

Drinking patterns, drinking-at-risk and the influence of the COVID-19 pandemic in 8 European countries

running title ***Drinking, drinking-at-risk and COVID-19 in Europe***

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ABSTRACT (250 words)

RESEARCH AIMS: To describe alcohol consumption and preferences among both drinkers, and high-risk drinkers; to compare consumption before and after the onset of the COVID-19 pandemic across 8 European countries.

METHOD: Secondary analysis of a dataset from 24,946 respondents 18-90 years old from 8 European countries who reported having drunk any alcoholic beverages during the week prior to the online interview (October-November 2022).

RESULTS: Weekly alcohol consumption across countries was between 123.6 and 197.2 grams of pure alcohol per person, with a male/female ratio between 1.1:1 and 1.5:1. Traditional wine-drinking pattern was confirmed for France, Italy, and Greece, as well as for Great Britain. Prevalence of high-risk drinkers (daily consumption >30 grams for females, >40 grams for males) was highest in Great Britain; M/F ratio was between 1.1:1 and 1.3:1, except in Belgium, Great Britain and Greece, where females outnumbered males. Those older than 65 years and those who resided in the countryside were less likely to be high-risk drinkers. Most respondents reported drinking the same *amount* of wine and beer in 2022 as before the COVID-19 outbreak, with high-risk drinkers increasing their drinking *frequency* of all types of alcoholic beverages.

CONCLUSIONS: Our results confirm a downward trend in alcohol consumption in most European countries. The gender gap between male and female high-risk drinkers is narrowing or, in some cases, reversing. In 2022, compared with before the COVID-19 outbreak, the majority of respondents reported drinking the same amount of alcoholic beverages, whereas high-risk drinkers increased the frequency of their drinking.

Keywords: consumption of alcoholic beverages, preferences for types of beverages, high-risk drinkers, drinking before and after the COVID-19 outbreak, eight European countries.

Short Summary. *This additional summary (50 words)* The paper describes alcohol consumption and preferences among drinkers across 8 European countries in 2022. A downward trend in consumption and a narrowing or reversed M/F gender gap among high-risk drinkers was found. Compared with before COVID-19 outbreak, drinkers reported taking the same amount, whereas high-risk drinkers increased their frequency.

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4,526 words (without figures and tables)

1. INTRODUCTION

According to the World Health Organization (WHO), recorded and unrecorded per capita alcohol consumption (APC) of 15+ years in Europe was an average of 11.5 litres of pure alcohol (174 grams per week) in 2010, 11.3 (171 grams per week) in 2016, and 9.2 in 2019 (140 grams per week), with a male/female ratio relating to drinkers of 2.9:1 in 2019 (World Health Organization, 2019,2024).

Several studies have compared the *consumption of various types of alcoholic beverages* across European countries. Among them are the European Comparative Alcohol Studies (ECAS), 1998--2001 (Norström,2002), the Alcohol Measures for Public Health Research Alliance (AMPHORA), 2009--2012 (Anderson et al.,2012), and other publications (Room & Mäkelä,2000; Grigg,2004; Shield et al.,2012; Correia et al.,2024). The WHO also collects world data on the consumption of different alcoholic beverages and heavy episodic drinking (World Health Organization 2018,2019,2024).

Consumer preferences for different types of alcoholic beverages indicate varying drinking cultures. The traditional alcohol consumption pattern in Central Europe is associated with beer drinking, in the Mediterranean area with wine drinking, and in Eastern/Northern Europe with spirit drinking (Room & Mäkelä, 2000). Epidemiological alcohol research has focused mainly on the total amount of alcohol consumed, even if some publications report on drinkers' perceptions and preferences for different beverages (Stefanile,1982; Klein & Pittman,1990; Pedersen et al.,2010). On the other hand, industries that produce alcoholic beverages use surveys for market research to adjust their sales to consumer demands (Drive Research,2023; SurveyMonkey study,2024; Alcoholic Drinks Market Report,2025).

The preference for one type of beverage over another has been defined by the proportion of total alcohol consumption in the last 30 days, with estimates for each beverage summing to 100% (Wilms et al.,2023). Other researchers classify a person as preferring beer, wine, or spirits when the alcohol consumption of the respective drink constitutes 70% or more of total alcohol consumption (Sluik et al.,2016).

The reduction in alcohol use in most EU countries from 2010--2016 reflects the primarily decreasing use of spirits and, to a lesser extent, wine and beer (World Health Organization, 2019). Such changes could be attributed to changing health policies and increasing health awareness, but the relationship between consumption and sociocultural, economic and political determinants should also be considered (Anderson et al.,2012; Allamani et al.,2014).

Problem drinking has been referred to by numerous terms and definitions, such as *heavy, heavy episodic, harmful, and risky* drinking. The prevalence of heavy episodic drinking, for example, defined by the WHO as the consumption of 60+ grams of alcohol on at least one occasion during the past 30 days, in Europe was 30.4% in 2016 (14.4% among women; 47.4% among men), indicating a decrease from 34.1% in 2010 (World Health Organization, 2019). The relationship between preferences for types of alcoholic beverages and risky drinking is an important area of study. Some scholars claim that preferences for beer and spirits are associated with more risky drinking patterns

(Dey et al.,2014; Gavurová et al.,2020), whereas wine is considered to generate fewer problems (Sluik et al.,2016; Domínguez-López et al.,2025).

Exploring changes in total and risky *consumption* before and after *the onset of the COVID-19* pandemic, defined as March 2020 by the WHO, presents an opportunity to study whether and how the changing health and social conditions produced by the pandemic have influenced drinking behavior.

Current studies on alcohol consumption by the general population before and after COVID-19 outbreak present inconsistent results, which could be explained by the variations in the observation period, in data collection methods, and in the country examined. In general, studies report both that more people reduced rather than increased their alcohol use (e.g. Leifman et al., 2022; Kilian et al.,2022), and that no change was found (Public Health England, 2021; Houston et al.,2024), and that alcohol consumption increased (Merlo et al., 2025; Ayyala-Somayajula et al.,2025). According to a recent WHO publication from 2019 to 2020 COVID-19 induced an estimated 10% reduction of alcohol consumption with different, and sometimes opposite, impacts in different countries and population groups (World Health Organization, 2024 p.XII).

Other studies reported an increase in quantity/frequency of alcohol consumption among risky or hazardous drinkers (Public Health England, 2021; Matone et al.,2022; Pankowski et al., 2023).

Our study seeks to complement previous publications comparing drinking in different European cultures in Northern, Central, Southern, and Eastern Europe, with a specific focus on (a) the different types of beverages consumed by respondents, rather than just overall alcohol consumption, (b) the different types of consumption among high-risk drinkers, and (c) changes in different types of alcohol consumption brought about by the outbreak of COVID-19, as perceived by respondents, at the time of the interview (fall 2022).

