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# Alcohol consumption in Spanish primary health care professionals: a national, cross-sectional study

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| Keywords: | Alcohol, primary health care, medical professionals, alcohol consumption, consumption pattern |
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# Alcohol consumption in Spanish primary health care professionals: a national, cross-sectional study

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## Abstract

**Aim:** To estimate the prevalence and analyse the habits of the consumption of alcoholic beverages among primary health care (PHC) professionals

**Design**: Observational, cross-sectional, descriptive study.

**Setting**: PHC centres in the Spanish National Health System (SNS).

**Participants**: Doctors and nurses who completed an on-line questionnaire which explored their intake of alcoholic drinks by means of the AUDIT-C alcohol assessment tool. The study population was recruited through random sampling stratified by the different regions containing the Spanish SNS PHC centres.

**Primary and Secondary Outcome Measures:** Frequency of consuming alcoholic drinks, daily consumption of alcoholic drinks, frequency of consuming more than six standard drinks (SDs).

**Results:** A total of 1,760 PHC professionals completed the questionnaire. The frequency of alcohol consumption was: abstention (12%) (95% confidence interval [95% CI] 10.4–13.5); 1 or less SDs/month (26%) [95% CI 23.8–27.9]; 2–4 SDs/month (32.2%) [95% CI 29.7–34.1]; 4 or more SDs/week (11.9%) [95% CI 10.3–13.3]. The number of drinks in any given day was: none (45.6%) [95% CI 42.9–47.6]; 1–2 drinks (47.3%) [95% CI 23.8–27.9]; 3–4 drinks (6.5%) [95% CI 5.3–7.6]. The rate of hazardous drinking was observed to be 32% [95% CI 26.7–37.3], with a greater frequency of intake in older professionals ($p<0.001$), in contrast to a higher number of drinks consumed in a typical day by younger professionals ($p<0.001$). Intake was higher among males ($p<0.001$), primary care physicians ($p<0.001$) and resident mentors ($p<0.001$).

**Conclusions:** Our study discloses the most up-to-date portrait of current alcohol consumption among Spanish PHC professionals, revealing figures above those of the general population. Interventions need to be developed to improve the level of awareness and education of medical professionals in this matter.


**Keywords:** Alcohol; primary health care; medical professionals; alcohol consumption; consumption pattern.

## Article Summary

**Strengths and limitations of this study:**

- The main strength of our study, in comparison with others published in this area, lies in its sample size, as it is a nationwide study with one of the broadest samples to date.

-One of the difficulties related to measuring alcohol consumption derives from the validity of self-reported alcohol use, which could lead an underestimation of the prevalence of the alcohol intake.

-Additionally, another potential study limitation, is the lack of quantification of alcohol consumption during the week and at weekends, since the AUDIT-C questionnaire was used as the basis for quantifying alcohol intake.

## Introduction

The European Union has the highest level of alcohol consumption worldwide[1]. This elevated consumption generates a substantial mortality burden due to acute and chronic diseases[2]. Therefore, the World Health Organization (WHO) has established a reduction in the harmful use of alcohol as a public health priority[3], while raising awareness about the scale and nature of health, social and economic problems associated with this consumption.

Nationally, alcohol was the most widely consumed legal drug in 2015 (77.6%), according to the Survey into Alcohol and Drugs in Spain (*Encuesta sobre Alcohol y Drogas en España*, [EDADES])[4], with consumption typically beginning at the age of 16. The EDADES survey shows alcohol is considered the substance of least risk of all those consumed by people aged between 15 and 65 years. Furthermore, even though consumption trends have remained stable since 2005, there is an increasing pattern of binge drinking, or the intake of more than six standard drinks (SDs), in one session in men or 4 SDs in women, where 1 SD is defined as the equivalent to 10 grams of pure alcohol[5].

