



## ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND OVERWEIGHT IN ADOLESCENTS AND YOUNG PEOPLE: A SYSTEMATIC REVIEW

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### ABSTRACT

**Objective:** To investigate the association between alcohol consumption and overweight among adolescents and young people. **Data sources:** Two searches were carried out in the PubMed database with the following descriptors: Adolescent, alcohol and obesity in the first and Body mass index and adolescence alcohol in the second. The filters used were: year of publication (from 2013 to 2017), presence of abstract and language (English, Portuguese or Spanish). **Data synthesis:** We selected 12 articles, all of which were analyzed in girls and boys and a large part collected the data in schools. Methodological varieties were observed among the studies, with various cut-off points being used to classify overweight, as well as different investigations to classify alcohol consumption. Of the twelve studies selected, three of them found a positive association between alcohol consumption and overweight, all of which were longitudinal studies. **Conclusion:** It can be concluded that the results between the association between alcohol consumption and overweight are conflicting. There was a positive association between alcohol consumption and overweight only in longitudinal studies, with variations between the sexes.

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### INTRODUCTION

Obesity is a multifactorial pathology with a great impact on health, characterized by excess body fat accumulated in an individual (Ayatollahi, 2007 and Hedley, 2004). There is a strong association between excess body fat and increased morbidity and mortality and development of chronic diseases (Mariath, 2002). It is observed that both overweight and obesity have already been identified as a major public health problem worldwide (Goldhaber-Fiebert, 2013 and Eichen, 2012). During the last two decades, the high prevalence rates of overweight and obesity among adolescents have been alarming both developed and developing countries<sup>6</sup>, for example in Mexico 31.6% (Trujillo-Hernández, 2010), Thailand 31% (Banwell, 2009), Oman 28.2% (Al-Kilani, 2012) and Italy 25.2% (Currie, 2012). These high prevalences of overweight and obesity in the young population are of concern, since in addition to short-term harm, this condition can be extended and aggravated in adulthood (Callo, 2016) Another major worldwide public health problem surrounding young people today is the use of psychoactive substances.

Among them, alcohol stands out, which is considered the drug most consumed among adolescents (Arantes, 2012). Alcohol consumption has a high prevalence among adolescents, demonstrating that it is a present reality and deserves greater care, given that several risk behaviors in adolescence are perpetuated throughout life (Chen, 2012; de Drogas, 2012; Miech, 2016; Hu, 2012). It is known that alcohol has a high energy density, being an additional energy source to the diet and that it has priority in hepatic metabolism, thus favoring a greater stock of fat in an individual, since it alters the metabolic pathway (Silva, 2011). This relationship of significance of alcohol to weight gain can be influenced by some issues, such as the consumption pattern, ie the amount of alcohol consumed and the frequency of its use. Moreover, research indicates the need for a long-term analysis of the possible influence of alcohol consumption and excess weight (Valério, 2016). In view of the fact that overweight and obesity is a worrying reality and that alcohol consumption is initiated in the middle of the adolescent and young population (Peleg-Oren, 2009 and Lipari, 2016), the objective of this study is to verify through the literature the possible association between alcohol consumption and overweight among adolescents.

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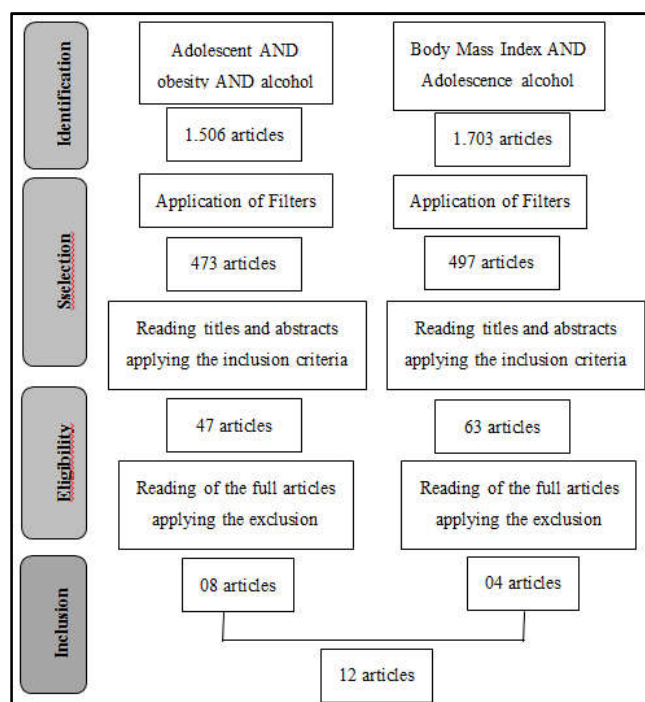


Figure 1. Diagram of the study selection flow according to Prism scale

Table 1. Characterization of the studies according to the author, year of publication, place, sample, place of data collection and age group

