not followed by Danish adolescents, and this represents a large public health challenge. Heavy alcohol use can result in both short-term and long-term health risks, such as physical fights,

unprotected sex, problems with parents or the police, and several different diseases later in life (2-4).

Previous research has reported sociodemographic variations with regard to alcohol use among adolescents, including gender (5), socioeconomic status (6), ethnicity (7, 8), and family patterns (9, 10). Boys have a higher risk for drinking alcohol as compared with girls (odds ratio [OR], 3.6; 95% confidence interval [CI], 2.9-4.1) (5). There is an association between ethnicity and alcohol drinking, and overall it has been shown that white adolescents tend to drink more often than black or Asian adolescents (7, 8). Previous studies have shown that adolescents who do not live with both of their parents have a higher risk of alcohol drinking (OR, 1.7; 95% CI, 1.4-2.1) and higher risk of binge drinking (OR, 1.4; 95% CI, 1.2-1.7) (9, 10). A study of Icelandic adolescents found that adolescents have a higher risk of drunkenness if their parents have an indifferent attitude toward alcohol drinking among their children (OR, 3.3; 95% CI, 2.1-5.1) (11). Inconsistent findings have been reported with regard to socioeconomic differences, but overall it seems that high parent income and high parent education have opposite effects on adolescent alcohol drinking (6). Adolescents whose mothers have university degrees are less likely to binge drink than adolescents whose mothers have less education (OR, 0.8; 95% CI, 0.7-0.9). Among the adult Danish population, alcohol habits are also influenced by level of education: adolescents from low-income families have a lower risk of alcohol drinking than adolescents from middle-income families (OR, 0.8; 95% CI, 0.6-0.9). We did not find many studies of adolescents' personal financial situations as predictors of binge drinking; only a few studies from the 1990s appear to have studied the association between pocket money and alcohol drinking (12). More recent studies have shown that there is a positive association between pocket money and other types of substance use such as smoking, so it has been suggested that a reduction in pocket money can be used to prevent adolescent smoking (13, 14). It is thus likely that pocket money may play a significant role in the drinking of alcohol among adolescents.

Adolescents' alcohol drinking most often takes place at social gatherings that occur on weekends; this is in contrast with the drinking patterns of Danish adults, who also tend to drink during the week. Adolescents seldom drink when they are alone or not at a party or on their way to a party. Thus, adolescents who spend a lot of time with their friends at parties or social gatherings tend to drink more alcohol (15). Previous research has shown a strong association between binge drinking

and social factors such as the impact of peers. Adolescents who have many friends that drink alcohol have a higher risk of drinking alcohol themselves (OR, 29.0; 95% CI, 15.8-51.3); if all of their friends drink alcohol, they have a much higher risk of drinking alcohol themselves (OR, 59.6; 95% CI, 28.7-123.6) (11). These findings are similar to those obtained by studies conducted in the Netherlands, Sweden, and Portugal (16-18). However, it is not clear to what extent these results indicate social selection or peer socialization.

As described previously, prior research has tried to determine the factors associated with adolescent alcohol drinking. Peer alcohol drinking has been identified as a determinant of adolescent alcohol drinking in several other countries; however, it would be of interest to determine whether peer alcohol drinking has the same predictive value on Danish adolescents, because Danish adolescents' alcohol habits differ from those of adolescents in many of the other countries. In Denmark, binge drinking is much more common than it is, for example, in Iceland and Sweden, where only 13% and 31%, respectively, of the adolescents reported binge drinking during the month before they were surveyed; during that same time period, 56% of Danish adolescents reported binge-drinking behavior (2). Therefore, one of the aims of the present study was to assess whether peer alcohol drinking predicted adolescent binge drinking in Denmark.

In Denmark, adolescents normally live at home with their parents until the age of 18 years, so it is likely that parents influence adolescent alcohol drinking. However, alcohol drinking is a very widespread behavior in Denmark, with only 7% of all Danes not consuming alcohol (1). The fact that nearly all Danish adults drink alcohol themselves may influence their attitudes toward and influence on adolescent alcohol drinking. The second aim of this study is to assess whether parents' attitudes toward alcohol drinking can predict adolescent binge drinking. Because it is not clear whether both parents have the same influence on adolescent behavior, mothers' and fathers' influences on adolescent binge drinking will be assessed separately.

