Non-Communicable Diseases Watch

February 2023

衞生防護中心 Centre for Health Protection

衞生署 Department of Health

Alcohol Consumption and Obesity Risk

Key Messages

※ Heavy alcohol drinking is positively associated with obesity risk. Alcohol is highly calorific that each gram of alcohol provides 7 kilo-calories. Apart from adding extra calories to daily diet, alcohol inhibits the breakdown and usage of fats as energy and favours fat accumulation particularly in the liver and abdominal area. So, the higher the level of alcohol consumption, the greater the risk of obesity.

※ The Population Health Survey 2020-22 showed that 8.7% (14.1% for males; 4.0% for females) of local persons aged 15 or above drank alcohol regularly (i.e. drank at least once a week) and 15.3% (18.3% for males; 12.6% for females) drank occasionally (i.e. drank in 3 days or less a month) in the 12 months preceding the survey.

※ Drinkers should note that alcohol consumption is a causal factor in more than 200 diseases, injuries and other health conditions. The co-occurrence of alcohol consumption and obesity would interact synergistically and place the person at excess risks for life-threatening non-communicable diseases (such as hypertension, chronic liver diseases and liver cancer).

※ To reduce alcohol-related harms and risk of obesity, members of the public are urged to lead a healthy lifestyle. Apart from refraining from alcohol consumption, they should undertake regular physical activity, eat a balanced diet, avoid smoking, maintain a healthy weight and waist circumference. For more information about alcohol-related harm or healthy living tips, please visit the Change for Health website at https://www.change4health.gov.hk/en/index.html.

This publication is produced by the Non-communicable Disease Branch, Centre for Health Protection of the Department of Health

Alcohol Consumption and Obesity Risk

Obesity is one of the top public health issues. The fundamental cause of obesity is an energy imbalance between calories consumed from food as well as drinks and calories expended in normal body functions along with daily activities[1]. According to the World Health Organization (WHO)'s definition, a body mass index (BMI) greater than or equal to (≥) 30.0 is considered obesity in adults[1]. For Asian men and women, however, the BMI cut points for defining obesity tend to be lower (such as a BMI ≥ 25.0 is considered obese)[2]. Globally, the World Obesity Federation estimated that about 764 million adults were obese (BMI ≥ 30) in 2020[3]. In fact, the global prevalence of obesity has nearly tripled since 1975[1]. One major contributor to rising adult obesity rate is excessive consumption of energy-dense foods and drinks including alcoholic beverages[1, 4, 5]. This article discusses the potential impact of alcohol (ethanol) on body weight gain and risk of obesity.

How Alcohol Drinking Could Contribute to Weight Gain

Alcohol is an organic chemical compound produced when yeast breaks down (ferments) the sugars in grains, fruits, vegetables or other plant foods. The nutritional properties, metabolic and mental effects of alcohol could lead to weight gain[4-8].

Firstly, alcohol is highly calorific. Each gram (g) of alcohol provides 7 kilocalories (kcal), slightly less than fats (9 kcal/g) but almost twice as many calories as carbohydrates or proteins (both contain 4 kcal/g)[4, 5]. While the calorie content of an alcoholic beverage is primarily based on the size of the drink as well as its alcoholic strength, other ingredients in the drink (such as sugar, maple syrup, fruit juice, soft drink or whipped cream) would add extra calories[4, 9]. As shown in Box 1, there are about 140 kcal in a can or small bottle (330 milliliter, ml) of beer with 5% alcohol by volume (ABV) and approximately 160 kcal in a glass of red wine (175 ml) with 13% ABV[9]. Such values are about the calorie content of 7 and 8 sugar cubes respectively. For a serving of 25 ml whisky with 40% ABV and a mixer, the calorie content can equate to 117 kcal[9] and this value is equivalent to the calorie content of nearly 6 sugar cubes. However, many people have poor knowledge of alcohol calories[9, 10]. Across European regions and in the United States, studies found that nearly three-quarters (74%) of alcohol drinkers were unaware of the calorie content of alcoholic beverages[10].