Primary health care (PHC) professionals play a fundamental role in the management of problems associated with alcohol consumption[6] as they constitute the first line of medical care[7]. According to the Clinician's Guide (2007)[8] by the US National Institute on Alcohol Abuse and Alcoholism, regular visits to PHC professionals that address alcohol consumption can lead to a significant improvement in patients who present hazardous drinking (a level of alcohol consumption that could prove harmful to the body, corresponding to scores of greater than 5 in men and 4 in women as determined by the AUDIT-C questionnaire)[9].

The development of preventive activities to curb alcohol consumption among PHC medical professionals depends on several factors, one of the most notable being the professional's particular drinking habit[10]. In their study, Frank et al.[11] described how the medical professionals'

alcohol use patterns correlated significantly with their clinical practice when offering advice and screening for hazardous drinking. There are currently several studies dealing with consumption levels in the general population and in different health care workers[12,13,14]. However, only a limited number of studies have addressed alcohol consumption among PHC professionals[15,16].

The objectives of this study were to: 1) analyse the level of alcoholic drinks consumed by PHC medical professionals; 2) ascertain the consumption habits currently reported by these professionals; 3) analyse the relationship between the professionals' socio-demographic and occupational variables and their level of consumption.

## Method

We designed an observational, cross-sectional, descriptive, multicentre study. The study population was comprised of medical professionals working in PHC centres belonging to the Spanish National Health System (SNS). The field work was carried out between August 2014 and August 2016.

Patient and Public Involvement statement

Study data was collected through an ad hoc questionnaire designed by members of the Córdoba Family and Community Medicine Teaching Unit, under guidance from experts in PAPPS groups (Preventive Activities and Health Promotion Programme) of the Spanish Society of Family and Community Medicine (semFYC), and subjected to a consensus, apparent-logic and content validity process. The questionnaire was designed to be anonymously self-completed by each medical professional. The selection criteria were: PHC professional (primary care physicians, nurses or resident doctors in family and community medicine) working for the SNS and who consented to participate in the study. The sample size was calculated based on a type 1 error of 5%, a precision of 3% and an expected prevalence of alcohol consumption of 50% ($p = q = 0.5$; maximum uncertainty), so the study had to include at least 1,068 subjects.

The study population was recruited by different means:

1) From medical professionals who participated in a previous study; the CECC-AP study[17], who in turn were recruited through PAPPS and the semFYC Communication and Health Group;

2) by sending emails to members contained in databases for the semFYC and the Spanish Society for Primary Care Physicians (SEMERGEN); and,

3) through a stratified random sampling of SNS health centres carried out in function of the number of centres in each autonomous region. Each health centre's director was sent an email

explaining the study objectives and encouraging them to disseminate the questionnaire among their staff.

The random sample of centres was gathered from the Ministry of Health's catalogue[18]. Current estimates indicate there are 33,482 doctors working in public PHC. Assuming 75% of the centres selected would agree to participate in the study, of which an average of four medical professionals per health centre and two per local clinic would volunteer, then we calculated a sample of at least 430 health centres and local clinics was required.

The study variables were sociodemographic (age, sex, autonomous region), professional (job type, residents mentor, time working in PHC, membership of scientific societies, affiliation to PAPPS) and consumption (frequency of consuming alcoholic drinks, daily consumption of alcoholic drinks, frequency of consuming more than 6 SDs/day). The last three variables, which are used to quantify alcohol consumption among the medical professionals, are taken from the WHO AUDIT-C questionnaire[19]. Questionnaire scores greater than 5 in men and 4 in women were considered as hazardous drinking[20,21,22].

Questionnaires were completed on-line via Google Drive. The data were treated statistically with SPSS 17.0 and EPIDAT 3.1 software. Descriptive statistics and 95% confidence intervals (95% CI) were calculated for the main study estimators. Subsequently, a bivariate analysis was conducted to test the relationship between the independent variables and the alcohol consumption questions (chi-square test, comparison of means test, e.g. Student's t-test or ANOVA, following verification of normality with the Kolmogorov–Smirnov test). In addition, the degree of correlation between the level of intake and clinical practice when addressing alcohol consumption was analysed using the Pearson correlation coefficient. Bilateral hypothesis testing with a p-value $\leq 0.05$ was used. Finally, a multivariate analysis was performed to verify the variables were independently associated with alcohol consumption. The alcohol consumption variable was dichotomised and the age, sex, job type (which was treated as a dummy variable), time working in PHC, residents mentor and affiliation to PAPPS variables included in a maximum model. All variables with a Wald test p-value $> 0.05$ were eliminated, resulting in a more parsimonious model. The Hosmer–Lemeshow test was applied to check the model's goodness of fit. The project was approved by the Ethics Committee at the Reina Sofía University Hospital, Córdoba.