2. MATERIALS AND METHODS

We analysed a dataset obtained by CGA ("Current Goodden Associates", Nielsen IQ), which is an "on-premise measurement, insight & research consultancy to food & drink businesses" (<https://cgastrategy.com/our-story/>).

Countries

The survey was conducted by the CGA in Belgium, France, Germany, Great Britain, Greece, Italy, Poland and Spain. The presence of eight different European countries allows us to consider different drinking cultures, which, subject to variations in recent decades, nevertheless tend to maintain their constancy (Correia et al., 2024). France, Italy, Spain and Greece are Mediterranean countries with traditions in the cultivation of vines and the consumption of wine; Germany and Belgium are typical beer-consuming countries; Poland has a tradition of spirit and beer consumption; and Great Britain is known for a weekend binge-drinking pattern, similar to the Northern European countries.

Sample

A total of 29,612 subjects between 18 and 89 years of age, seven older than 90 years of age, who reported having consumed alcoholic beverages in the week prior to the interview, were selected in each country, according to a quota sampling based on age, sex, and education. They were invited by email to an online interview, which was carried out from 21st October to 10th November 2022. The reported response rate was on average 84%. The respondents were incentivized with a cash

reward of €1.50–€5.00, depending on the country. The total dataset of 29,612 subjects was reduced to 24,946 who were confirmed to have drunk the previous week before the interview.

Measures

Because alcohol units are defined differently according to countries (e.g., in the UK, a standard drink contains 8 grams of alcohol; in France, 10; in Italy, 12), the following formula was used to convert quantities of consumed alcoholic beverages into grams of ethanol for making cross-country comparisons (Scafato et al., 2009):

$$\text{Alcohol by volume (\% vol)} \times \text{ethanol density (constant=0.79)} \times \text{quantity in ml} = \text{grams of alcohol}$$

The alcohol by volume (ABV) content for each type of beverage varied across countries from 2-6% for beer, 15-40% for spirits (with 5% for ready-to-drinks), 12-13% for wine (with 20% for fortified wines), and 4.5% for cider. The number of drinks reported by respondents was multiplied by the average container size commonly used in their country (see further information in Supplementary Tables 1-2).

Across countries, volume in grams of ethanol per day was classified as *low risk* (>0–20 g), *moderate risk* (>20–30 g for females, >20–40 g for males) and *high-risk* (>30 g for females, >40 g for males) (Scafato et al., 2009). The small number of respondents reporting 'transgender' or 'prefer not to say' was categorized as moderate risk if their daily consumption was >20 g and as high risk if it was >30 g.

Preferences were computed as percentages of how many grams of each type of beverage (beer, wine, spirits and cider) contributed to the total amount of pure alcohol consumed (Wilms et al., 2023).

To assess changes in the *consumption* of beer, wine, spirits, and cider with respect to the COVID-19 outbreak, we assigned -1 to less frequent consumption, 0 to the same amount of consumption, and 1 to more frequent consumption of each type of beverage. If the final sum was negative, the respondents were considered to have drunk less frequently; if the sum was positive, they were considered to have drunk more frequently; if the sum was 0, they were considered to have drunk the same amount.

Statistical Analysis

Since this is a secondary analysis of a dataset elicited by a market survey, its representativeness can be limited. We therefore matched the sample distributions with the *post-stratification* technique, which adjusts the sample weights after the data have been collected, using 2022 population statistics by age and gender (Greenacre, 2016). In the Greek sample, we did not achieve representativeness of the sample since the number of cases in the oldest female group was null (see Supplementary Table 3 reports the original sample details by gender, age, place of residence and highest educational level by countries.).

Differences in the mean grams of pure alcohol consumed between men and women were assessed using two-sample t-tests with unequal variances (*Welch's t-test*) within each country. For each country, we used summary statistics (mean, standard deviation, and sample size by sex) to compute the test statistic and the associated p-value.

Chi-square tests were conducted for gender differences in risk-drinking within each country.

Within each country, we fitted a multivariable modified *Poisson* regression model with robust standard errors to identify impacting factors potentially associated with high-risk drinking. Sex, age group, highest educational attainment, and place of residence at the time of the survey were included as predictors. For each category of these variables, we derived country-specific prevalence ratios (PRs) and their corresponding 95% confidence intervals, representing the ratio of

the prevalence of high-risk drinking in one group compared with another. We then conducted meta-analyses to obtain pooled PR estimates across countries, using fixed-effects models when heterogeneity was low and random-effects models when the estimated heterogeneity exceeded 60%. For each meta-analysis, a forest plot was created, where the country-specific estimates of the associations between factors and high-risk alcohol consumption were reported with their 95% confidence intervals, including the overall meta-analytic estimate.

3. RESULTS

Sociodemographic characteristics of the sample

Table 1 shows that for all countries, females outnumbered males, whereas “other” (transgender, prefer-not-to-say) were less than 1%; the most represented age class was 31-50 years, followed by those over 65 years. In Greece, the most represented age class is 51-65 years old. In most countries, the highest educational level reached was a university degree, whereas in both Italy and Germany, a high school diploma was the highest educational level achieved by the majority. The interviewees’ residences were primarily in cities or town centres.

table 1 here

Consumption and preferences of alcoholic beverages

Table 2 shows that weekly APC consumption in grams of pure alcohol was greater in Great Britain, Spain and Poland (ranging from 139.5 to 197.2 grams per week) and lower in France, Greece, Italy, Germany and Belgium (ranging from 123.6 to 130.2 grams per week). The gender ratio was between 1.1:1 and 1.5:1, with the minimum in Greece and the maximum in France. Supplementary Tables 5-6 show the median value of alcohol consumption in grams per week and the interquartile range (IQR).

table 2 here

Preferences in the consumption of different types of alcoholic beverages

Figure 1 shows that in Germany, the consumption of *beer* (39.2%) contributed more to the total alcohol volume than in any other country; it was followed by Poland, Spain and Belgium, whereas in Italy, the contribution of beer was the lowest (19.3%). *Wine* constituted the highest share of total alcohol consumption in Italy (62.0%), France (58.8%), Belgium (56.6%), Great Britain (55.1%) and Greece (50.3%), whereas it was lowest in Poland (26.8%). *Spirits* made up a considerable, although not the highest, share of the total alcohol volume consumed in Poland (34.0%), Greece (26.8%) and Spain (24.2%), while the smallest share was in Belgium (14.8%), France (15.5%), and Great Britain (15.1%). Cider accounted for only a small proportion of alcohol consumption in all countries. Supplementary Figures 1-8 report rates of beverage contribution by country and sociodemographic characteristics.

figure 1 here

Drinking frequency

Table 3 shows that respondents who consumed any type of alcoholic beverage were most likely to drink once or twice a week, particularly in Greece (45.3%), Great Britain (41.8%) and Germany (40.1%). Daily, almost daily and repeated consumption were common in Italy (27.1%), Spain (25.6%), Belgium (24.0%), and France (23.4%). The respondents who drank once every fortnight or less were a clear minority.

table 3 here

Places where alcohol is consumed

The *place* where people drank the most was in their own home (more than 78%). Public places were also common sites for drinking, especially in Belgium (81.5%), Greece (85.8%) and Spain (86.9%). Supplementary Tables 7-8 report the frequency with which alcohol was consumed and the places of consumption by sociodemographic characteristics.