Apart from adding extra calories to daily diet, alcohol inhibits fat oxidetion (i.e. the breakdown and usage of fats as energy) and favours fat accumulation particularly in the liver and abdominal area[6, 11]. Influencing various hormones and neurotransmitters, alcohol may stimulate appetite and augments food intake[4-6]. Compared to solid food, alcoholic beverages have faster gastric transit times with less satiety (the feeling of being full) and therefore drinkers may eat more[4, 5]. Concomitant food intake while drinking (such as pair beer with snack foods such as peanuts and potato chips) will further increase calorie intake[6, 7]. Among people who drank in the United Kingdom and Canada, studies showed that alcoholic beverages accounted for about 10–11% of the total daily energy intake[12, 13]. The corresponding proportions reached 17% among alcohol drinkers in the United States and Latina American countries[14, 15].

While not getting enough sleep is a risk factor of obesity[16], alcohol affects sleep patterns and reduces sleep quality[17]. A study compared sleep quality among people aged 18–65 years who consumed different amounts of alcohol and found that even a single drink had a demonstrably negative impact on the restorative quality of sleep[18] .

Box 1: Calorie content in beer, wine and spirit

A can or small bottle of beer (330ml) of 5% ABV contains about 140 kcal	A glass of red wine (175 ml) of 13% ABV contains about 160 kcal	A serving of whisky (25 ml) of 40% ABV contains about 60 kcal, rises to 117 kcal with a mixer
		
100 ml of beer of 5% ABV contains about 40 kcal	100 ml of red wine of 13% ABV contains about 90 kcal	100 ml of whisky of 40% ABV contains about 240 kcal

(Source: WHO 2017)

Association of Alcohol Consumption and Obesity Risk

Studies show that alcohol drinking is positively associated with obesity risk[5, 6], even light alcohol consumption[19]. A nationwide study involving nearly 27 million people aged 20 years and older from South Korea found that the higher the level of alcohol consumption, the greater the risk of obesity (with BMI greater than or equal to 25) and central obesity (with waist circumference ≥ 90 cm for men and ≥ 85 cm for women), after accounting for a number of potential influential factors including amount of weekly physical exercise and smoking habit. Compared with non-drinkers, men who consumed on average 7.1–14.0 g/day alcohol were 10% and 6% more likely to have obesity and central obesity respectively. The corresponding risks increased 34% and 37% among men who consumed on average 28.1 g/day or more. Similarly, women who consumed on average 7.1–14.0 g/day alcohol were 9% and 17% more likely to have obesity and central obesity respectively. The corresponding risks increased 22% and 46% among women who consumed on average 28.1 g/day or more[19].

Patterns of Alcohol Consumption among People in Hong Kong

The Department of Health (DH) conducted the Population Health Survey 2020-22 to collect up-to-date pertinent information on the patterns of health status and health-related behaviours and practices of the general population of Hong Kong. Regarding alcohol consumption, results showed that 8.7% (14.1% for males; 4.0% for females) of persons aged 15 or above drank alcohol regularly (i.e. drank at least once a week) and 15.3% (18.3% for males; 12.6% for females) drank occasionally (i.e. drank in 3 days or less a month) in the 12 months preceding the survey. More importantly, 2.0% (3.3% for males; 0.8% for females) of persons aged 15 or above reported binge drinking (i.e. consuming 5 or more portions of alcoholic beverages on one occasion) at least once per month during the 12 months preceding the survey. As shown in Table 1, the proportion of regular drinkers was highest among persons aged 45–54 (11.1%), the proportion of occasional drinkers was highest at among persons aged 25–34 (20.7%). Among persons who had drink alcoholic beverages in the 12 months preceding the survey, most persons drank beer (69.3%), followed by table wines (47.1%) and spirits (11.4%). The average amount of alcohol (number of units of alcohol) usually consumed by the drinkers in a typical day was 3.4, 2.9, and 3.9 alcohol units (each unit is equivalent to 10 grams of alcohol) for beer, table wine and spirits respectively[20].