## Results

A total of 1,760 PHC professionals participated in the study. The participants' sociodemographic and occupational characteristics are shown in Table 1. Participants were predominantly female (62.9%; 95% CI:60.6–65.2); had an average age of 47.7 years (SD 11.24,

range: 26 to 64 years; 95% CI: 47.17–48.22); and had worked in PHC for an average of 14.10 years (SD 10.55; range: 1–39; 95% CI: 13.60–14.59).

**Table 1.**

**Sociodemographic and occupational characteristics of professionals surveyed**

| Characteristics of professionals | n (%) | CI 95% |
|---|---|---|
| Sex | | |
| Male | 653 (37.1) | 34.8-39.4 |
| Female | 1107 (62.9) | 60.6-65.2 |
| Age (years) | | |
| Less than 35 | 475 (27.2) | 24.9-29.1 |
| 36-45 | 432 (24.7) | 22.5-26.6 |
| 46-55 | 426 (24.4) | 22.2-26.2 |
| 56 or more | 415 (23.7) | 21.6-25.6 |
| Type of professional | | |
| Primary care physician | 1330 (75.6) | 73.5-77.6 |
| Nurse | 220 (12.5) | 10.9-14.1 |
| Medical Resident | 201 (11.4) | 9.9-12.9 |
| Resident Tutor | | |
| Yes | 588 (33.4) | 31.2-35.6 |
| No | 1172 (66.6) | 64.4-68.8 |
| Affiliation with Scientific Societies | | |
| semFYC | 1117 (63.5) | 61.2-65.7 |
| SEMERGEN | 472 (26.8) | 24.7-28.9 |
| SEMG | 79 (4,5) | 3.5-5.5 |
| ASANEC | 21 (1.2) | 0.7-1.7 |
| Other | 71 (4.0) | 3.1-5.0 |
| Affiliation to specific programs: PAPPS * | 456 (25.9) | 23.8-28.0 |

* Program of Preventive Activities and Health Promotion (semFYC); 95% CI: 95% confidence interval

The frequency of alcohol consumption in PHC professionals was: 1 or 2 SDs per month in 26% (95% CI: 23.8–27.9) of the study population and 2 to 4 SDs every month in 32.2% (95% CI: 29.7–34.1) (Table 2). Considering the alcoholic drink intake of PHC medical professionals on a typical day, 45.6% (95% CI: 42.9–47.6) reported they drank nothing, whereas 47.3% (95% CI: 44.6–49.3) said they consumed 1 or 2 SDs. With regards to binge drinking, 19.5% (95% CI: 17.5–21.2) confirmed they drank 6 or more SDs at least once a month. Furthermore, hazardous drinking was recorded in 32.0% (95% CI: 26.7–37.3) of participants based on AUDIT-C criteria.

**Table 2.**

**Alcohol consumption of Primary Health Care professionals.**

| Alcohol consumption | n (%) | CI 95% |
|---|---|---|
| Frequency of consumption | | |
| Never | 210 (12.0) | 10.4-13.5 |
| 1-2/ per month | 455 (26.0) | 23.8-27.9 |
| 2-4/ per month | 562 (32.2) | 29.7-34.1 |
| 2-3/ per week | 313 (17.9) | 16.0-19.6 |
| 4 or more/ per week | 208 (11.9) | 10.3-13.3 |
| Number of alcoholic drinks on a typical day | | |
| 0 | 797 (45.6) | 42.9-47.6 |
| 1-2 | 827 (47.3) | 44.6-49.3 |
| 3-4 | 113 (6.5) | 5.3-7.6 |
| 5-6 | 9 (0.5) | 0.2-0.8 |
| 10 or more | 2 (0.1) | 0.01-0.4 |
| Drinking 6 or more drinks in one day | | |
| Never | 1325 (75.8) | 73.2-77.3 |
| Once a month | 341 (19.5) | 17.5-21.2 |
| Monthly | 59 (3.4) | 2.5-4.2 |
| Weekly | 21 (1.2) | 0.7-1.7 |
| Daily | 2 (0.1) | 0.01-0.4 |