Number	Author / Year	Sample	Local	Local (sample)	Age
21	Blackstone and Herrmann, 2015	10.925	United States	school	12 – 16
22	Vetri et al, 2015	395	India	University	19 - 25
23	Silva et al, 2015	1.321	Brazil	school	10-16
24	Pengpid and Peltzer, 2014	800	India	University	17 – 20
25	Stewart et al, 2016	4.729	Nepal	health campaign	10 – 23
26	De Moraes&Falcão, 2013	991	Brazil	school	14 – 18
27	Castro, Nunes& Silva, 2016	930	Brazil	school	14 – 19
28	Gómez-Miranda et al, 2015	1.138	Mexico	University	< 21> 21
29	Deforche et al, 2015	291	Belgium	school / University	Median 17
30	Fazzino et al, 2017	7.941	United States	University	18-26/24-32
31	Huang, Lanza&Angelin, 2013	5.141	United States	school	12 – 18
32	Bodenlos, Gengarely and Smith, 2015	304	United States	school / University	Median 18

## MATERIALS AND METHODS

This study is a systematized review of the literature that was carried out through the following steps: 1.definition of the guiding question, 2.elaboration of the eligibility criteria of the articles, 3. choice of the descriptors, 4.selection of the database, 5. cross-checking of descriptors, 6. Use of filters, 7.Reads of abstracts applying the inclusion criterion, 8.Reading in full of the articles included applying the exclusion criteria and 9.Realization of this study with selected articles (Figure 1). The collection of the articles occurred in the period from April 2017 to February 2018, through the Pubmed database, through two search strategies. The filters used were: year of publication (from 2013 to 2017), presence of abstract and language (English, Portuguese or Spanish). The articles that included the guiding question of the study were: "Is there an association between alcohol consumption and overweight and obesity among adolescents and young people?", Young people aged 10 to 25 years and studies that do not repeats in the two searches. The quality of the studies was carefully evaluated, analyzing all possible sources of methodological and statistical errors that did not compromise the relevance of the study under analysis. Exclusion criteria were: exclusively qualitative approach, questionnaire validation, systematic reviews and those that did not include

the inclusion criteria. Thus, 12 articles were selected to compose this review.

## RESULTS

All studies addressed girls and boys in their analyzes. In relation to the place of data collection, the majority developed the study in schools (42.8%), followed by universities (28.5%). Regarding geographic location, a large concentration of studies was conducted in North America (6), followed by South America (3) (Table 1). Different classifications for cutoff point were observed regarding alcohol consumption and to evaluate overweight. For the classification of alcohol consumption studies have used: In the last 30 days (Blackstone, 2016; Silva, 2016; Castro, 2016; Huang, 2015), in the last 2 weeks (Pengpid, 2014), once in the week (Gómez-Miranda, 2015) and Consumption in Binge (De Moraes, 2013; Castro, 2016; Fazzino, 2017; Bodenlos, 2015). To classify overweight, a large proportion of the authors considered the classification of the body mass index (BMI) (Blackstone, 2016; Vetri Selvan, 2015; Pengpid, 2014; Stewart, 2013; Deforche, 2015; Fazzino, 2017 and Huang, 2013) and other studies evaluated abdominal obesity (Silva, 2016; Pengpid, 2014; De Moraes, 2013; Castro, 2016).

**Table 2. Cross-sectional studies addressing the association between alcohol consumption and overweight**

Number	Independent variable	Dependent variable	Results	
21	Alcohol use (Last 30 days)	BMI	p= 0,85	
22	Numberof drinks in theday Numberofdaysconsumption	BMI	p= 0,5	
23	Alcohol use (Last 30 days)	Central adiposity	Waist Circumference:	
			Men:	p = 0,50
		Women:	p = 0,26	
		Total adiposity	Body fat	
Men:	p=0,32			
Women:	p=0,30			
24	Alcohol use (last2weeks / Numberof drinks)	BMI WC	*	
25	Alcohol use	BMI	OR 1.07 (0.64 -1.81)	
26	Bingedrinking	WC	Men:	p= 0,18
			Women:	p= 0,08
27	Alcohol use (Last 30 days) BingeDrinking	WC	p= 0,37	
28	Alcohol use (once a week)	Overweight	p = 0,892	

\* :Study only reports no association

**Table 3. Longitudinal studies addressing the association between alcohol consumption and overweight**

Number	Independent variable	Dependent variable	Time	Results	
29	Alcohol use	BMI	1 year and 6 months	p= 0,005 (Men) ** (Women)	
30	BingeDrinking -Once a monthor more in thelast 12 months	BMI	14years	Overweight: RR 1,41 (1.13, 1.74)	
		Gainof>5Kg		Obesity: RR 1,36 (1.09, 1.71)	
				Weightgain:RR 1.20(1.03 -1.39)	
31	Alcohol use Last 30 days	BMI	22 anos	OR:0.8	
32	BingeDrinking	Weightgain	3 anos	First Semester	Men: p= 0.01
				Women:	p= 0.24
				Second Semester	Men: p=0.78
				Women:	p=0.25