Table 1: Pattern of alcohol drinking among persons aged 15 or above in the 12 months preceding the survey by gender

	Male	Female	Total
Never/Not in the past year	67.6%	83.5%	76.0%
Drink alcohol occasionally	18.3%	12.6%	15.3%
Drink less than once a month	*10.1%*	*8.6%*	*9.3%*
Drink 1 day a month	*4.2%*	*2.1%*	*3.1%*
Drink 2–3 days a month	*4.0%*	*1.9%*	*2.9%*
Drink alcohol regularly	14.1%	4.0%	8.7%
Drink 1 day a week	*5.1%*	*1.8%*	*3.3%*
Drink 2–3 days a week	*4.1%*	*1.3%*	*2.6%*
Drink 4–6 days a week	*1.0%*	*0.3%*	*0.6%*
Drink everyday	*3.8%*	*0.6%*	*2.1%*

Note: Figures may not add up to the total due to rounding.
Source: Population Health Survey 2020-22.

Reduce Alcohol-related Harms and Risk of Obesity

Alcohol consumption is a causal factor in more than 200 diseases, injuries and other health conditions[21], whereas obesity is a major risk factor for cardiovascular diseases, type 2 diabetes and some cancers[1]. More importantly, the co-occurrence of alcohol consumption and obesity would interact synergistically[22] and place the person at excess risks for life-threatening non-communicable diseases such as hypertension[23], chronic liver disease[24] and liver cancer[25]. To reduce alcohol-related harms and risk of obesity, members of the public are urged to lead a healthy lifestyle. Besides refraining from alcohol consumption, they should undertake regular physical activity, eat a balanced diet with sufficient intake of fruit and vegetables, and avoid smoking. For Chinese adults in Hong Kong, they should maintain an optimal body weight with a BMI between 18.5 and 22.9. Irrespective of BMI, men should keep their waist circumference less than 90 cm and women should keep theirs less than 80 cm. For more information about alcohol-related harm or healthy living tips, please visit the Change for Health website at https://www.change4health.gov.hk/en/index.html.

To raise public awareness on the potential health effect of alcohol drinking and facilitate members of the public to make an informed choice for better health, the Department of Health (DH) has produced an Announcement in the Public Interests (API) "Alcohol and Calories" (Box 2) which can be accessible at https://youtu.be/BhzQzzQ_K88. DH will continue working closely with other partners to increase public awareness about the importance of healthy living, enhance personal health literacy as well as build a health-enhancing environment.

Box 2: Announcement in the Public Interests "Alcohol and Calories"