As described previously, recent studies have shown a positive association between the use of substances like cigarettes and the availability of pocket money. However, the role of pocket money as a predictor of binge drinking has not been very well studied. Thus, it would be interesting to assess whether a larger amount of pocket money predicts adolescent binge drinking. The studying of this association will be the third aim of this research.

Methods

Study population

This study is based on the Danish data from ESPAD 2011. ESPAD is a cross-sectional survey that was conducted in 36 European countries in 2011. Data were collected from self-reported questionnaires that were handed out to ninth graders in randomly selected primary and private schools in Denmark. Two hundred and thirty-one schools were selected to participate in the ESPAD 2011 survey, and 97 of these schools (42%) took part in the study. Ten percent of the students were not in school the day that the survey was conducted. The target population of the ESPAD study was restricted to students born in 1995 and who were 15 years old at the time of the survey. The questionnaire was handed out to students in grade 9; however, in this grade level at the time of the study, there were also students who were born in 1994 (who were 16 years old at the time of the survey) as well as a few students born in 1993 and 1996. All of the Danish ninth graders who completed the survey have been included in the analysis performed for the current study. The Danish part of ESPAD 2011 contains data regarding 2765 adolescents' drug and alcohol habits; 79.9% of the participants were 15 years old, 17.5% were 16 years old, 2.1% were 14 years old, and 0.5% were 17 years old at the time of the survey.

Measurements

Three exposure variables were included: 1) the proportion of drinking peers; 2) the amount of money spent without parent supervision; and 3) the attitudes of the mother and father toward adolescent alcohol drinking. The first variable was measured by asking the students, "How many of your friends would you estimate get drunk?" The answer options were "None," "Few," "Some," "Most," and "All." For the second variable, students were asked, "How much money do you usually spend weekly on yourself without parent supervision?" Students then had the option to enter a four-digit number. The variable of pocket money was composed of both money given to the students by their parents and money earned by the adolescents themselves. The attitudes of mothers and fathers toward adolescent alcohol drinking was measured by asking the students, "What do you think your mother's/father's reaction would be if you get drunk?" The answer options were "Would not allow it," "Would discourage it," "Would not mind," "Would approve it," and "Do not know."

The outcome variable of binge drinking was included. This variable was measured by asking students the following: "Think back on the last 30 days. How many times (if any) have you had six or

more drinks (1 drink = 33 cl with 5% alcohol percent) on one occasion?" The answer options were "None," "1 time," "2 times," "3-5 times," "6-9 times," and "10 or more times." The outcome variable was then dichotomized into adolescents who have not been binge drinking and adolescents who have been binge drinking between 1 and 10 times during the last month.

Ten variables were included as potential confounders: 1) year of birth; 2) gender; 3 and 4) mother's/father's education level; 5 and 6) mother's/father's attitude towards adolescent alcohol drinking; and 7 through 10) with whom the adolescent lives (mother, father, stepmother, or stepfather). In every model, the potential confounders to be included were assessed by testing whether the potential confounder was associated with the exposure variable and whether it could be a risk factor for the outcome variable (data not shown).

The questionnaire as a whole can be viewed elsewhere (2).

Statistics

Logistic regression was used to assess the association between exposure and outcome. Thus, the associations are expressed as ORs with 95% CIs. Tests for homogeneity, tests for trends across categories of the exposure variables, and tests for interaction with age and gender for the association between exposure and outcome variables have been performed (19). For the association between the mother's and father's approval of drunkenness and binge drinking, data have been tested for interaction with the variables of living with the mother and living with the father. All statistical analyses were made with the use of SAS 9.2 software (SAS Institute, Cary, NC).

Data have been collected via cluster sampling on the class level, and this can result in intra-class correlation. The models have been analyzed with and without adjustment for intra-class correlation. Because the standard errors for log (OR) calculations were virtually the same in the models, these have not been corrected for intra-class correlation in the results shown in this article.

Ethical considerations

The ESPAD survey followed Danish national ethical rules (2). The students were informed that answering the questionnaire was voluntary. No parental consent was needed. Because the survey was confidential and anonymous, it was exempt from approval by an ethical committee. However, the survey was approved by both the National Board of Health and the University of Aarhus.

