Alcohol use and misuse: a profile of adolescents from 2018 Italian HBSC data

Lorena Charrier1, Natale Canale2, Paola Dalmasso1, Alessio Vieno2, Veronica Sciannameo2, Alberto Borraccino1, Patrizia Lemma1, Silvia Ciardullo4, Paola Berchialla5 and the 2018 HBSC-Italia Group*

1Dipartimento di Scienze della Sanità Pubblica e Pediatriche, Università degli Studi di Torino, Turin, Italy
2Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Università degli Studi di Padova, Padua, Italy
3Dipartimento di Scienze Cardio-Toraco-Vascolari e Sanità Pubblica, Università degli Studi di Padova, Padua, Italy
4Centro Nazionale per la Prevenzione delle Malattie e la Promozione della Salute, Istituto Superiore di Sanità, Rome, Italy
5Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino, Turin, Italy
*The members of the 2018 HBSC-Italia Group are listed before the References

INTRODUCTION

Despite a trend of declining in alcohol consumption simultaneously to its abstinence increase among adolescents highlighted by different authors [1-3] and confirmed by data from the two most recent waves of HBSC surveillance (2014 and 2018), alcohol remains the most commonly used substance by 15-year-olds: overall almost three in five have drunk alcohol in their lifetime, compared with one in four for smoking and around one in seven that use cannabis [4, 5]. For decades two main models of alcohol consumption among adolescents have been described in Europe: the “dry culture” model in Northern Europe, characterized by sporadic consumption, mainly concentrated in the weekend, outside of mealtimes with the primary aim to get drunk; the “wet culture”, specific to the Mediterranean countries, characterized by more regular alcohol consumption, with greater overall quantities, but associated with meals and rituals. In this framework, Italy had a long-standing “wet culture” that has always been associated with high levels of alcohol consumption, especially wine [6-8]. However, recent reports indicate also for Italy and other Mediterranean countries an increase of the phenomenon of drinking “out of meal” and the growing tendency to approximate a Northern European style in the use of alcohol, that is, binge drinking (having experienced binge drinking – five or more drinks on one occasion – in the last 12 months was the question asked in the national HBSC questionnaire) [9, 10].

Data from the last international HBSC survey show that the overall prevalence of lifetime drunkenness remained relatively stable since 2014, with Italian data in...
line with the HBSC averages (about 20% of 15-year-old adolescents had been drunk twice or more in their lifetime).

Alcohol abuse in adolescence may have a variety of adverse social, physical, psychological consequences for young people including missing school, school failure, having unprotected sex (with unintended pregnancy and sexually transmitted diseases as consequences), destructive behaviour, increase in injury likelihood, violence and even deaths [11-20].

The behavioural pattern of adolescents who consume alcohol can become even more complex. Findings from many studies confirm the co-occurrence of health risk behaviours, the idea that young adolescents exhibit multiple health risk behaviours that tend to cluster together [21-27] and also the evidence of strong similarities between countries in the clustering of adolescent risk behaviours [2].

On the other hand, proximal contexts such as family environment and school may shape the behavioural pattern of adolescents. Previous studies suggest that living in an intact family structure, having good relations with parents and parental control are protective factors for alcohol use and abuse as well as adolescents who spend a lot of time doing homework, enjoy school and perceive their school climate as positive, have lower prevalence rates of all alcohol outcomes [28, 29].

Although previous studies have found these relationships separately, less it is known about the psychosocial pattern of alcohol in adolescents. The aim of the present study was to draw a comprehensive picture of the behavioural and psychological patterns that characterize alcohol use and abuse among 15-year-old adolescents in Italy.

MATERIALS AND METHODS

Study population and design

A summary of the methodology, the main areas and questions included in the Italian HBSC questionnaire can be found in a previous paper [30] and in the Appendix 1 of the paper by Nardone et al., published in this issue of Annali dell’Istituto Superiore di Sanità.

Participants

Because most risk behaviours showed more robust estimates of prevalence among 15-year-old students and some behaviours (i.e. gambling, cannabis use, binge drinking and sexual intercourse) were only assessed in this age-class, we limited our analyses to 15-year-old adolescents included in the Italian HBSC survey conducted in 2018.

Statistical analyses

Details about the statistical analysis plan can be found in a previous paper [26].