Risky Drinkers

Table 4 shows the proportions of low-, moderate- and high-risk drinkers in each country. In Poland, Italy, Belgium, France and Greece, low-risk drinkers (n=17,162) accounted for more than 70% of alcohol consumers. The proportion of moderate-risk drinkers (n=3,567) was roughly the same as that of high-risk drinkers in several countries (between 12.2% in Belgium and 14.5% in Italy), except in Great Britain, where the proportion was half that of high-risk drinkers (16.9%).

High-risk drinking (n=4,217) contributed the least to the total amount of alcohol consumed in Germany, France, Greece and Belgium. Overall, their proportion of total alcohol consumption per country (between 12.9% in Germany and 16.6% in Spain) roughly corresponded to the proportion of moderate alcohol consumption, except in Great Britain, where high-risk consumption contributed 32.4% of total alcohol consumption. For high-risk drinkers, the gender ratio differed significantly ($p < 0.05$) across six of the eight countries (excluding Belgium and Greece), with ratio between 1.3:1 and 1.1:1 in France, Italy, Germany, Poland and Spain, which was reversed in Belgium (0.98:1) and Great Britain (0.90:1). Supplementary Table 9 contains sensitivity analyses with post-stratification weights of the proportions of low-, moderate- and high-risk consumption.

table 4 here

Preferences of high-risk drinkers

Wine contributed the most to the total amount of alcohol consumed in Italy (63.7%), France (62.4%), Belgium (60.3%) and Great Britain (57.6%), with the lowest share in Poland (30.9%). Beer was favoured in Germany (31.6%), Poland (29.9%), and Spain (26.9%) and least common in Italy (14.8%), whereas spirits were preferred in Poland (29.9%) and Spain (26.9%) (Figure 2).

figure 2 here

High-risk consumption and sociodemographic factors

Figure 3 displays the meta-analytic results from eight countries as forest plots—one for each of the nine impacting factors potentially associated with high-risk alcohol consumption.

People over 65 years of age had a lower risk of high-risk consumption than did people aged 31 to 50 years (overall PR 0.71; 95% CI 0.56-0.90); for the remaining age groups, there was no significant overall difference in the risk of high-risk consumption compared with the reference group. Compared with the 31–50 years reference group, however, a protective effect was found in two age groups in France (PR for 18–30-year-olds: 0.78 and PR for 51–65-year-olds: 0.70) and one age group in Poland (PR for 51–65-year-olds: 0.71).

Overall, residents of rural areas and medium-sized cities had a lower risk of high-risk use than did residents of city centres (PR: 0.76; 95% CI 0.69–0.84 for rural areas; PR: 0.84; 95% CI 0.77–0.91 for medium-sized cities). Compared with those living in city centres, people living in suburbs presented no difference in the risk of high-risk consumption, except in Belgium, Italy and Spain. In these countries, suburban residents had a lower risk (PR: 0.50, 0.53 and 0.70, respectively). Gender had no significant effect except in Spain, where male sex was a risk factor for high-risk alcohol consumption (PR: 1.26; 95% CI 1.07–1.47). Overall, there were no differences in the risk of high-risk consumption related to school achievement except in Poland, where people with a university degree presented a greater risk of high-risk consumption (PR: 1.29 95% CI. 1.05-1.57).

figure 3 here

Comparison of the consumption of alcoholic beverages before and after the onset of the COVID-19 pandemic

The majority of respondents to the October-November 2022 survey reported drinking the same amount of alcoholic beverages as before the pandemic (March 2020). The proportion varied from 50.5% in Great Britain to 64.6% in Greece for *beer*, from 51.3% in Great Britain to 65.2% in Germany for *wine* and similar figures for *cider*. Significantly lower proportions were reported for *spirits* (between 28.8% in Italy and 44.8% in Germany) (Table 5).

Among the total respondents in nearly all countries, a greater percentage of *high-risk* consumers reported drinking almost all types of alcoholic beverages more frequently at the time of the survey than before the COVID-19 pandemic, with percentages ranging from 27.3% for *cider* in Greece to 45.0% for *spirits* in Belgium. The exceptions were Great Britain (*beer* and *wine*) and Poland (*spirits* and *cider*).

table 5 here

4. DISCUSSION

Consumption of alcoholic beverages

Our analyses include data from 24,946 interviewees aged 18-and over who had drunk beer, wine, spirits or cider (except for Italy, where no information on this beverage was obtained) during the week prior to the interviews in eight European countries. Weekly alcohol consumption is higher in Great Britain, Spain and Poland (ranging between 197.2 and 139.5 APC grams of pure alcohol) and lower in France, Greece, Italy, Germany and Belgium (ranging between 130.5 and 123.6 grams of pure alcohol).

These data appear different when compared with the statistics provided by the World Health Organization as to alcohol per capita (15+ years), that are based on official data supplied by member states and by FAO and United Nations database and refer to 2019 as the last year (World Health Organization 2022, 2024). The average weekly consumption figures per capita provided by WHO for 2019, compared with those of 2015, were 165.0 grams for Belgium (-8.5%), 185.3 for France (-3.2%), and 123.6 for Germany (-2.0%). On the other side, during the same period Spain, Italy, Poland and UK showed an increase in alcohol consumption of between 2.2% and 11.5%.

In our study, data were collected from interviews referring to the week prior to the survey, which was conducted in October - November 2022 on 18+ years drinking subjects. Alcohol consumption in the eight countries is lower compared with the official WHO data for 2019, except for Italy (129.2 grams in our data vs. 121.5 in WHO data) and Great Britain (197.2 vs. 173.2 for the whole of the UK).

However, in other surveys carried out on the general population of our countries, consumption figures appeared not too far off from those provided by our survey. For example, in France in 2019, the average declared alcohol consumption per person was between 77 and 112 grams per week (129.8 in our survey) (Santé publique France, 2019); in Germany the estimate from the ESA (Epidemiology Survey for Substance Abuse) in 2021 was 141.4 grams (123.6 in our survey) (Rauschert et al., 2022).