Results

Table 1 shows the sample characteristics distributed by gender. There are 18 missing values for gender, so the characteristics of only 2747 students are shown; 48% of the students are boys, and 52% are girls. Table 1 shows that the majority of students were born in 1995 (75% boys and 84.5% girls) and that 63.5% of the boys and 55.9% of the girls reported binge drinking during the previous month. In addition, 57.7% of the boys and 61% of the girls reported that the majority of their peers drink alcohol, 12.2% of the boys and 5.8% of the girls reported that their mothers did not mind adolescent drunkenness, and 49.5% of the boys and 44.9% of the girls reported that their fathers approved of adolescent drunkenness. The majority of these students spent between 100 and 249 DKK weekly without parental supervision (38.9% of the boys and 42.1% of the girls).

TABLE 1. Sample characteristics for boys and girls

| | Boys, N=1317 | | Girls, N=1430 | |
|--|--------------|-----|---------------|------|
| | % | n | % | n |
| Binge drinking (past 30 days) | | | | |
| 0 times | 36.5 | 454 | 44.1 | 585 |
| 1 time | 20.4 | 253 | 20.9 | 278 |
| 2 times | 16.7 | 207 | 15.1 | 200 |
| 3-5 times | 17.4 | 217 | 13.0 | 173 |
| 6-9 times | 5.3 | 66 | 4.9 | 65 |
| >10 times | 3.7 | 46 | 2.0 | 27 |
| Missing | | 74 | | 102 |
| Birth year | | | | |
| 1993 | 0.6 | 8 | 0.4 | 5 |
| 1994 | 23.5 | 308 | 12.0 | 171 |
| 1995 | 75.0 | 981 | 84.5 | 1203 |
| 1996 | 0.9 | 12 | 3.1 | 44 |
| Missing | | 8 | | 7 |
| Proportion of drinking peers | | | | |
| None | 2.3 | 30 | 2.5 | 36 |
| Few | 4.6 | 60 | 4.9 | 70 |
| Some | 23.3 | 303 | 22.3 | 317 |
| Most | 57.7 | 752 | 61.0 | 867 |
| All | 12.1 | 158 | 9.3 | 132 |
| Missing | | 14 | | 8 |
| Mother's reaction on drunkenness | | | | |
| Would not allow | 7.4 | 97 | 9.7 | 137 |
| Would discourage | 29.5 | 385 | 33.7 | 476 |
| Would not mind | 12.2 | 159 | 5.8 | 82 |
| Would approve | 46.8 | 612 | 48.0 | 677 |
| Do not know | 4.1 | 53 | 2.8 | 40 |
| Missing | | 11 | | 18 |
| Father's reaction on drunkenness | | | | |
| Would not allow | 8.5 | 110 | 10.7 | 152 |
| Would discourage | 20.8 | 270 | 28.3 | 400 |
| Would not mind | 15.3 | 198 | 10.4 | 147 |
| Would approve | 49.5 | 643 | 44.9 | 635 |
| Do not know | 5.9 | 77 | 5.7 | 80 |
| Missing | | 19 | | 16 |
| Amount of weekly spent money without parent supervision | | | | |
| 0-49 DKK | 19.0 | 234 | 14.2 | 192 |
| 50-99 DKK | 17.0 | 209 | 18.5 | 250 |
| 100-249 DKK | 38.9 | 480 | 42.1 | 568 |
| ≥250 DKK | 25.1 | 310 | 25.2 | 340 |
| Missing | | 84 | | 80 |

Note. 1 DKK = 0.13 EUR

All tests for interaction with age and gender for the association between exposure and outcome variables had results that were not significant, except for the association between the mother's attitude toward adolescent alcohol drinking and adolescent binge drinking. For this association, there was a significant interaction with gender ($p = .05$), so the ORs have been stratified according to gender.

For the association between the mother's and the father's reactions to drunkenness and binge drinking, there have been tests for interaction with the variables of living with mother and living with the father. Results for both tests were not significant, so the effects of the mother's and the father's reactions to drunkenness do not appear to depend on whether the adolescent lives with the mother or the father.

The results from the logistic regression analyses showed that adolescents who have a large proportion of peers who drink alcohol are more likely to binge drink. Table 2 shows that the risk of binge drinking increases with the number of drinking peers (trend test, $p < .0001$). If all of the students' friends drink alcohol, the student has a significantly greater risk of binge drinking (OR, 17.0; 95% CI, 6.8-42.7) as compared with students who do not have drinking peers.