A logistic regression model (LRM) was run on the dependent variable “frequent alcohol use” (response “weekly” or “every day” at the question “How often do you drink alcohol at present?”), and a spike-and-slab prior approach was used for selecting variables associated to alcohol use among gender, Family Affluence Scale (FAS), which measures the socioeconomic status of adolescents’ family (see Appendix 1 in the paper by Nardone et al., published in this same issue of Annali dell’Istituto Superiore di Sanità), parents’ country of birth, family structure, easy to talk to father and mother, drunkenness, binge drinking, friends that drink alcohol, friends drunk at least weekly, having smoked every day in the last 30 days, cannabis and gambling lifetime experience, ever had sexual intercourse, self-rated health, life satisfaction, health complaints (like headache, stomach aches, feeling low, irritable or had tempered, and having difficulty getting to sleep), liking school, been bullied, bullied others, fight, Body Mass Index (BMI, Cole’s classification), body image, consumption of fruit and vegetables, consumption of sweets, use of soft-drinks, breakfast during schooldays and meals with family.

Variables with a posterior probability of a non-zero coefficient greater than 5% were entered as manifest variables in a latent class regression (LCR) model to identify clusters of adolescents sharing similar drinking habits [31]. Since the LCR model requires the specification of the number of clusters (latent classes), a series of models were fitted for two to five clusters. The choice of the best model was based upon the lowest value of the Bayesian information criterion [32].

Statistical analyses were performed using R version 4.0.0 [33]. R package PoLCA [34] was used to carry out the LCR analysis and Boom Spike Slab for the spike-and-slab regression.

RESULTS

Analyses were performed on 18,918 questionnaires of 15-year-old students (9,506 females and 9,412 males). Table 1 reports the characteristics of the study sample stratified for self-reported alcohol consumption among 15-year-old students. These data show high rates of other risk behaviours like heavy smoking habits, cannabis and gambling lifetime experience, drunkenness and binge drinking, fights, having friends who drink alcohol and experience frequent alcohol abuse and having had sexual intercourse, among adolescents that reported to drink at least weekly or every day. In addition, these adolescents tend to show lower life satisfaction, a lower rate of their health and more health complaints than their peers who don’t drink or drink rarely; they also seem to eat fruit and vegetables less frequently, and to consume sweets and soft-drinks at least once a day. High prevalence of alcohol consumption turned out to be associated with a family structure different from living with both parents and with more difficult relationships with adolescents’ mother.

On the basis of the self-reported alcohol consumption (the possible responses to the question “How often do you drink alcohol at present?” ranged from never to every day – never; rarely; every month; every week; every day), the LCR model identified three latent classes for the second-grade HS students (Figure 1), which separate the sample (cluster 1 vs cluster 2, p <0.001; cluster 3 vs cluster 1, p <0.001).

The first cluster (red line) consisted mostly of adolescents who drink alcohol every day; the second cluster (green line) was composed of mostly “more moderate”
Table 1
Characteristics of the study sample stratified for alcohol consumption (responses from “Never” to “Everyday” to the question “How often do you drink alcohol at present?”)