Also, discrepancies between the data collected in alcohol surveys and the statistics on recorded total per capita consumption have been reported: the data collected in alcohol surveys are based on self-reporting, which is subject to bias (e.g. underreporting of alcohol consumption, overestimation of the number of drinks consumed, etc.) (see e.g. Kilian et al., 2020).

Finally, the impact of COVID pandemic was presumably an additional intervening factor in affecting alcohol consumption across the respondents. In our study, even if during the fall in 2022 the majority of drinkers did not declare an increase in the amount they drank, a significant minority of interviewees reported a reduction in the frequency of drinking.

Countless studies have shown that males are more likely than females to drink alcohol and drink more heavily (see e.g. Rehm et al., 2015; Mc Caul et al., 2019). The statistics as to alcohol per capita (15+ years), provided by the World Health Organization, that are based on official yearly data supplied by member states and by FAO and United Nations database report M/F ratios usually close to 3:1 – lower figures (2.9:1) are reported for current drinkers (World Health Organization, 2024).

Contrary to these studies, our results show only a slight excess of male consumption on female consumption among current drinkers (1.1:1- 1.5:1), which may cast doubt on the reliability of our dataset.

However, among the factors that may have contributed to the decrease in the M/F ratio is the fact that our survey examined participants' alcohol consumption only during the week prior to the interviews, which were conducted between October and November 2022 on current drinkers over the age of 18.

Also, there is a growing body of literature reporting an appreciable reduction in the M/F ratio of alcohol consumption during recent years. A convergence in drinking behaviours, with a M/W ratio of 1.57:1 was documented in the Norwegian HUNT study during 2006-2008 (Bratberg et al, 2016); a linear decrease over time of the sex ratio was found in 68 studies published between 1980 and 2014, with males 1.1 times more likely than females to consume alcohol among cohorts born in the late 1900s (Slade et al., 2016); in United States drinking M/F gaps among adolescents and emerging adults during the years 2002-2018 have narrowed or disappeared and even reversed for some measures, while among adults alcohol use is increasing for women but not for men (White 2020). A US nationally representative longitudinal survey used to assess alcohol consumption patterns

among respondents 21 years and older who reported drinking between February and November 2020 found M/F ratios between 1.4:1 and 1.8: the strategies put in place to reduce the public health impact of COVID-19 may have contributed to increased alcohol intake to cope with emotional stress among women (Barbosa et al. (2023).

Preferences in the consumption of different types of alcoholic beverages

Our results show that the preference for *wine* exceeds that for other beverages in seven of the eight countries (see Figure 1). In Poland, the preference proportions for *beer* and *spirits* were greater than those in other countries, which is in agreement with the current literature (Swiątkiewicz et al.,2014; World Health Organization,2018). The data underline the continued traditional preference for *wine* in Mediterranean countries such as France, Italy, and Greece (Allamani & Prina,2007; Cogordan et al.,2014; Šajn,2023).

For Great Britain, our results appear to confirm its entry among *wine*-preferring countries according to a trend that has been observed since the 1950s (Plant et al.,2014; World Health Organization,2018). Our data from Germany do not correspond to the current results of German drinking patterns, where *beer* consumption is still the prevailing beverage (see, e.g., World Health Organization, 2018). However, a preference for wine was confirmed in a recent trend analysis (Wilms et al.,2023), which might suggest that our survey may have intercepted a change in progress among the respondents. Similarly, our results do not confirm what has been reported in Spain, where a shift in prevalence from wine to *beer* has taken place since the beginning of this century (Matrai et al.,2014; Llamosas et al.,2022). The preference for wine (39%), however, is only slightly greater than that for beer (35.3%).

Place and frequency of drinking

Research suggests that drinking alcohol at home, where it may be accompanied by food and sociality, affords different affective experiences than do drinking alcohol at bars, pubs and restaurants (Mac Lean et al.,2024; Warde et al.,2023); however, on some occasions, solitary drinking at home may be associated with heavy drinking (Cook et al.,2023). In fact, for our respondents, the most common *place* to drink was in their home, probably with family members during meals, followed by public places and others' homes, presumably with relatives and friends. Drinking "on the go" is less common. The area where people drank was undoubtedly affected by restrictions on going to public places during the pandemic.

With respect to the *frequency* of consuming any type of alcoholic beverage, all the respondents reported that they most commonly drank alcohol once or twice a week (see Table 3). However, drinking daily, nearly daily, or multiple times per day was more common in Italy, Spain, France and Belgium than in the other four countries. This appears to be in accordance with the traditional Mediterranean pattern of daily drinking during meals (Allamani, 2007; EUROSTAT, 2022).

The area where people drank and their frequency of drinking were undoubtedly affected by restrictions on going to public places during the pandemic

High-risk drinking

Compared with those in other countries, the proportion of high-risk drinkers among total consumers was highest in Great Britain (32.4%), whereas those at low risk were the lowest (50.6%) (Table 4); this finding is in agreement with research indicating that the UK has problems with heavy drinking and its associated adverse effects (Plant et al., 2014; Rajput et al., 2019). In the other countries, the percentage of high-risk drinkers was between 13% and 15%.

Comparing risk levels between our data and those reported in the literature is difficult because of differences in definitions, and we can only sketch a rough comparison.

The percentage of heavy drinkers in Europe varies significantly by country, age, and gender, according to different definitions. For example, the prevalence of age-standardized heavy episodic drinking (defined by consuming at least 60 grams of pure alcohol on one occasion once or more often in the last month) exceeds 25% of the European population (aged 15+). (WHO 2024). The figures for high-risk drinkers in our study, which refer to males who drink more than 40 grams/day and females who drink more than 30 grams/day, show lower percentages (14-16.6%), while in Great Britain the percentage exceeds 30%. In the other seven countries, the highest percentage (around 70%) is among low-risk drinkers, while both moderate and high-risk drinkers are equivalent at around 12-17%. Also, we have to keep in mind that the High-Risk drinkers of our survey may have partly been the effect of COVID-19 pandemic, which makes understanding these phenomena rather complex.

With respect to the gender gap, according to national statistics, the M/F ratio among high-risk/heavy drinkers for France is 3:1 (OFDT, 2020), that for Spain is 1.8:1 (Observatorio Español de las Drogas y las Adicciones,2020), and that for Belgium is 1.7:1 (For a healthy Belgium,2020). Our study reports M/F ratios between 1.1:1 and 1.3:1 in France, Italy, Germany, Poland and Spain, which were reversed in Belgium, Great Britain and Greece, with M/F ratios between 0.90:1 and 0.98:1. This finding is in agreement with findings that the gender gap is narrowing among adults and even reversing among adolescents (Slade et al.,2016; Johnston et al.,2022).