TABLE 2. Association between proportion of drinking peers and binge drinking at least once during the last month

| Proportion of peers who get drunk | OR [95%CI]* | OR [95%CI]** | OR [95%CI]*** |
|-----------------------------------|----------------|----------------|----------------|
| None | 1.0 | 1.0 | 1.0 |
| Few | 1.1[0.5-2.7] | 1.1[0.5-2.7] | 1.4[0.5-3.7] |
| Some | 2.7[1.3-5.7] | 2.9[1.4-6.2] | 3.5[1.5-8.3] |
| Most | 6.8[3.2-14.3] | 7.3[3.5-15.5] | 7.0[3.0-16.6] |
| All | 18.6[8.3-41.4] | 19.6[8.7-43.8] | 17.0[6.8-42.7] |

Trend test $p < 0.0001$ $p < 0.0001$ $p < 0.0001$
 $F(v_d)$ $p < 0.0001$ $p < 0.0001$ $p < 0.0001$

Note. OR = odds ratio; CI = confidence interval; $F(v_d)$ = 4 degree of freedom test

*Unadjusted; **Adjusted for age and gender; ***Adjusted for age, gender, mother's education, parents' attitude towards drunkenness, amount of money spent, living with father

Adolescents who manage a lot of pocket money themselves have a higher risk of binge drinking. Table 3 shows that the risk of binge drinking increases with the amount of pocket money spent (trend test, $p < .0001$). Adolescents who spend more than 250 DKK weekly have a significantly higher risk of binge drinking (OR, 4.8; 95% CI, 3.6-6.5) as compared with students who spend 0 to 50 DKK weekly.

The association between the mother's approval of intoxication and binge drinking is complex. Table 4 shows that there is a significant association with boys' binge drinking ($p = .0002$); a similar

association was not seen among girls ($p = .38$). Boys have a higher risk of binge drinking (OR, 2.2; 95% CI, 1.1-4.3) if their mothers approve of them getting intoxicated by alcohol. This association is not seen among girls; if their mothers approve of them getting intoxicated by alcohol, they do not have a higher risk of binge drinking (OR, 1.0; 95% CI, 0.5-1.9).

TABLE 3. Association between amount of money spent without parent supervision and binge drinking at least once during the last month

| Amount of money spent weekly without parent supervision | OR [95%CI]* | OR [95%CI]** | OR [95%CI]*** |
|---|--------------|--------------|---------------|
| 0-49 DKK | 1.0 | 1.0 | 1.0 |
| 50-99 DKK | 1.7[1.3-2.2] | 1.8[1.4-2.4] | 1.9[1.4-2.5] |
| 100-249 DKK | 2.7[2.2-3.5] | 2.9[2.3-3.7] | 2.6[2.0-3.4] |
| ≥250 DKK | 5.4[4.1-7.2] | 5.9[4.4-7.7] | 4.8[3.6-6.5] |
| Trend test | $p < 0.0001$ | $p < 0.0001$ | $p < 0.0001$ |
| F(v ₃) | $p < 0.0001$ | $p < 0.0001$ | $p < 0.0001$ |

Note. OR = odds ratio; CI = confidence interval; F(v₃) = 3 degree of freedom
 *Unadjusted; **Adjusted for age and gender; ***Adjusted for age, gender, parents' attitude towards drunkenness, living with father, proportion of drinking peers

TABLE 4. Association between mother's reaction on adolescent drunkenness and binge drinking among girls and boys at least once during the last month

| Mother's reaction on drunkenness | OR [95%CI]* | OR [95%CI]** | OR [95%CI]*** |
|----------------------------------|--------------|--------------|---------------|
| Girls | | | |
| Would not allow | 1.0 | 1.0 | 1.0 |
| Would discourage | 0.8[0.5-1.4] | 0.8[0.5-1.4] | 0.7[0.4-1.4] |
| Would not mind | 2.0[1.1-3.9] | 2.0[1.1-3.8] | 1.1[0.5-2.5] |
| Would approve | 1.8[1.1-2.8] | 1.8[1.1-2.8] | 1.0[0.5-1.9] |
| Do not know | 0.7[0.3-1.5] | 0.7[0.3-1.5] | 0.8[0.3-2.2] |
| Trend test | $p < 0.0001$ | $p < 0.0001$ | $p = 0.14$ |
| F(v ₄) | $p < 0.0001$ | $p < 0.0001$ | $p = 0.38$ |
| Boys | | | |
| Would not allow | 1.0 | 1.0 | 1.0 |
| Would discourage | 1.4[0.8-2.3] | 1.4[0.8-2.3] | 1.2[0.6-2.3] |
| Would not mind | 2.2[1.2-3.9] | 2.2[1.3-3.9] | 1.1[0.5-2.3] |
| Would approve | 3.7[2.2-6.1] | 3.7[2.2-6.1] | 2.2[1.1-4.3] |
| Do not know | 0.7[0.3-1.4] | 0.6[0.3-1.3] | 0.4[0.2-1.2] |
| Trend test | $p < 0.0001$ | $p < 0.0001$ | $p = 0.0006$ |
| F(v ₄) | $p < 0.0001$ | $p < 0.0001$ | $p < 0.0002$ |