The studies that adopted self-reported anthropometry obtained lower percentages for both overweight 15.3% (Blackstone, 2016) and abdominal obesity, 10.6% (Gómez-Miranda, 2015), when compared with those who measured the anthropometric data: 26.8% (Stewart, 2013), 20.5% (VetriSelvan, 2015). Among the 12 studies selected for this review, the majority (66.7%) had a cross-sectional design (Table 2) and 33.3% longitudinal (Table 3). No association of overweight / obesity with alcohol consumption was found in any cross-sectional study, both for studies that verified BMI and for those who analyzed the WC. However, regarding longitudinal studies, three of them pointed out a positive association between alcohol consumption and overweight. Among them, one found association between binge and BMI in both sexes (Fazzino, 2017), another identified the association between frequent alcohol consumption and BMI only in boys (Deforche, 2015), and finally, one study found an association between alcohol consumption in binge and gain weight in boys (Bodenlos, 2015).

## DISCUSSION

Different results between the association of alcohol consumption and overweight were found. This may be related to the fact that there is a methodological diversification between the surveys, both for overweight classification, using various cut-off points, as well as for alcohol consumption, and there is sometimes little detail of this risk behavior. This variation makes it difficult to compare the results. It was found that the only three studies that found a positive association between alcohol consumption and overweight had a longitudinal design, pointing out the fact that a greater follow-

up of these individuals may be necessary in order to study a possible long-term association (Deforche, 2015; Fazzino, 2017; Bodenlos, 2015). Regarding gender, it was observed that alcohol consumption is more prevalent in males. A longitudinal study (Bodenlos, 2015) that found an association between weight gain and alcohol consumption only in boys argues that one factor that may contribute to this finding is that there was a considerable loss of the total male sample. The authors of this study report that there was a greater permanence of the girls, and in addition, it was evidenced that these girls had greater health care, and could thus have influenced the final results. The schools and universities were the majority of the places where the surveys were carried out. This can be attributed due to the fact that these sites have a larger contingent of adolescents and young people. One of these studies (Fazzino, 2017) aimed to evaluate the exposure of alcohol to the outcome of obesity in the transition from school to university, finding an increase in this practice and a positive association with excess weight among boys. Another finding (Bodenlos, 2015) found a positive association in the first semester of the university, referring to the fact that the young people who are experiencing greater freedom and psychosocial changes increase the amount of alcohol consumption, and often do not manage this new phase well, adopt excessive consumption of alcohol. One point that some research brings as an alert is the fact that one must be careful because the larger the age group, the greater the independence, and the greater the risk (Gómez-Miranda, 2015; Deforche, 2015 and Fazzino, 2017). However, alcohol consumption in the lower age brackets should be also be regarded as a relevant concern, because the adolescent tends to conduct risk behaviors throughout adult life.

In addition to the high prevalence of alcohol consumption, a factor that some authors point out is about the consumption pattern. One of the hypotheses raised in a study that found no association between overweight and alcohol consumption (Huang, 2013) is that possibly a small amount of alcohol ingested might be less likely to influence energy balance and weight gain. Cross-sectional studies, however, that adopted binge drinking found no association with overweight / obesity (De Moraes, 2013 and Castro, 2016), differently from that in longitudinal studies (Fazzino, 2017 and Bodenlos, 2015). This suggests that further prospective studies may be necessary to allow for the analysis of some repercussions of excessive alcohol consumption and overweight in the long term. For the dependent variables, most of the studies were used to classify excess weight through BMI. Some authors have analyzed the association of alcohol consumption exclusively with abdominal obesity, using waist circumference as a measure, justifying that visceral fat is the one that provides a greater cardiovascular risk and that deserves greater attention. Because they are epidemiological studies, due to their greater applicability, BMI is more widely used as an indicator of nutritional status, even though it does not indicate body composition. However, the choice to use more than one anthropometric measurement creates an opportunity for a closer approximation of the nutritional reality of these adolescents. Even so, only two studies (Pengpid, 2014 and Stewart, 2013).verified both total overweight through BMI and central adiposity by WC to classify excess weight.

## Conclusion

It has been verified through this literature review that the results between the association of alcohol consumption and overweight are conflicting. Longitudinal investigations identified a positive association, not being the same in cross-sectional surveys, which did not find any association. These mixed results can be justified by the methodological variety of studies. A greater detail of alcohol consumption and further prospective studies is important to allow a better investigation of how this risk behavior can affect the association of obesity and overweight among adolescents and young people.

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