In our study (Figure 3), being older (over 65 years) compared to being middle aged (31--50 years) reduces the probability of being a high-risk drinker; this concurs with findings that the likelihood of being an excessive drinker declines as adults mature into their 60s, possibly because of poor health, reduced social networks, or having received useful consumption guidelines (Moos et al.,2009; Rossow & Træen,2020).

The finding that living in rural areas and town centres—as well as in suburban areas for a few countries—is protective against high-risk drinking (see Figure 3) is in line with studies that found that having a nonrural residence increased the likelihood of at-risk drinking in three European countries—Norway, Denmark, and Belgium—(Rossow & Træen, 2020). However, other studies have shown that rural areas in Italy and France are more conducive to high-risk drinking than nonrural areas (Allamani & Prina, 2007; OFDT, 2020).

We found no statistically significant correlations between high-risk drinking and higher education across countries except in Poland. Recent studies report contradictory results, with high-risk/hazardous/binge-drinking associated with either lower (Rosoff et al.,2021) or higher educational attainment (Trias-Llimós,2022; Tschorn et al.,2022).

Among high-risk drinkers, wine is the preferred beverage in seven countries, whereas Poles prefer spirits (Figure 2). These results differ from previous findings, where wine consumption is less correlated with problem drinking than is the consumption of beer or spirits (Dey et al.,2014; Domínguez-López et al.,2025).

Comparing consumption frequency and quantity before and after the COVID-19 outbreak

Publications on alcohol consumption by the general population before and after COVID-19 outbreak present inconsistent results, which may depend on variations in the observation period, definitions of alcohol consumption, methods of data collection, and country or countries under study. For example, one study report that between April and July 2020 and September 2021 more people in Europe reduced rather than increased their alcohol use, except in UK and Ireland where alcohol consumption on average remained unchanged or increased, respectively (Kilian et al.,2022). Other researchers measuring breath alcohol concentrations in the U.S. reported insignificant

consumption increases and decreases between January 2020 and January 2021 (Houston et al.,2024). According to Public Health England survey data, measuring self-reported alcohol consumption suggests a polarisation in drinking, with most respondents reported drinking the same volume and the same frequency as they did before the pandemic, while roughly similar proportions of respondents reported drinking more or more frequently and drinking less or less frequently (Public Health England 2021). In its recent publication WHO estimated that from 2019 to 2020 the COVID-19 pandemic had a 10% reduction of alcohol consumption, but with different, and sometimes opposite, impacts in different countries and population groups (World Health Organization, 2024 p.XII). Another publication using cross-sectional data from serial nationally representative surveys of adults aged 18 years or older who participated in the U.S. National Health Interview Survey from 2018 to 2022 reported that, compared with 2018, there were absolute increases in any alcohol use in 2020 (2.69%) and 2022 (2.96%) (Ayyala-Somayajula et al.,2025).

The data set on which we based our analysis contains qualitative information collected in October-November 2022, during the final phase of the COVID-19 pandemic. This period saw a containment of the COVID emergency, partly due to the mass vaccination of the population, and can be considered the final stage of the pandemic, which began in early 2020 and was declared over in May 2023; UN News, 2023). It could also be viewed an appropriate point of observation on the experience of the pandemic. More than 50% of the wine and beer drinkers in our sample reported drinking the same amount of wine and beer as they did before the pandemic, whereas drinkers of spirits reported reduced rates, echoing the conclusions in the above-mentioned literature. The remaining respondents are fairly evenly distributed between those who report having increased their drinking and those who report having decreased it. Our results are similar to those reported in the literature, in particular those of Public Health England, and imply that moderate- or low-risk drinkers were mostly able to maintain control over their drinking without being affected by the constraints induced by the pandemic.

Unlike the total sample, our study demonstrates that more *high-risk* consumers in almost all countries reported more frequent consumption of almost all types of beverages, especially spirits, at the time of the survey than before the pandemic. These finding parallels other research findings that heavy drinkers tended to drink more during the pandemic (Public Health England,2021; Matone et al.,2022; Ayyala-Somayajula et al.,2025). Overall, these studies suggest that the social and psychological strain induced by the pandemic may have had an impact on heavy drinkers and individuals with alcohol use disorders by producing greater stress and increased alcohol consumption.

5. STUDY LIMITATIONS

The study is based on a dataset from a market survey and may have several biases. Younger and more educated people and individuals in managerial or supervisory roles, are overrepresented in the sample. To increase the generalizability of the results, we adjusted the data through post-stratification by sex and age. Furthermore, our dataset refers to Great Britain, whereas publications usually refer to the United Kingdom, which also includes Northern Ireland; thus, our results are only approximately comparable with those of other UK studies.

The database we worked on was built interviewing only drinkers. Another limitation is that we performed post-stratification adjustments based on general population structure, on a sample of drinkers only.

Also, retrospective questions, on which questions about changes in alcohol consumption following the outbreak of COVID are based, are known to have significant limitations.

The survey was conducted between October 21st and November 10th, 2022, and this is a further limitation to the generalizability of the paper's results.

The respondents in our analysis reported having consumed alcoholic beverages in the week prior to the interview. While this short period reduces the distortions caused by remembering periods further back in time and provides more accurate information on the amount of alcohol consumed, it does not consider those who have drunk, as well as the occasional heavy episodic drinkers in the previous month or year, who account for a substantial amount of alcohol-related harm.

6. CONCLUSIONS

Our results from interviews of 24,946 subjects in eight European countries who had drunk during the last week before the interview appear to broadly support the downward trend of consumption of alcoholic beverages in the European countries that were surveyed. They also underline that the gender gap among drinkers is narrowing.

The preferences for different types of alcoholic beverages documented in our study confirm the traditional wine-drinking behaviour in France, Italy and Greece, while they indicate that wine consumption in Great Britain is approaching that of wine-preferring countries, and confirm that Poland has become a beer-drinking country.

The usual place to drink is one's own home, followed by public places. This may have been influenced by the time of the survey in fall 2022, when the pandemic restrictions had not yet ended.

High-risk drinkers in our study (males who drink more than 40 grams/day and female who drink more than 30 grams/day) show percentages of 14-16.6%, but in Great Britain the percentage exceeds 30%. The gender gap among high-risk drinkers in the countries surveyed appears to have narrowed or even reversed compared with those in previous publications. Such issues, and their associated adverse effects, call for continued focus on the implementation of alcohol prevention programmes by local health authorities.

