

# Drunkorexia: an emerging trend in young adults

Matteo Lupi<sup>1</sup> · Giovanni Martinotti<sup>1,2</sup> · Massimo Di Giannantonio<sup>1</sup>

Received: 22 February 2017 / Accepted: 3 August 2017 / Published online: 24 August 2017  
© Springer International Publishing AG 2017

## Abstract

**Objective** Several studies demonstrated an association between alcohol consumption and unhealthy food habits. Particularly, in young adults it has been observed the tendency to use extreme forms of weight control as a way to compensate planned binge drinking.

**Method** A questionnaire was administered to a sample of 4275 healthy subjects (43.9% males; 56.1% females), aged between 18 and 26 (mean age 22.04). The survey investigated socio-economic characteristics, drinking habits with a specific focus on binge consumption, abnormal eating behaviours and psychoactive substance use.

**Results** 34.1% of the overall sample reported to limit their calorie intake before drinking, with no significant gender difference. A significant correlation was found between drunkorexic attitudes and, respectively, binge drinking behaviours ( $p < .01$ ), use of cocaine ( $p < .01$ ), and use of Novel Psychoactive Substances ( $p < .01$ ).

**Discussion** Our data identified drunkorexia as a common behaviour among Italian young adults. Raising awareness on drunkorexia may help health care providers to timely address and approach its possible short- and long-term consequences.

**Level of evidence** Level V (descriptive study).

**Keywords** Drunkorexia · Binge drinking · Alcohol · Young adults · Eating habits

## Objective

Several studies demonstrated an association between alcohol consumption and unhealthy eating habits [1–3]. Recent researches also described a relationship between restrictive diets and binge drinking [4–6]. Binge drinking is defined as the consumption of five or more drinks in men, or four or more drinks in women, in a single episode at least once during the past 2 weeks [7]; the National Institute on Alcohol Abuse and Alcoholism (NIAAA) identifies binge drinking as a pattern of drinking that brings blood alcohol concentration (BAC) to .08 g percent or above, after four or five drinks (for women or men, respectively) in a 2 h period [8].

Particularly, in young adults it has been observed the tendency to use extreme forms of weight control as a way to compensate planned binge drinking. This behaviour is sometimes referred to as “Drunkorexia”, a term that has been coined to characterise an eating disorder linked to alcohol abuse, i.e. “drunk” plus “anorexia” [9], and recently it has been labelled as the inappropriate compensatory behaviour to avoid weight gain from consuming alcohol (ICB-WGA) [10]. This definition refers to a new abnormal and dangerous eating habit, mostly prevalent among adolescent girls, although it has also been noted in young men. The choice of extreme fasting is made to binge drink without worrying about the calorie intake, and being able to enjoy extensively the intoxicating effects of alcohol [3, 11]. Therefore, repeated episodes of alcohol abuse in combination with food restriction can result in sudden blackouts, alcohol poisoning, increased chances of

✉ Matteo Lupi  
matteo826@yahoo.it

<sup>1</sup> Department of Neuroscience, Imaging and Clinical Sciences, “G. d’Annunzio” University, Via dei Vestini 33, 66100 Chieti, Italy

<sup>2</sup> Department of Pharmacy, Pharmacology, Clinical Science, University of Hertfordshire, Herts, UK

engaging in risky behaviours and injuries and, over time, liver cirrhosis and cognitive decline [8].

Given the increase of this phenomenon, it is important to better understand its specific prevalence, especially among young individuals. To achieve this goal, we conducted a survey-based study to capture specific eating and drinking habits that may provide information on the prevalence of drunkorexia among Italian young adults. Additional exploratory analyses were conducted regarding the possible relationship between drunkorexic attitudes and drugs of abuse.

## Methods

A questionnaire was administered to a sample of 4275 healthy subjects (43.9% males; 56.1% females), aged 18–26 (mean age 22.04; SD 2.52). The survey was a section of a larger study that investigated and correlated socio-economic characteristics (age, gender, residence, job status, level of education, living status), alcohol use with a specific focus on binge consumption, use of legal stimulants (tobacco, caffeine), use of “classic” (cannabis, cocaine, heroin, etc.) and novel psychoactive substances (NPS) [12]. The present study adds new knowledge about abnormal eating behaviours and drunkorexic attitudes of the sample previously examined, integrating data of clinical importance and relevant to public health.