<table>
<thead>
<tr>
<th>How often do you drink alcohol at present?</th>
<th>Never</th>
<th>Rarely</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Every day</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>3827</td>
<td>6376</td>
<td>3412</td>
<td>4093</td>
<td>718</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender = female (%)</td>
<td>2025</td>
<td>3494</td>
<td>1860</td>
<td>1710</td>
<td>193</td>
<td>26.9</td>
</tr>
<tr>
<td>Low FAS (%)</td>
<td>806</td>
<td>1208</td>
<td>528</td>
<td>666</td>
<td>137</td>
<td>19.9</td>
</tr>
<tr>
<td>Medium FAS (%)</td>
<td>2024</td>
<td>3436</td>
<td>1741</td>
<td>2031</td>
<td>372</td>
<td>54.1</td>
</tr>
<tr>
<td>High FAS (%)</td>
<td>903</td>
<td>1624</td>
<td>1075</td>
<td>1297</td>
<td>178</td>
<td>25.9</td>
</tr>
<tr>
<td>Parents born (%)</td>
<td>3000</td>
<td>5496</td>
<td>2960</td>
<td>3574</td>
<td>591</td>
<td>84.7</td>
</tr>
<tr>
<td>Living with both parents (%)</td>
<td>267</td>
<td>440</td>
<td>225</td>
<td>281</td>
<td>46</td>
<td>6.6</td>
</tr>
<tr>
<td>Eating with both parents (%)</td>
<td>473</td>
<td>361</td>
<td>172</td>
<td>186</td>
<td>61</td>
<td>8.7</td>
</tr>
<tr>
<td>Family structure = living with both (%)</td>
<td>3083</td>
<td>5168</td>
<td>2686</td>
<td>3202</td>
<td>529</td>
<td>77.2</td>
</tr>
<tr>
<td>Talk father = easy or very easy (%)</td>
<td>2117</td>
<td>3263</td>
<td>1599</td>
<td>2021</td>
<td>418</td>
<td>60.0</td>
</tr>
<tr>
<td>Talk mother = easy or very easy (%)</td>
<td>2882</td>
<td>4675</td>
<td>2342</td>
<td>2738</td>
<td>490</td>
<td>70.4</td>
</tr>
<tr>
<td>Drunkenness = lifetime, at least twice (%)</td>
<td>24</td>
<td>467</td>
<td>872</td>
<td>1784</td>
<td>366</td>
<td>52.1</td>
</tr>
<tr>
<td>Binge drinking = yes in the past 12 months (%)</td>
<td>166</td>
<td>1752</td>
<td>2092</td>
<td>3162</td>
<td>563</td>
<td>78.9</td>
</tr>
<tr>
<td>Friends that drink alcohol = lots-all (%)</td>
<td>1812</td>
<td>4047</td>
<td>2814</td>
<td>3587</td>
<td>558</td>
<td>77.7</td>
</tr>
<tr>
<td>Friends drunk at least weekly = lots-all (%)</td>
<td>548</td>
<td>1038</td>
<td>657</td>
<td>1303</td>
<td>314</td>
<td>43.7</td>
</tr>
<tr>
<td>Smoking = every day in the last 30 days (%)</td>
<td>46</td>
<td>252</td>
<td>246</td>
<td>692</td>
<td>123</td>
<td>32.5</td>
</tr>
<tr>
<td>Cannabis = lifetime, yes (%)</td>
<td>181</td>
<td>846</td>
<td>970</td>
<td>1696</td>
<td>327</td>
<td>50.3</td>
</tr>
<tr>
<td>Gambling = lifetime, yes (%)</td>
<td>888</td>
<td>2134</td>
<td>1437</td>
<td>2046</td>
<td>394</td>
<td>60.9</td>
</tr>
<tr>
<td>Ever had sexual intercourse = yes (%)</td>
<td>300</td>
<td>936</td>
<td>750</td>
<td>1361</td>
<td>331</td>
<td>52.5</td>
</tr>
<tr>
<td>Self-rated health = good/excellent (%)</td>
<td>3348</td>
<td>5600</td>
<td>2892</td>
<td>3467</td>
<td>562</td>
<td>78.9</td>
</tr>
<tr>
<td>Life satisfaction ≥6 (%)</td>
<td>3267</td>
<td>5503</td>
<td>2836</td>
<td>3410</td>
<td>559</td>
<td>79.1</td>
</tr>
<tr>
<td>Health complaints = at least 2 more than once a week (%)</td>
<td>2734</td>
<td>4927</td>
<td>2750</td>
<td>3387</td>
<td>590</td>
<td>83.6</td>
</tr>
<tr>
<td>Body Mass Index (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Underweight (%)</td>
<td>101</td>
<td>116</td>
<td>68</td>
<td>45</td>
<td>13</td>
<td>2.1</td>
</tr>
<tr>
<td>Proper weight (%)</td>
<td>2719</td>
<td>4724</td>
<td>2571</td>
<td>3011</td>
<td>466</td>
<td>74.4</td>
</tr>
<tr>
<td>Overweight (%)</td>
<td>494</td>
<td>845</td>
<td>430</td>
<td>614</td>
<td>116</td>
<td>18.5</td>
</tr>
<tr>
<td>Obese (%)</td>
<td>87</td>
<td>167</td>
<td>76</td>
<td>123</td>
<td>31</td>
<td>5.0</td>
</tr>
<tr>
<td>Body image = perceiving to be too fat (%)</td>
<td>1005</td>
<td>1893</td>
<td>1104</td>
<td>1329</td>
<td>200</td>
<td>28.6</td>
</tr>
<tr>
<td>Liking school = a bit or a lot (%)</td>
<td>2633</td>
<td>4181</td>
<td>2013</td>
<td>2068</td>
<td>281</td>
<td>39.7</td>
</tr>
<tr>
<td>Been bullied = never (%)</td>
<td>3414</td>
<td>5769</td>
<td>3107</td>
<td>3698</td>
<td>616</td>
<td>87.4</td>
</tr>
<tr>
<td>Bullied others = never (%)</td>
<td>3481</td>
<td>5695</td>
<td>2985</td>
<td>3392</td>
<td>517</td>
<td>73.0</td>
</tr>
<tr>
<td>Fight = never in the last 12 months (%)</td>
<td>3112</td>
<td>4737</td>
<td>2283</td>
<td>2267</td>
<td>296</td>
<td>41.9</td>
</tr>
<tr>
<td>Fruit = at least once a day everyday (%)</td>
<td>1396</td>
<td>2225</td>
<td>1185</td>
<td>1302</td>
<td>244</td>
<td>34.2</td>
</tr>
<tr>
<td>Vegetables = at least once a day everyday (%)</td>
<td>1202</td>
<td>1949</td>
<td>1107</td>
<td>1134</td>
<td>200</td>
<td>28.1</td>
</tr>
<tr>
<td>Sweets = less than once a day (%)</td>
<td>2853</td>
<td>4774</td>
<td>2560</td>
<td>2909</td>
<td>432</td>
<td>60.2</td>
</tr>
<tr>
<td>Soft-drinks = less than once a day (%)</td>
<td>3480</td>
<td>5753</td>
<td>3103</td>
<td>3533</td>
<td>488</td>
<td>68.0</td>
</tr>
<tr>
<td>Breakfast during schooldays = 5 days (%)</td>
<td>2224</td>
<td>3494</td>
<td>1742</td>
<td>1996</td>
<td>330</td>
<td>46.9</td>
</tr>
<tr>
<td>Meals with family = every day (%)</td>
<td>2196</td>
<td>3525</td>
<td>1667</td>
<td>1988</td>
<td>385</td>
<td>53.6</td>
</tr>
</tbody>
</table>
Adolescents who report heavy alcohol consumption (alcohol abuse profile) show higher prevalence of lifetime drunkenness (76%) compared to peer that drink less frequently (8%); they tend to have friends that drink alcohol as well, and experience weekly drunkenness (41% vs 12% among adolescents that do not drink).