Note. OR = odds ratio; CI = confidence interval; F(v₄) = 4 degree of freedom test
 *Unadjusted; **Adjusted for age and gender; ***Adjusted for age, parents' education, proportion of drinking peers, father's attitude towards drunkenness, amount of money spent, living with father, stepfather or mother

The association between the father's approval of intoxication and binge drinking only demonstrated a significant association for the raw association ($p < .0001$) and for the association adjusted for age and gender ($p < .0001$). When the association was fully adjusted, there was no significant association found between the father's approval of intoxication and binge drinking ($p = .84$). These findings are shown in Table 5.

TABLE 5. Association between father's reaction on adolescent drunkenness and binge drinking at least once during the last month

| Father's reaction on drunkenness | OR [95%CI]* | OR [95%CI]** | OR [95%CI]*** |
|----------------------------------|-----------------|-----------------|-----------------|
| Would not allow | 1.0 | 1.0 | 1.0 |
| Would discourage | 1.04[0.75-1.45] | 1.03[0.74-1.43] | 1.08[0.66-1.77] |
| Would not mind | 1.71[1.19-2.46] | 1.62[1.12-2.34] | 1.21[0.71-2.06] |
| Would approve | 2.31[1.69-3.15] | 2.23[1.63-3.06] | 1.27[0.76-2.11] |
| Do not know | 1.09[0.70-1.68] | 1.05[0.68-1.64] | 1.15[0.57-2.32] |
| Trend test | $p < 0.0001$ | $p < 0.0001$ | $p = 0.35$ |
| F(v ₄) | $p < 0.0001$ | $p < 0.0001$ | $p = 0.84$ |

Note. OR = odds ratio; CI = confidence interval; F(v₄) = 4 degree of freedom test
 *Unadjusted; **Adjusted for age and gender; ***Adjusted for age, gender, parents' education, proportion of drinking peers, mother's attitude towards drunkenness, amount of money spent, living with father or stepfather

Discussion

The study found that the proportion of drinking peers appeared to be a strong determinant of adolescent binge drinking and that the risk of binge drinking increased with an increasing proportion of drinking peers. These findings are as expected, because adolescent alcohol drinking is a social phenomenon. As described previously, several other studies from different countries have reported similar findings. A Dutch study found that adolescents who have friends that drink alcohol have a higher risk of drinking alcohol themselves: there was nearly a five-fold higher risk for 12- to 15-year-old boys and a seven-fold higher risk for 12- to 15-year-old girls. The previous studies also found that the risk is lower for older students between the ages of 21 and 25 years; in this group, the risk is nearly two-fold for both men and women between the ages of 21 and 25 years (17). Thus, it seems that the effect of peer alcohol drinking decreases with age. In this study, we found no interaction with age for the association between peer alcohol drinking and the risk of binge drinking. However, the age spread was not as wide as it had been in the other studies.

An Icelandic study of the social determinants of adolescent drunkenness found a significant association between peer drunkenness and adolescent drunkenness ($p < .0001$) (11). Peer alcohol drinking seems to be an important determinant of adolescent alcohol drinking across several countries. Countries like Iceland and Denmark differ significantly with regard to the prevalence of adolescent alcohol drinking: in Denmark, 76% of adolescents reported drinking alcohol within a certain 30-day period, whereas during that same period only 17% of Icelandic adolescents reported drinking alcohol (2). Although these two countries differ significantly with regard to the prevalence of adolescent alcohol drinking, there seems to be a similar dose-response relationship between the amount of drinking peers

and the risk of alcohol drinking. On the basis of the survey results and in conjunction with the results of other surveys from Iceland (11), the Netherlands (17), Sweden (18), and Portugal (16), it could be assumed that the determinant of drinking peers can be generalized to many other countries, despite the differences in their cultures with regard to alcohol use.