Preliminary data on drunkorexic behaviour from a smaller sample of 1311 subjects (belonging to the same population of this work), had already been analysed [5]. Increasing the number of available data has conferred to this study a higher statistical power, able to discriminate between variables, with the aim to emphasize the data and show level of significance previously underpowered; the objective was to represent a picture of the population as faithful to reality as possible. Moreover, compared to the previous study, we performed a correlational analysis among drunkorexic attitudes and use of other substances, adding important clinical information to date not present in the scientific literature on the matter.

Abnormal eating behaviour and drunkorexic attitudes have been taken into account analysing the answer to the following question: “within the last 30 days, did you restrict your eating, until fasting, to be able to intake larger amounts of alcohol?”; “within the last 30 days, did you diet to lose weight?”; “within the last 30 days, did you vomit or take laxatives to lose weight?”; “within the last 30 days, did you take diet pills to lose weight?”; and “within the last 30 days, did you exercise to lose weight?”. A binge-drinking episode has been defined as consumption of four or five drinks (for women or men, respectively) in a single episode and in a 2 h period, according to the current guidelines [7, 8].

The data were collected between January 2014 and April 2015 by our team of psychologists and psychiatrists, with the support of a peer-working group. Data were collected anonymously and confidentiality maintained. Interviewers obtained informed consent from all respondents, in accordance with the Declaration of Helsinki. The study was approved by local ethics committees and Institutional Review Boards.

The snowball sampling randomising procedure was followed for the selection of the sample; specifically, stakeholders were approached and asked for contacts, and obtained contacts were asked to participate [13].

Baseline data were analysed using descriptive statistics, including means and standard deviations, frequencies and percentages. The Chi-squared test of independence of categorical variables, correlational analysis using phi coefficient ( $\phi$ ) were used for comparisons of quantitative data. SPSS version 22.0 was used for all analyses.

We considered as salient only absolute correlations equal to or greater than .25, which explain 6–9% or more of the variance; the value of probability was influenced by the number of subjects in the sample [14].

## Results

Socio-demographic data indicated that 60.8% of the subjects were students, 12.3% working students, 17.8% workers and 9.1% unemployed. In addition, 68.9% of the respondents lived with parents, 19.1% with friends, 8.0% alone and 3.9% with a partner.

80.9% of the total sample reported to drink alcohol regularly; among regular alcohol users, 79.5% showed binge drinking habits, while among non-regular alcohol users 13.3% of subjects presented occasional binge drinking behaviours. In the overall sample, the percentage of binge drinkers was 67.6%. Besides alcohol, the mostly used psychoactive substances were cannabinoids (84.7%), cocaine (6.5%) and 3,4-methylenedioxyamphetamine (MDMA) (2.1%); a total of 53.3% of the subjects were tobacco smokers, and 84.8% of the respondents consumed coffee [12].

34.1% of the overall sample (with no statistically significant difference between males and females) reported to limit their calorie intake before drinking. Moreover, our data highlighted that in the 30 days before the survey, 22.8% of subjects undertook a diet to lose weight, 2.1% vomited or took laxatives to lose weight, 1% used drugs and 35.6% exercised for the same reason; there were no statistically significant differences between those who consumed alcohol and those who did not, and between those with binge drinking habits and those without.

Finally, we performed correlational analysis among the following attitudes: limiting calorie intake before drinking

**Table 1** Correlational analysis

	1	2	3	4	5	6	7
1. Drunkorexic attitudes		0.257**	0.053**	0.176**	0.218**	0.470**	0.294**
2. Binge drinking			0.543**	0.289**	0.327**	0.124**	0.101**
3. Alcohol				0.231**	0.235**	0.085**	0.062**
4. Tobacco					0.361**	0.165**	0.128**
5. Cannabinoids						0.275**	0.204**
6. Cocaine							0.343**
7. NPS							

*N* = 4275

\*\* *p* < .01

(drunkorexic attitudes), binge drinking behaviours, habitual alcohol consumption, tobacco, cannabinoids, cocaine and NPS use. A significant correlation was found between “limiting calorie intake before drinking” and binge drinking behaviours, between “limiting calorie intake before drinking” and cocaine use, and between “limiting calorie intake before drinking” and NPS use. Data are summarised in Table 1.

## Discussion

Our results show a surprising 34.1% of subjects that use to reduce calorie intake before drinking. This result is consistent with what has been previously reported in North America [2, 4] confirming this global new trend of eating habits associated with the intake of large quantities of alcohol. On the other hand, while other reports indicated a major prevalence of drunkorexic attitudes among females [1, 4, 9, 11], in our sample we did not find gender-related differences.