Among moderate drinker adolescents (moderate profile), 83% reported to have friends who drink and 51% reported to have experienced binge drinking in the past 12 months. Similarly to adolescents who abuse alcohol, 47% of them experienced gambling (against 52% among teens who abuse alcohol). However, differently from adolescents who abuse alcohol, only 19% experienced cannabis use (against 68%) and a higher percentage reported to like school (61% against 45%).

Finally, among teens who do not drink or drink rarely alcohol (no Alcohol profile), only 52% reported to have friends who make use of alcohol, and 74% noticed to like school. None of them experienced drunkenness nor smoking every day in the last 30 days, and only 2% make binge drinking and cannabis use. Other risk behaviours are considerably lower: 14% reported fights and only 6% had sexual intercourse against 51% among heavy alcohol consumers for both items.

DISCUSSION

Adolescence is a transitional phase of life particularly susceptible to transgressions and risk-taking impulses, like smoking, cannabis use and harmful drinking [9, 35]. Moreover, the evidence about the co-occurrence of risk behaviours among adolescents may have important implications for the design of intervention programs and the most promising approaches for reducing risk behaviours are those that simultaneously address several domains of risk and protective factors [23, 24].

To depict these aspects of adolescent health, we searched for the behavioural patterns that characterize different levels of alcohol consumption and drew up a profile of Italian teens who use and abuse alcohol.

Confirming previous findings that adolescents exhibit multiple health risk behaviours that tend to cluster in behavioural patterns [21-27], we have identified a cluster of about 21% of 15-year-old adolescents who abuse alcohol and show higher rates of other risk behaviours such as cannabis use, gambling experience, fights with peers, heavy smoking habits in addition to a more negative school approach with respect to peers with a more moderate alcohol use or adolescents who do not drink or drink rarely.