95% CI: 95% Confidence Interval

There was a statistically significant relationship between subject age and frequency of alcoholic drink consumption (Table 3); older participants tended to drink more frequently. Similarly, the data revealed younger medical professionals drank a greater number of drinks on any given day (Table 4). Binge drinking was more prevalent among younger participants.

**Table 3.**

**Frequency of alcohol consumption of Primary Health Care professionals**

| Variable | | Never n (%) | 1 o less/ per month n (%) | 2-4/per month n (%) | 2-3/per week n (%) | 4 or more/per week n (%) | p Value* |
|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 60 (12.6) | 137 (28.8) | 193 (40.6) | 70 (14.7) | 15 (3.2) | <0.001 |
| | 36-45 | 80 (18.5) | 120 (27.8) | 147 (34) | 62 (14.4) | 23 (5.3) | |
| | 46-55 | 42 (9.9) | 115 (27.0) | 127 (29.8) | 80 (18.8) | 62 (14.6) | |
| | More than 55 | 28 (6.7) | 83 (20) | 95 (22.9) | 101 (24.3) | 108 (26) | |
| Sex | Male | 40 (6.2) | 137(21.1) | 172 (26.5) | 151 (23.3) | 149 (23) | < 0.001 |
| | Female | 170 (15.5) | 318 (28.9) | 390 (35.5) | 162 (14.7) | 59 (5.4) | |
| Type of professional | Primary care physician | 135 (10.2) | 323 (24.4) | 413 (31.2) | 257 (19.4) | 194 (14.7) | < 0.001 |
| | Medical Resident | 27 (13) | 69 (33.2) | 83 (39.9) | 25 (12.0) | 4 (1.9) | |
| | Nurse | 48 (22) | 63 (28.9) | 66 (30.3) | 31 (14.2) | 10 (4.6) | |
| Resident Mentor | Yes | 50 (8.6) | 126 (21.6) | 173 (29.6) | 129 (22.1) | 106 (18.2) | <0.001 |
| | No | 160 (13.7) | 329 (28.3) | 389 (33.4) | 184 (15.8) | 102 (8.8) | |

*Chi-square Test

**Table 4.**

**Number of Standard Drinking Units (SD) of alcohol consumed by Primary Health Care professionals on a typical day**

| Variable | | None n (%) | 1 -2 SDs n (%) | 3-4 SDs n (%) | 5-6 SDs n (%) | 10 or more SDs n (%) | p Value* |
|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 230 (48.4) | 203 (42.7) | 35 (7.4) | 7 (1.5) | 0 (0) | < 0.001 |
| | 36-45 | 240 (55.6) | 168 (38.9) | 21 (4.9) | 1 (0.2) | 2 (0.5) | |
| | 46-55 | 196 (46) | 203 (47.7) | 26 (6.1) | 1 (0.2) | 0 (0) | |
| | More than 55 | 131 (31.6) | 253 (61) | 31 (7.5) | 0 (0) | 0 (0) | |
| Sex | Male | 206 (31.7) | 374 (57.36) | 63 (9.7) | 6 (0.9) | 0 (0) | <0.001 |
| | Female | 591 (53.8) | 453 (41.2) | 50 (4.5) | 3 (0.3) | 2 (0.2) | |
| Type of professional | Primary care physician | 574 (43.4) | 655 (49.5) | 85 (6.4) | 6 (0.5) | 2 (0.2) | 0.086 |
| | Medical Resident | 104 (50) | 87 (41.8) | 15 (7.2) | 2 (1) | 0 (0) | |
| | Nurse | 119 (54.6) | 85 (39) | 13 (6) | 1 (0.5) | 0 (0) | |
| Resident Mentor | Yes | 224 (38.4) | 322 (55.1) | 36 (6.2) | 1 (0.2) | 1 (0.2) | 0.001 |
| | No | 573 (49.2) | 505 (43.4) | 77 (6.6) | 8 (0.7) | 1 (0.1) | |

SD: Standar Drink; * Chi-square Test.