The combination of excessive self-imposed starvation and binge drinking may lead to serious physical and psychological consequences. For example, drinking in a state of malnutrition may predispose individuals to a higher rate of blackouts, alcohol poisoning, violence, alcohol-related brain damage and other serious consequences. Alcohol consumption with an empty stomach allows ethanol to reach the blood more rapidly, and increases blood alcohol levels with a life-threatening speed [1]. In addition, alcohol abuse can have a detrimental impact on hydration and body’s retention of minerals and nutrients, further exacerbating the consequences of malnutrition and worsening the individual’s cognitive capacities [11]. These harmful consequences are usually more relevant in women, given their reduced capability to metabolize alcohol [15].

In recent years, a link between food reward system and addiction has been proposed [16]. An important report in the US examining the relationship between eating disorders

and substance abuse highlighted that up to 50% of the people diagnosed with eating disorders had a comorbid alcohol or drug misuse [17]. Other recent data reported that 27% of anorexic patients presented a substance use disorder, and that 30–50% of patients with bulimia nervosa showed a comorbid diagnosis of alcohol or drug use disorder [18]; on the other hand, in a sample of drug addicts, more than 35% of the subjects showed a comorbid eating disorder, compared to 1.6% of general population [19].

Indeed, several studies have shown that both rewarding psychoactive substances and food intake can activate the mesolimbic dopamine system, sharing some common biological pathways. The level of pleasure experienced subjectively is correlated with the amount of dopamine released in the striatum, especially in the nucleus accumbens (NAc); this circuit is implicated in the craving process, and can involve both eating disorders and use of drugs. This common pathway has been highlighted in both binge and restrictive phases [19].

Finally, our data provide preliminary indication that this phenomenon may be further associated with abuse of other drugs, such as cocaine and NPS. This is consistent with the known prevalence of substance use comorbidity in people with both alcohol use disorder and other psychiatric comorbidities [20–22].

While this study was merely conducted using a survey-based approach, it holds clinical and public health importance, providing further evidence for an emerging serious problem among young individuals. It can be arguable whether drunkorexia is really a new disorder or not, but there is no question that people suffering from anorexia or bulimia are prone to alcohol or substance abuse. In the perspective of treatment, a specific approach cannot be proposed; probably the possibility of addressing both the dimension in combination can be postulated [10]. Moreover, there may also be an underlying mental health disorder driving both eating and alcohol use disorder; an accurate diagnosis is vital to a correct identification of both the conditions.

Therefore, raising awareness on drunkorexia may help health care providers to early detect cases, trying to address the problem timely and appropriately. A comprehensive and structured multi-component prevention programme is needed. Moreover, education needs to be given repeatedly to be effective and with enduring effects [23].

Our study has several limitations: (1) the questionnaire used in the study does not represent a validated instrument, able to deeply analyse the level of knowledge and the specific experiences reported by the subjects recruited; (2) the snowball randomization procedure does not guarantee a strict distribution of the subjects; (3) BMI values of the sample are not provided.

However, in light of our data, future studies should assess the magnitude of this trans-diagnostic phenomenon and its possible short- and long-term consequences, to develop prevention programmes that target those mechanisms that underlie both the disorders.

#### Compliance with ethical standards

**Conflict of interest** This manuscript was entirely funded by the authors, and no pharmaceutical companies were informed of or were involved in the review. All authors contributed to this review with equal efforts. The authors have no potential conflict of interest directly relevant to the contents of the manuscript.