When their alcohol consumption in 2022 was compared with that before the COVID-19 outbreak, the respondents reported drinking the same amount of wine and beer. On the other hand, high-risk drinkers increased their frequency of drinking, suggesting that the social and psychological stress induced by the pandemic may have led heavy drinkers to increase their consumption of alcoholic beverages.

These results can have implications for the framing of alcohol use prevention programmes. In particular, they suggest that women (especially young women) should be the focus of concerted efforts to reduce the impact of alcohol consumption and related harms, such as foetal alcohol syndrome.

Furthermore, additional research should further investigate the impact of changes in alcoholic beverage consumption during the COVID-19 pandemic, so that policymakers can make informed decisions about alcohol control regulations during possible analogous events.

Table 1. Sociodemographic characteristics of the sample across 8 European countries

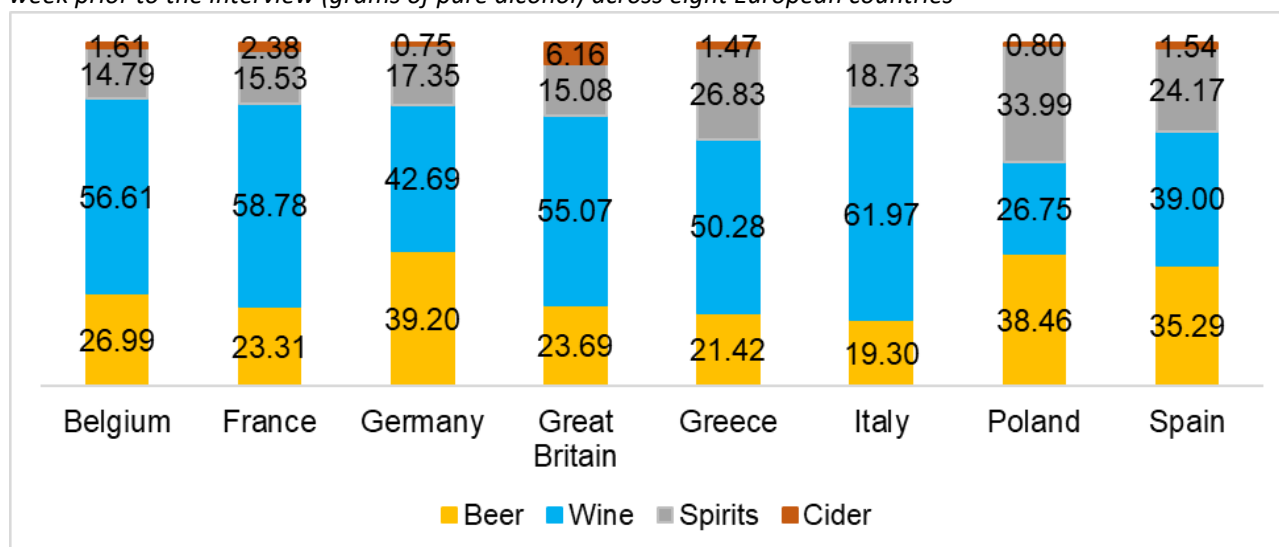
	Belgium n(%) (*)	France n(%)	Germany n(%)	G. Britain n(%)	Greece n(%)	Italy n(%)	Poland n(%)	Spain n(%)
Total sample	1,657	3,409	3,936	3,335	2,191	3,616	3,222	3,580
Gender								
Male	806 (48.7)	1,620 (47.5)	1,916 (48.7)	1,605 (48.1)	997 (45.5)	1,739 (48.1)	1,522 (47.2)	1,733 (48.4)
Female	846 (51.0)	1,779 (52.2)	2,010 (51.1)	1,712 (51.3)	1,181 (53.9)	1,860 (51.4)	1,672 (51.9)	1,838 (51.4)
Other (Transgender, Prefer not to say)	5 (0.3)	10 (0.3)	10 (0.3)	18 (0.5)	13 (0.6)	17 (0.5)	28 (0.9)	9 (0.3)
Age								
18-30	324 (19.6)	679 (19.9)	678 (17.2)	695 (20.8)	465 (21.2)	595 (16.5)	575 (17.8)	597 (16.7)
31-50	538 (32.5)	1,057 (31.0)	1,199 (30.5)	1,093 (32.8)	536 (24.5)	1,108 (30.6)	1,200 (37.2)	1,259 (35.2)
51-65	396 (23.9)	745 (21.8)	979 (24.9)	753 (22.6)	699 (31.9)	870 (24.1)	731 (22.7)	844 (23.6)
Over 65	399 (24.1)	928 (27.2)	1,080 (27.4)	794 (23.8)	491 (22.4)	1,043 (28.8)	716 (22.2)	881 (24.6)
Place of residence								
City centre	317 (19.2)	728 (21.3)	1,000 (25.4)	574 (17.2)	1,374 (62.7)	1,595 (44.1)	1,336 (41.5)	1,503 (42.0)
Rural	525 (31.7)	988 (29.0)	1,152 (29.3)	822 (24.7)	285 (13.0)	329 (9.1)	416 (12.9)	532 (14.9)
Suburban	358 (21.6)	447 (13.1)	881 (22.4)	1,287 (38.6)	360 (16.4)	286 (7.9)	321 (10)	391 (10.9)
Town centre	457 (27.6)	1,246 (36.5)	903 (23)	652 (19.6)	173 (7.9)	1,406 (38.9)	1,149 (35.7)	1,154 (32.2)
Highest educational level reached								
Compulsory education	(*)	613 (18.5)	738 (19.3)	803 (24.5)	235 (10.9)	567 (16.1)	399 (12.8)	790 (23.0)
High-school diploma	722 (45.0)	998 (30.1)	1,706 (44.6)	829 (25.3)	632 (29.3)	1,777 (50.4)	1,241 (40)	912 (26.5)
University degree or higher	882 (55.0)	1,707 (51.4)	1,382 (36.1)	1,644 (50.2)	1,291 (59.8)	1,182 (33.5)	1,463 (47.2)	1,737 (50.5)

(*) In Belgium, compulsory education ends with a high-school diploma.

Table 2. Consumption of alcoholic beverages across 8 European countries during the week prior to the interview. Grams of pure alcohol per person consumed (with standard deviation). P-values from two-sample t-tests with unequal variances (Welch's t-test) were computed for each country.