Evaluation of the frequency of consuming alcoholic drinks with respect to gender (Table 3) showed that more women abstained than men (18.1% vs. 8.0%). What is more, a higher percentage of men (57.36%) consumed 1 or 2 drinks/day than women (41.2%) (Table 4). Regarding intensive consumption or binge drinking (Table 5), a greater percentage of women than men abstained from drinking 6 or more SDs in a single occasion (82.5% vs. 64.4%).

Analysing the frequency of alcoholic drink consumption according to job type revealed that nurses abstained the most (25.7%), while residents had the highest level of consumption. With respect to intense alcohol intake, nurses again presented the highest percentage of abstention from this drinking pattern. Similarly, more medical residents took part in binge drinking once a month in comparison with primary care physicians and nurses (Table 5).

**Table 5.**

**Binge drinking frequency of Primary Health Care professionals**

| Variable | | Never n (%) | Less than once per month n (%) | Monthly n (%) | Weekly n (%) | Daily n (%) | p Value* |
|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 299 (62.9) | 137 (28.8) | 32 (6.7) | 6 (1.3) | 1 (0.2) | < 0.001 |
| | 36-45 | 344 (79.6) | 75 (17.4) | 9 (2.1) | 3 (0.7) | 1 (0.2) | |
| | 46-55 | 350 (82.2) | 69 (16.2) | 5 (1.2) | 2 (0.5) | 0 (0) | |
| | More than 56 | 332 (80) | 60 (14.5) | 13 (3.1) | 10 (2.4) | 0 (0) | |
| Sex | Male | 418 (64.4) | 183 (28.2) | 33 (5.1) | 15 (2.3) | 0 (0) | < 0.001 |
| | Female | 907 (82.5) | 158 (14.4) | 26 (2.4) | 6 (0.5) | 0 (0) | |
| Type of professional | Primary care physician | 1007 (76.2) | 258 (19.5) | 42 (3.2) | 3(1) | 2 (0.2) | < 0.001 |
| | Medical Resident | 132 (76.2) | 61 (29.3) | 12 (5.8) | 3 (1.4) | 0 (0) | |
| | Nurse | 186 (85.3) | 22 (10.1) | 5 (2.3) | 5 (2.3) | 0 (0) | |
| Resident Mentor | Yes | 462 (79.1) | 107 (18.3) | 8 (1.4) | 6 (1) | 1 (0.2) | 0.012 |
| | No | 863 (74.1) | 234 (20.1) | 51 (4.4) | 15 (1.3) | 1 (0.1) | |

* Chi-square Test.

Alcohol intake was higher in the mentor group compared to the non-mentor group (Table 3) and also the mentor group drank alcohol more frequently on a weekly basis (23.3% vs. 10.4%). However, mentors reported a greater degree of abstention from binge drinking patterns (Table 5).

As shown in Table 6, the variables associated with alcohol intake, by means of multivariate analysis, and after adjusting the model for the rest of the variables under consideration, were age (greater consumption in older participants), sex (men drank more) and job type (highest alcohol intake was observed in primary care physicians).

**Table 6.**

**Variables associated with alcohol consumption. Multivariate analysis.**

| Variable | OR | CI 95% | p Value |
|---|---|---|---|
| Age | 1.02 | 1.01-1.03 | <0.001 |
| Sex (Male vs. Female) | 2.26 | 1.83-2.79 | <0.001 |
| Type of professional | -- | -- | 0.028 |
| -Primary care physician vs. Medical Resident | 1.44 | 1.07-1.93 | 0.016 |
| - Primary care physician vs. Nurse | 1.67 | 1.09-2.54 | 0.017 |

Dependent variable: alcohol consumption (Yes vs Not); OR: Odds Ratio; 95% CI: 95% Confidence Interval; Hosmer-Lemeshow Test: 18,266; p = 0.019

## Discussion

This study represents the first national analysis of alcohol consumption habits among PHC professionals in Spain. It can be used to make comparisons against studies conducted in professionals from various health care fields in other countries and in relation to the Spanish general population.