The study also found that a large amount of pocket money is a determinant of adolescent binge drinking and that the risk of binge drinking increases with the amount of pocket money spent. We have not been able to find many studies investigating the association between pocket money and adolescent binge drinking; however, a few studies from the 1990s found a positive association between pocket money and high levels of weekly alcohol drinking (12, 20). It is quite surprising that there are so few studies, because there has been much attention given to the association between pocket money and other types of substance use like smoking. A study of Chinese adolescents showed that adolescents who receive more than 1000 RMB (120 Euro) each month have a six-fold higher risk of smoking as compared with those who receive less than 200 RMB (24 Euro) each month (14). A study from India showed that adolescents who receive pocket money have a two-fold risk of smoking (13). These findings are backed up by several other studies from Nepal (21), New Zealand (22), and the United States (23). The findings from the current study show that there is a strong association between pocket money and adolescent binge drinking in Denmark. This association needs to be studied more to fully understand it and to clarify whether the association exists in other countries.

Several economic studies have shown that there is an association between the price of alcohol and the consumption of alcohol (24, 25). This study complements this knowledge by discovering an association between the amount of pocket money spent and alcohol consumption. This knowledge can be used when designing preventive alcohol policy, because adolescent binge drinking can be prevented from two economic angles: by increasing the price of alcohol and by advising parents and adolescents to keep the amount of self-administered pocket money at a low level.

This study found that mothers' approval of intoxication appears to be a determinant of binge drinking among boys but not among girls. Other studies have investigated the association between parental control or approval of intoxication and alcohol drinking, and they have reported similar findings. However, none of these studies have found an interaction with gender for this

association. An Icelandic study demonstrated that adolescents have a nearly two-fold higher risk of intoxication if their parents do not mind alcohol drinking as compared with adolescents whose parents are against alcohol drinking (11). A French study found that adolescents with a low grade of parental control have a two-fold higher risk of alcohol drinking as compared with adolescents with a high grade of parental control (26). Parental control and approval of alcohol intoxication are associated with adolescent alcohol drinking. However, this study found that mothers' approval of alcohol intoxication was only a determinant of binge drinking among the boys and not among the girls, so a potential interaction with gender should be considered in similar studies.

Finally, the present study found that there is no significant association between the father's approval of intoxication and binge drinking when the association was adjusted for potential confounders. We have found no other studies that support this finding. There does not appear to be a logical explanation as to why the father has a less significant role in adolescent binge drinking as compared with the mother. In Denmark, there is a high divorce rate of 40% (27), and children of divorced parents typically live with their mothers. However, the association has been adjusted for the variable of living with the father or a stepfather, so the living situation should not affect the association.

Strengths

The main strengths of this study are that the analysis has been made on a large dataset that contains data about 2765 adolescents. The dataset also allowed for adjustment for several potential confounders.

Limitations

There are some limitations to this study that should be noted. First, the study design is cross-sectional and does not provide causal evidence. Because data about exposure and outcome were collected at the same point in time, the outcome can affect the information provided by the adolescents about exposure variables. Therefore, it is possible that adolescents with high levels of alcohol consumption state that their friends drink more alcohol than adolescents with low levels of alcohol consumption or that adolescents who have—or who believe that they have—peers who drink a lot report drinking more themselves than they actually do. If this is the case, then the association between peer alcohol drinking and binge drinking would be overestimated. Second, ESPAD invited randomly selected primary and private schools in Denmark to participate in the study, but schools for students

with special needs as well as adolescents who are not attending school are excluded from the study. Therefore, the results are only representative of normal adolescents who are attending primary or private schools in Denmark. Third, ESPAD invited 231 schools to participate in the study, but only 97 schools (42%) participated. The low participation rate is a general problem in Denmark, and it can be attributed to the high number of surveys carried out in Danish schools. It is estimated that the non-participating schools do not differ significantly from the participating schools with regard to drinking habits. Fourth, 10% of students were not in school the day that the survey was conducted. These students may have higher alcohol consumption levels than the students who attended school that day, but this selection does not necessarily affect the associations.

Clinical Significance

The proportion of drinking peers and the amount of pocket money spent appear to be important determinants of adolescent binge drinking. The mother's approval of intoxication appears to be a determinant for binge drinking among boys but not among girls. This new knowledge helps to add some nuance to the variety of determinants of binge drinking. The problem of binge drinking among adolescents may need to be approached from several different angles, and many different aspects of young people's lives may need to be addressed. The solution to this problem may need to include an economic strategy (pocket money), a social strategy (peers), and a parenting strategy (mother's disapproval of intoxication).

Declaration of conflicting interests

None declared.

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