Country	Total	Males	Females	p-values (Welch's t-test)
Belgium	124.3 (5.4)	143.0 (7.4)	107.1 (6.9)	<0.001
France	129.8 (4.2)	158.4 (6.1)	103.7 (5.8)	<0.001
Germany	123.6 (4.4)	148.3 (5.6)	99.9 (6.9)	<0.001
Great Britain	197.2 (4.2)	224.9 (6.3)	169.8 (5.3)	<0.001
Greece	130.2 (5.7)	135.3 (9.6)	126.3 (7.3)	<0.001
Italy	129.2 (3.9)	152.0 (4.7)	108.4 (6.1)	<0.001
Poland	139.5 (5.8)	162.8 (5.1)	115.5 (8.6)	<0.001
Spain	152.0 (5.4)	183.1 (7.2)	122.7 (8.2)	<0.001

Figure 1 - Rates of each type of alcoholic beverage contributing to the total amount of alcohol consumed during the week prior to the interview (grams of pure alcohol) across eight European countries



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Table 3 - Rates of frequency and place of consumption of respondents who drank any type of alcoholic beverage during the week before the interview across 8 European countries

	Belgium %	France %	Germany %	Great Britain %	Greece %	Italy %	Poland %	Spain %
Frequency of alcohol consumption								
Multiple times per day, Daily, Nearly every day	24.0	23.4	17.7	17.9	14.4	27.1	9.4	25.6
3-5 times a week	19.9	18.1	18.8	23.8	20.9	16.4	14.2	19.5
Once or twice a week	37.7	37.2	40.1	41.8	45.3	38.0	38.1	39.6
Once every fortnight, Once every month	15.8	18.3	19.2	14.3	16.1	15.4	28.8	13.0
Once every 2-3 months, Once every 6 months	2.5	3.1	4.2	2.2	3.3	3.2	9.6	2.3
Places where alcohol is consumed								
Home	81.5	83.4	84.7	82.2	79.1	78.8	88.3	78.1
Other's houses	46.3	52.0	50.4	36.1	51.6	43.4	55.4	39.8
Public Places	81.5	75.0	75.2	77.6	85.8	78.1	66.5	89.0
On the go	4.4	5.3	13.6	5.3	4.5	10.2	3.7	7.6

Table 4 - Proportion of low-, moderate-, and high-risk drinkers on total amount of alcoholic beverage consumption in grams of pure alcohol among respondents who drank any type of alcoholic beverage in the week prior to the interview across 8 European countries (n= 24,946)

	Risk categories									p-value from a Chi- square test of gender and risk categories
	Low- risk drinkers (0-20 grams) N= 17,162			Moderate risk drinkers (M= 20-40 grams; F, other= 20-30 grams) N= 3,567			High-risk drinkers (M= >40 grams; F, other= >30 grams) N= 4,217			
	Men	Women	Total	Men	Women	Total	Men	Women	Total	
Belgium	70.2	77.0	73.8	15.8	8.8	12.2	13.9	14.2	14.0	0.003
France	66.1	78.2	72.4	18.6	9.2	13.7	15.3	12.6	13.9	< 0.001
Germany	67.9	79.7	73.9	17.6	9.0	13.2	14.6	11.3	12.9	< 0.001
G.Britain	47.0	54.1	50.6	22.3	12.0	16.9	30.6	33.8	32.4	< 0.001
Greece	69.8	71.9	71.1	16.5	13.8	14.9	13.6	14.4	14.0	0.596
Italy	63.8	76.6	70.5	20.2	9.2	14.5	16.0	14.2	15.0	< 0.001
Poland	62.9	78.8	71.1	21.3	7.6	14.1	15.7	13.6	14.8	< 0.001
Spain	61.3	76.6	69.2	20.8	8.0	14.2	17.9	15.4	16.6	< 0.001

Figure 2. Percentages of each type of alcoholic beverage contributing to the total amount of alcohol consumed by high-risk drinking of respondents who drank any type of alcoholic beverage during the week prior to the interview (n= 4,217)

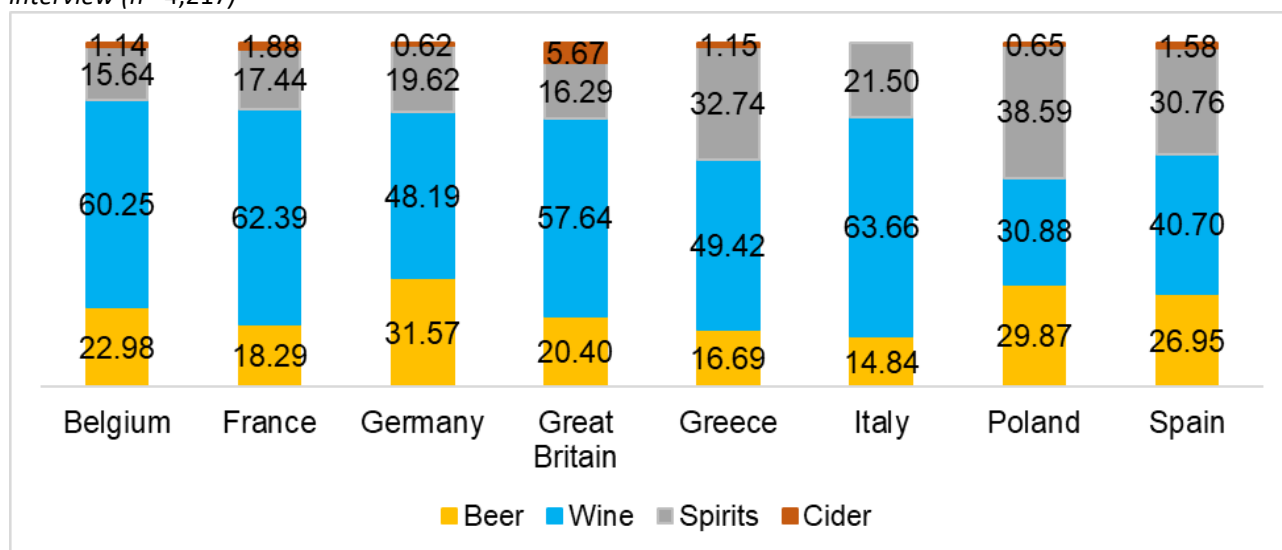


Figure 3. Forest plots presenting adjusted prevalence ratios (PRs) and 95% confidence intervals for nine impacting factors (related to age, sex, compulsory education, university degree, and place of residence) potentially associated with being a high-risk drinker in 8 European countries during the week prior to the interview. Squares represent the country-specific PRs, with the square size proportional to the weight assigned in the meta-analysis. Horizontal lines indicate the 95% confidence intervals, and diamonds denote the pooled PR estimate and its corresponding 95% CI.