There are currently several regional studies dealing with the alcohol consumption patterns of PHC professionals, of particular note are the ones published by Rodríguez et al.[15] and Aubá et al.[16] Their studies already highlighted the need to quantify alcohol intake among PHC medical professionals. In this regard, Saeys and Cammu[23] suggested the behaviour health care professionals demonstrated at work affected patient attitudes and their motivation towards making lifestyle changes, including the reduction of or abstention from toxic substances such as alcohol.

One of the most relevant aspects of this study is the quantification of the level of hazardous drinking derived from the AUDIT-C questionnaire, upon which other national studies were also based[24]. Rosta[25] found that 16–18% of doctors followed a pattern of hazardous drinking, a value which is clearly below the one we obtained here (32%). Whereas, Antoni Gual[26] stated in a study conducted on a sample of 4,250 individuals that 22% of the Spanish adult general population said they consumed alcohol at levels above the hazard threshold.

The observation of an elevated level of hazardous drinking among PHC professionals[27], in comparison with the general population, can be explained by the presence of several factors intrinsic to working in the health care environment[28], such as working conditions (number of shifts, occupational burnout syndrome, or the number of hours worked per week), degree of job satisfaction, organisational climate, personal situation (marital status, number of children) and area of medical specialisation[29]. Rosta evaluated this parameter in a sample of 1,917 German doctors working in different specialties within a hospital context and found approximately 20% were hazardous drinkers. A study performed by Oreskovich[22], featuring a sample of 7,197 surgeons, revealed 15.4% were hazardous drinkers and identified that suffering from burnout syndrome (OR 1.25; 95% CI:1.06–1.48), depression (OR 1.48; 95% CI: 1.26–1.73) or medical malpractice (OR 1.45; 95% CI: 1.17–1.78) were predisposing factors of elevated consumption.

With respect to gender differences, the results of the present study agree with those of two previous studies carried out in Spain[15,16], which also emphasised a higher incidence of consumption among men. Furthermore, the results of our study are consistent with those obtained from EDADES and the Spanish portion (EESE)[30] of the European Health Interview Survey. Both observed a male predominance with respect to binge drinking, as well as higher levels of this intensive consumption pattern among younger participants.

As with the general population in Spain, alcohol consumption in our study increased with age, although it was notable that younger participants drank a greater number of drinks on a typical day. This higher number of drinks consumed by the younger population correlates with the increasing prevalence of binge drinking observed among the young in recent years. As such, the Spanish National Health Survey (ENS) 2011–2012 already indicated this finding as it identified that youths consume more drinks on a typical day (11% of men and 5.5% of women aged between 15 and 24 years).

One of the study's most striking results is the alcohol consumption pattern shown by PHC professionals; one third of participants drink alcohol 2–4 times a month, while 26% have a drink on one or less occasions per month. In regional studies, for example Rodríguez et al.[15], the predominant pattern was for an occasional drink (32%). These data obtained for health care professionals are similar to those from the ENS 2011–2012 survey in which 38.3% of respondents drunk alcohol at least once per week.

Our data reveal differences between different medical professions; primary care physicians drink more frequently, while resident doctors consume a higher number of drinks on a typical day, and nurses show the highest level of abstention. There are no studies available for comparing these data within the context of PHC, which is why future research could prove helpful in verifying the presence of these differences in alcohol consumption among the job types studied here.