**Ethical standards** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

#### References

- Burke SC, Cremeens J, Vail-Smith K, Woolsey C (2010) “Drunkorexia: calorie restriction prior to alcohol consumption among college freshman. *J Alcohol Drug Educ* 54(2):17–35
- Eisenberg MH, Fitz CC (2014) “Drunkorexia”: exploring the who and why of a disturbing trend in college students’ eating and drinking behaviors. *J Am Coll Health* 62(8):570–577. doi:10.1080/07448481.2014.947991
- Roosen KM, Mills JS (2015) Exploring the motives and mental health correlates of intentional food restriction prior to alcohol use in university students. *J Health Psychol* 20(6):875–886. doi:10.1177/1359105315573436
- Barry AE, Piazza-Gardner AK (2012) Drunkorexia: understanding the co-occurrence of alcohol consumption and eating/exercise weight management behaviors. *J Am Coll Health* 60(3):236–243. doi:10.1080/07448481.2011.587487
- Lupi M, Acciavatti T, Santacroce R, Cinosi E, Martinotti G, Di Giannantonio M (2015) “Drunkorexia”: a pilot study in an Italian sample. *Res Adv Psychiatry* 2(1):28–32
- Knight A, Simpson S (2013) Drunkorexia: an empirical investigation of disordered eating in direct response to saving calories for alcohol use amongst Australian female university students. *J Eat Disord* 1(Suppl 1):P6. doi:10.1186/2050-2974-1-S1-P6
- Wechsler H, Nelson TF (2001) Binge drinking and the American college student: what’s five drinks? *Psychol Addict Behav* 15(4):287–291
- National Institute on Alcohol Abuse and Alcoholism (2004) NIAAA Council Approves Definition of Binge Drinking, NIAAA Newsletter, No. 3. National Institute on Alcohol Abuse and Alcoholism, Bethesda
- Chambers RA (2008) Drunkorexia. *J Dual Diagn* 4(4):414–416. doi:10.1080/15504260802086677
- Hunt TK, Forbush KT (2016) Is “drunkorexia” an eating disorder, substance use disorder, or both? *Eat Behav* 22:40–45. doi:10.1016/j.eatbeh.2016.03.034
- Osborne VA, Sher KJ, Winograd RP (2011) Disordered eating patterns and alcohol misuse in college students: evidence for “drunkorexia”? *Compr Psychiatry* 52(6):12. doi:10.1016/j.comppsych.2011.04.038
- Martinotti G, Lupi M, Carlucci L, Santacroce R, Cinosi E, Acciavatti T, Sarchione F, Verrastro V, Diotaiuti P, Petruccioli I, Ferrari S, Nanni MG, Pinna F, Volpe U, Saggino A, Janiri L, Leggio L, Di Giannantonio M (2016) Alcohol drinking patterns in young people: a survey-based study. *J Health Psychol*. doi:10.1177/1359105316667795
- Goodman LA (1961) Snowball sampling. *Ann Math Stat* 32(1):148–170
- Kline P (2000) *The Handbook of Psychometric Testing*, 2nd edn. Routledge, London
- Ramchandani VA, Kwo PY, Li TK (2001) Effect of food and food composition on alcohol elimination rates in healthy men and women. *J Clin Pharmacol* 41(12):1345–1350
- Alonso-Alonso M, Woods SC, Pelchat M, Grigson PS, Stice E, Farooqi S, Khoo CS, Mattes RD, Beauchamp GK (2015) Food reward system: current perspectives and future research needs. *Nutr Rev* 73(5):296–307. doi:10.1093/nutrit/nuv002
- National Center on Addiction and Substance Abuse (CASA) at Columbia University (2001) *Food for thought: substance abuse and eating disorders*. New York
- Barbarich-Marsteller NC, Foltin RW, Walsh BT (2011) Does anorexia nervosa resemble an addiction? *Curr Drug Abuse Rev* 4(3):197–200
- Umberg EN, Shader RI, Hsu LK, Greenblatt DJ (2012) From disordered eating to addiction: the “food drug” in bulimia nervosa. *J Clin Psychopharmacol* 32(3):376–389. doi:10.1097/JCP.0b013e318252464f
- Martinotti G, Lupi M, Acciavatti T, Cinosi E, Santacroce R, Signorelli MS, Bandini L, Lisi G, Quattrone D, Ciambone P, Aguglia A, Pinna F, Calò S, Janiri L, di Giannantonio M (2014) Novel psychoactive substances in young adults with and without psychiatric comorbidities. *Biomed Res Int* 2014:815424. doi:10.1155/2014/815424
- Bersani FS, Corazza O, Albano G, Valeriani G, Santacroce R, Bolzan Mariotti Posocco F, Cinosi E, Simonato P, Martinotti G, Bersani G, Schifano F (2014) 25C-NBOMe: preliminary data on pharmacology, psychoactive effects, and toxicity of a new potent and dangerous hallucinogenic drug. *Biomed Res Int* 2014:73474. doi:10.1155/2014/734749
- Martinotti G, Lupi M, Carlucci L, Cinosi E, Santacroce R, Acciavatti T, Chillemi E, Bonifaci L, Janiri L, Di Giannantonio M (2015) Novel psychoactive substances: use and knowledge among adolescents and young adults in urban and rural areas. *Hum Psychopharmacol* 30(4):295–301. doi:10.1002/hup.2486
- Parrott AC, Drayton R, Henry L (2016) Alcohol: drink less and live more. *J Alcohol Drug Depend Subst Abuse* 2:004