Other aspects that the literature recognized as protective for alcohol use and abuse [28, 29], like living in
intact families and having good relations with parents, did not turn out to be distinctive features of the behavioural pattern of teens in Italy. Conversely, in line with literature results, the role of peers showed a significant association with alcohol abuse, confirming that in this phase of life the influence of friends increases and becomes greater than that of parents [28, 36].

**Alcohol use and abuse: Italian HBSC results 2018 vs International HBSC results 2018**

Data about alcohol consumption obtained from Italian HBSC 2018 study were compared to those from the International HBSC 2018, which involved 45 countries (including Italy).

Data from the last international survey [5] confirm alcohol as the most commonly used substance by 15-year-olds, despite the decline of lifetime use since 2014: almost 3 in 5 have drunk alcohol in their lifetime, with a higher prevalence among boys, especially among younger adolescents. 1 in 5 15-year-olds had been drunk twice or more in their lifetime and almost 1 in 7 (15%) had been drunk in the last 30 days; drunkenness remains higher among boys than girls in all age groups and in almost all HBSC countries [5], even though an increase in alcohol use among adolescent girls was noticed in some countries [1], confirming the gender convergence of the last decade highlighted in previous studies [9].

Italy ranked among the HBSC countries with the highest prevalence of regular alcohol consumption (7th and 15th place for boys and girls, respectively, who reported having ever drunk alcohol in their lifetime; 4th and 13th place for having drunk alcohol in the last 30 days). Conversely, our country was in the second half of the international ranking for drunkenness for both genders (27th place for 15-year-olds who declare having been drunk at least twice in their lifetime and 26th place for having been drunk in the last 30 days).

Further research is needed to better understand the long-term impact of interventions with proven positive short-term effects and to improve the evidence of effectiveness of interventions addressing multiple risk-taking behaviours. In a public health perspective, the evidence of strong similarities between countries in the clustering of adolescent risk behaviours suggests to European and North American countries to collaborate in developing and implementing programs aimed at preventing or reducing adolescent risk behaviours [2]. Furthermore, interventions and policies focused on adolescent health should consider the presence of vulnerability in some young people evaluating differences and possible inequalities among them.

**STRENGTHS AND LIMITATIONS**

The main strength of this study was the use of a large and representative Italian sample that allowed to draw a profile of teens who drink and abuse alcohol.

To do that, we used a Bayesian approach to select variables for clustering adolescents into risk profiles,
which has proven advantageous in the analysis of highly correlated information.

Unfortunately, as details are lacking about some risk behaviours among younger students, we had to limit our analyses to 15-year-olds.

The HBSC methodology strengths and limitations were described in Appendix 1 of the paper by Nardone et al., published in this issue of *Annali dell’Istituto Superiore di Sanità*.

**CONCLUSIONS**

Our findings highlighted that 1 in 5 Italian adolescents aged 15 years are heavy alcohol consumers and confirmed previous findings that risk-taking behaviours tend to cluster in behavioural patterns. In fact, the same adolescents that showed alcohol abuse, experienced other risk behaviours such as cannabis use, binge drinking, drunkenness, heavy smoking, gambling, sexual intercourse and fighting more frequently that their peers with a more moderate alcohol consumption.

This should be considered when designing and implementing programs to reduce risk behaviours among adolescents.

**Acknowledgments**

We thank all students who completed the questionnaires. Special thanks to the school head teachers, class teachers and other school staff who actively participated in the implementation of the HBSC survey. We thank all the Regional and Local Health Unit coordinators and the health workers for their fundamental contribution to the HBSC.

**Funding**

Italian HBSC survey is promoted and funded by the Ministry of Health – Centro per la Prevenzione e Controllo delle Malattie and by the Italian National Institute of Health.

**Ethical approval**

The Italian HBSC study protocol and questionnaire were formally approved by the Ethics Committee of the Italian National Institute of Health (PROT-PRE876/17, 20 November 2017).

**Authors’ contribution**

LC, PB and PD participated in designing the study. LC, PB, AV, NC, SC, PD, PL, AB and VS drafted the manuscript. PB conceived the analyses plan; PB and LC performed the statistical analysis. All authors participated in data collection as members of the Italian HBSC team.

**REFERENCES**


3. Vieno A, Altoè G, Kuntsche E, Elgar FJ. Do public ex-
27. Walsh SD, Sela T, De Loose M, et al. Clusters of contemporar-