This study includes some limitations that must be taken into account. One of the difficulties related to measuring alcohol consumption derives from the validity and comparability of data, given the wide disparity in the volume of alcohol intake estimated in different studies and because these estimations are based on health care professionals' own declarations, then this could have produced an underestimation of the prevalence of consumption[31]. While another limitation of this work, arising from the study design, is the fact that it is impossible to establish the alcohol consumption trend among professionals, and the influence of educational activities in terms of addressing alcohol consumption in PHC. This would require a long-term study with a longitudinal but non-cross-sectional design. Additionally, another potential study limitation is the lack of quantification of alcohol consumption during the week and at weekends, since the AUDIT-C questionnaire was used as the basis for quantifying alcohol intake. This aspect could be included in future studies. Equally, we must bear in mind that it could include a selection bias because participants volunteered to complete the questionnaire and therefore professionals with the greatest interest in the subject would be more likely to participate in the survey, which could distort the true prevalence of alcohol consumption. To analyse the representativeness of the sample with respect to the study population, we compared our data according to age and sex against 2015 data published by the Spanish Organisation of Medical Colleges (OMC)[32]. The proportion of female primary care physicians in Spain was 54.2%, yet in our study this ascended to 62.9%, so we can consider this an overrepresentation of female doctors. Given that the prevalence of alcohol consumption in women is known to be less than in men, we can conclude our study would underestimate the level of overall consumption. Regarding age, the present study included a greater proportion of younger professionals. Again, considering a greater degree of consumption has been observed among younger medical professionals, it is reasonable to suspect that this disparity could result in an underestimation of the overall prevalence of alcohol consumption. By contrast, we believe that the sample is representative of PHC professionals because more than 95% worked for the SNS.

One of the strengths of our study, in comparison with others published in this area, lies in its sample size, as it is a nationwide study with one of the broadest samples to date. However, there are international studies with a greater sample size, in particular the publications by Hughes[33] with 9,600 professionals and Juntumen[34] with 3,476.

In conclusion, our study illustrates the current situation of alcohol consumption among Spanish PHC professionals, revealing a prevalence that is greater than the general population, and it is consistent with other international studies. This problem represents an area in which we need to develop preventive strategies and awareness and educational interventions, as well as strategies that help improve the working conditions for PHC professionals. Those in charge of occupational health within the SNS must become more conscious of the magnitude of the problem, offering the necessary advice and help to employees who are identified as drinking too much or hazardously or having an addiction problem through occupational health care units or services (just as they do with professionals who wish to quit smoking). Other entities, such as professional colleges[35], who are aware of the importance of safeguarding the health of their members, already offer this type of preventive intervention.

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## Footnotes

**Contributors** ERR, LPT, JFG, JPR, ARV, FCG conceived of the study, participated in its design and implementation, and wrote the manuscript. LPT and ERR analysed the data. All authors read and approved the final manuscript.

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**Competing interests** None declared.

**Data sharing statement** No additional data available.

# Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

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| | | Reporting Item | Page Number |
|---|---|---|---|
| Title | #1a | Indicate the study's design with a commonly used term in the title or the abstract | 2 |
| Abstract | #1b | Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Background / rationale | #2 | Explain the scientific background and rationale for the investigation being reported | 4 |
| Objectives | #3 | State specific objectives, including any prespecified hypotheses | 4 |
| Study design | #4 | Present key elements of study design early in the paper | 4 |
| Setting | #5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 4 |
| Eligibility criteria | #6a | Give the eligibility criteria, and the sources and methods of selection of participants. | 4 |

| | | | |
|---|---|---|---|
| | #7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| Data sources / measurement | #8 | For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable. | 5 |
| Bias | #9 | Describe any efforts to address potential sources of bias | 4-5 |
| Study size | #10 | Explain how the study size was arrived at | 5 |
| Quantitative variables | #11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why | 5 |
| Statistical methods | #12a | Describe all statistical methods, including those used to control for confounding | 5 |
| | #12b | Describe any methods used to examine subgroups and interactions | n/a |
| | #12c | Explain how missing data were addressed | n/a |
| | #12d | If applicable, describe analytical methods taking account of sampling strategy | 4-5 |
| | #12e | Describe any sensitivity analyses | n/a |
| Participants | #13a | Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable. | 5-6 |
| | #13b | Give reasons for non-participation at each stage | See note 1 |
| | #13c | Consider use of a flow diagram | n/a |
| Descriptive data | #14a | Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and | 5-6 |