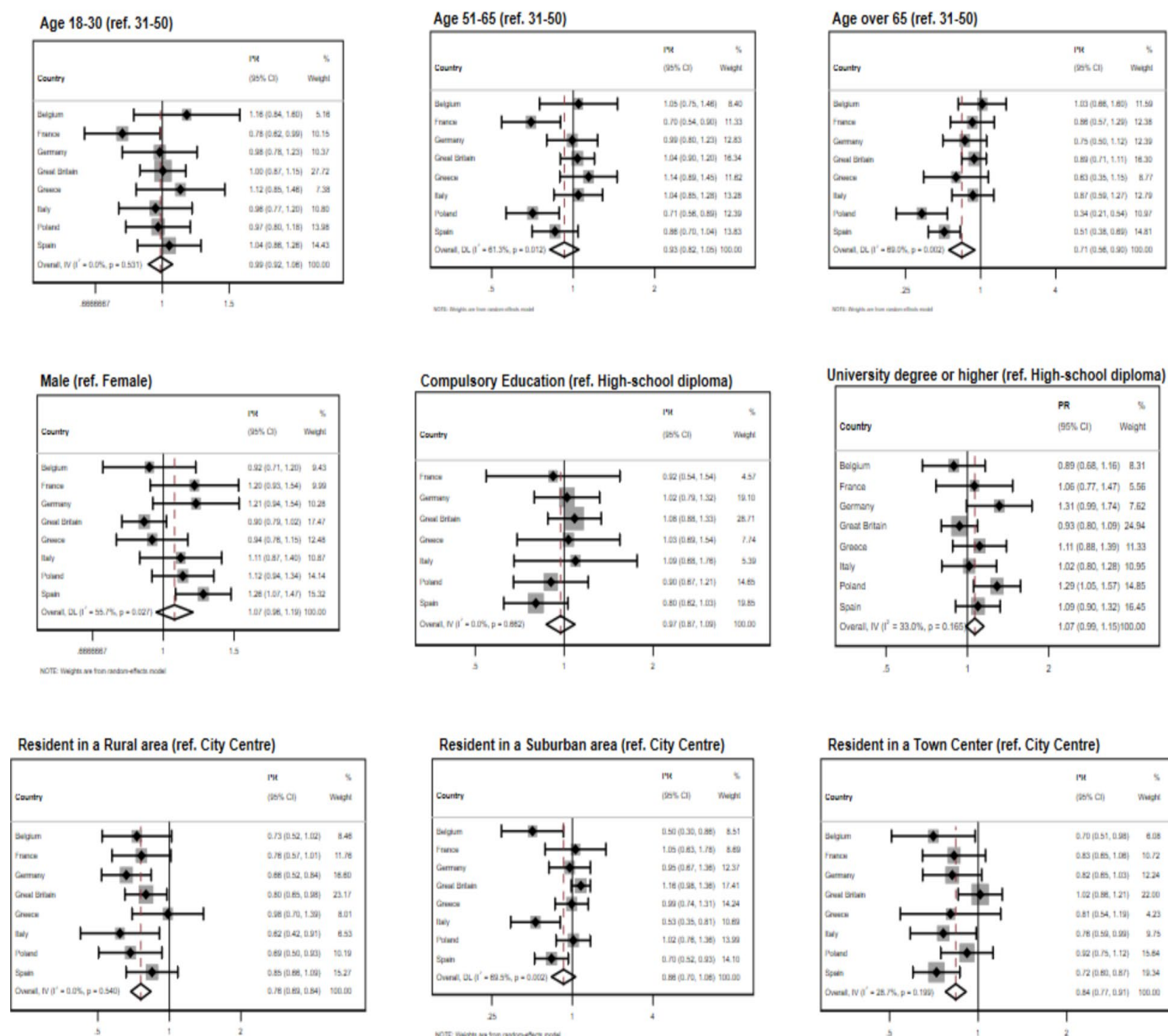


Table 5. Changes in the amount and frequency of different types of alcoholic beverages consumed across eight European countries before and after the COVID-19 outbreak among all respondents (n= 24,946) and high-risk drinkers (n= 4,217).

	Beer			Wine			Spirits			Cider		
	Less frequently	The same amount	More frequently	Less frequently	The same amount	More frequently	Less frequently	The same amount	More frequently	Less frequently	The same amount	More frequently
Belgium												
<i>All consumers</i>	19.7	63.8	16.5	18.8	64.2	17.0	32.1	43.5	24.4	21.7	58.4	19.9
<i>High-risk</i>	22.5	48.8	28.7	15.8	51.9	32.3	23.8	31.2	45.0	15.9	40.8	43.3
France												
<i>All consumers</i>	19.3	59.8	20.9	19.7	62.2	18.1	35.2	38.1	26.6	21.3	64.0	14.7
<i>High-risk</i>	15.0	54.0	30.9	15.3	51.3	33.4	30.4	27.9	41.7	21.4	51.8	26.8
Germany												
<i>All consumers</i>	15.3	64.4	20.3	18.9	65.2	15.9	29.4	44.8	25.8	18.6	62.5	18.9
<i>High-risk</i>	15.9	52.4	31.7	14.7	57.1	28.1	22.2	42.9	34.9	10.9	61.9	27.2
Great Britain												
<i>All consumers</i>	29.6	50.5	20.0	26.9	51.3	21.8	29.9	37.5	32.7	25.2	52.8	22.0
<i>High-risk</i>	29.8	47.4	22.8	26.5	48.1	25.4	25.3	37.0	37.7	21.2	49.7	29.1
Greece												
<i>All consumers</i>	13.4	64.6	22.0	16.8	64.6	18.6	32.3	41.3	26.4	16.0	63.2	20.8
<i>High-risk</i>	9.8	59.5	30.7	12.3	52.8	34.9	24.9	37.9	37.2	11.7	60.9	27.3
Italy												
<i>All consumers</i>	18.6	62.0	19.4	22.7	61.7	15.6	37.0	28.8	34.2			
<i>High-risk</i>	13.0	51.8	35.2	20.0	49.2	30.8	33.4	26.8	39.8			
Poland												
<i>All consumers</i>	21.4	60.6	18.0	25.3	58.5	16.3	41.8	39.3	18.9	21.9	65.0	13.1
<i>High-risk</i>	21.1	48.4	30.4	25.1	45.1	29.8	33.9	36.7	29.4	21.5	58.8	19.7
Spain												
<i>All consumers</i>	17.6	57.2	25.2	20.3	59.4	20.3	27.8	32.0	40.3	16.0	52.5	31.6
<i>High-risk</i>	11.7	51.3	37.0	16.5	54.0	29.5	20.6	46.0	33.4	7.8	67.9	24.2

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7. CONFLICT OF INTEREST STATEMENT (ALPHABETICAL ORDER OF ABBREVIATED NAMES)

8. SUPPLEMENTARY MATERIAL. *Tables 1-9. Figures 1-8*