References

1. Obesity and Overweight (9 June 2021). Geneva: World Health Organization. Accessed 29 December 2022: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
2. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet 2004;363(9403):157-163.
3. World Obesity Atlas 2022. London: World Obesity Federation, March 2022.
4. Fong M, Scott S, Albani V, et al. 'Joining the Dots': Individual, sociocultural and environmental links between alcohol consumption, dietary intake and body weight - A narrative review. Nutrients 2021; 13(9):2927.
5. Traversy G, Chaput JP. Alcohol consumption and obesity: An update. Current Obesity Reports 2015; 4(1):122-130.
6. Golzarand M, Salari-Moghaddam A, Mirmiran P. Association between alcohol intake and overweight and obesity: a systematic review and dose-response meta-analysis of 127 observational studies. Critical Reviews in Food Science and Nutrition 2021:1-21.
7. Kwok A, Dordevic AL, Paton G, et al. Effect of alcohol consumption on food energy intake: a systematic review and meta-analysis. British Journal of Nutrition 2019;121(5):481-495.
8. Yeomans MR. Alcohol, appetite and energy balance: is alcohol intake a risk factor for obesity? Physiology & Behavior 2010;100(1):82-89.
9. Alcohol Labelling. A Discussion Document on Policy Options. Denmark: World Health Organization Regional Office for Europe, 2017.
10. Robinson E, Humphreys G, Jones A. Alcohol, calories, and obesity: A rapid systematic review and meta-analysis of consumer knowledge, support, and behavioral effects of energy labeling on alcoholic drinks. Obesity Reviews 2021;22(6):e13198.
11. Jeon S, Carr R. Alcohol effects on hepatic lipid metabolism. Journal of Lipid Research 2020; 61(4):470-479.
12. Shelton NJ, Knott CS. Association between alcohol calorie intake and overweight and obesity in English adults. American Journal of Public Health 2014; 104(4):629-631.
13. Sherk A, Naimi TS, Stockwell T, et al. Calorie intake from alcohol in Canada: Why new labelling requirements are necessary. Canadian Journal of Dietetic Practice and Research 2019;80(3):111-115.
14. Brenes JC, Gómez G, Quesada D, et al. Alcohol contribution to total energy intake and its association with nutritional status and diet quality in eight Latina American countries. International Journal of Environmental Research and Public Health 2021; 18(24):13130.
15. Butler L, Poti JM, Popkin BM. Trends in energy intake from alcoholic beverages among US adults by sociodemographic characteristics, 1989-2012. Journal of the Academy of Nutrition and Dietetics 2016;116(7):1087-1100.
16. Bacaro V, Ballesio A, Cerolini S, et al. Sleep duration and obesity in adulthood: An updated systematic review and meta-analysis. Obesity Research & Clinical Practice 2020;14(4):301-309.
17. Colrain IM, Nicholas CL, Baker FC. Alcohol and the sleeping brain. Handbook of Clinical Neurology 2014;125:415-431.
18. Pietilä J, Helander E, Korhonen I, et al. Acute effect of alcohol intake on cardiovascular autonomic regulation during the first hours of sleep in a large real-world sample of Finnish employees: Observational study. JMIR Mental Health 2018;5(1):e23.
19. Park EJ, Shin HJ, Kim SS, et al. The effect of alcohol drinking on metabolic syndrome and obesity in Koreans: Big data analysis. International Journal of Environmental Research and Public Health 2022;19(9):4949.
20. Population Health Survey 2020-22. Hong Kong SAR: Department of Health.
21. Alcohol (9 May 2022). Geneva: World Health Organization. Accessed 29 December 2022: https://www.who.int/news-room/fact-sheets/detail/alcohol.
22. Åberg F, Färkkilä M. Drinking and obesity: Alcoholic liver disease/Nonalcoholic fatty liver disease interactions. Seminars in Liver Disease 2020;40 (2):154-162.
23. Sun J, Wang X, Terry PD, et al. Interaction effect between overweight/obesity and alcohol consumption on hypertension risk in China: a longitudinal study. BMJ Open 2022;12(7):e061261.
24. Glyn-Owen K, Böhning D, Parkes J, et al. The combined effect of alcohol and body mass index on risk of chronic liver disease: A systematic review and meta-analysis of cohort studies. Liver International 2021;41(6):1216-1226.
25. Loomba R, Yang HI, Su J, et al. Synergism between obesity and alcohol in increasing the risk of hepatocellular carcinoma: a prospective cohort study. American Journal of Epidemiology 2013;177(4): 333-342.

World Obesity Day is convened by the World Obesity Federation in collaboration with its global members with the view of calling for a cohesive, cross-sector response to the obesity crisis.

The theme for 2023 is **Changing Perspectives: Let's Talk About Obesity**. The goal is to correct misconceptions, end stigmas and get everybody making the decision to shift from single views to shared strategies.

Together we can change the narrative of obesity.
For more details about World Obesity Day campaigns, please visit the thematic website at https://www.worldobesityday.org/.

Non-Communicable Diseases (NCD) WATCH *is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.*