| | | | |
|---|---|---|---|
| | | unexposed groups if applicable. | |
| | #14b | Indicate number of participants with missing data for each variable of interest | n/a |
| Outcome data | #15 | Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable. | 5-6 |
| Main results | #16a | Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 5-6 |
| | #16b | Report category boundaries when continuous variables were categorized | 5-6 |
| | #16c | If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | 5-6 |
| Other analyses | #17 | Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses | |
| Key results | #18 | Summarise key results with reference to study objectives | |
| Limitations | #19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias. | 8-9 |
| Interpretation | #20 | Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence. | 7-8 |
| Generalisability | #21 | Discuss the generalisability (external validity) of the study results | 8-9 |
| Funding | #22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 12 |

## Author notes

1. Discusion (7-8)

BMJ Open

# Alcohol Consumption in Spanish Primary Health Care Providers: A National, Cross-sectional Study

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# Alcohol Consumption in Spanish Primary Health Care Providers: A National, Cross-sectional Study

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Alcohol Consumption in Spanish Primary Health Care Providers: A National, Cross-sectional Study

**Abstract**

**Aim:** To estimate the prevalence of alcohol consumption and analyse the drinking patterns among Primary Health Care (PHC) providers.

**Design**: Observational, cross-sectional, descriptive study.

**Setting**: PHC centres in the Spanish National Health System (SNHS).

**Participants**: Doctors and nurses who completed an on-line questionnaire which explored their alcohol intake, using the AUDIT-C alcohol assessment tool. The study population was recruited by random sampling stratified by regions of the SNHS PHC centres.

**Primary and Secondary Outcome Measures:** Frequency of alcohol consumption, number of alcohol drinks on a typical day, frequency of more than six standard drinks (SDs) intake.

**Results:** A total of 1,760 PHC providers completed the questionnaire. The frequency of alcohol consumption was: abstention (12%) (95% confidence interval [95% CI] 10.4–13.5); 1 or less SDs/month (26%) [95% CI 23.8–27.9]; 2–4 SDs/month (32.2%) [95% CI 29.7–34.1]; 2-3 SDs/week (17.9%) [95% CI 16.0–19.6]; 4 or more SDs/week (11.9%) [95% CI 10.3–13.3]. The number of drinks on a typical day was: none (45.6%) [95% CI 42.9–47.6]; 1–2 drinks (47.3%) [95% CI 23.8–27.9]; 3–4 drinks (6.5%) [95% CI 5.3–7.6]. The percentage of hazardous drinking, according to AUDIT-C criteria, was 32% [95% CI 26.7–37.3], with a greater frequency of intake in older professionals ($p<0.001$), in contrast to a higher number of drinks consumed on a typical day by younger providers ($p<0.001$). Intake was higher among males ($p<0.001$), primary care physicians ($p<0.001$) and resident trainers ($p<0.001$).

**Conclusions:** Our study discloses the most up-to-date portrait of current alcohol consumption among Spanish PHC providers, showing a higher prevalence of alcohol intake, compared to the general population. Preventive strategies should be implemented to improve the awareness and training of PHC professionals towards alcohol consumption.

**Keywords:** alcohol; primary health care; professional; alcohol consumption; consumption pattern.

## Article Summary

**Strengths and limitations of this study:**

- The main strength of the study, in comparison with others published in this area, lies in its sample size, due to the fact that it is a nationwide research with one of the broadest samples to date.

- The wide variety of sociodemographic and occupational variables of alcohol consumption recorded in this paper provides a comprehensive analysis of this issue in the Primary Care setting.

-The validity of self-reported alcohol use of Primary Health Care providers could lead to an underestimation of the alcohol intake prevalence.

## Introduction

The European Union has the highest level of alcohol consumption worldwide[1]. Harmful alcohol use generates a substantial mortality burden due to acute and chronic diseases[2]. Therefore, the World Health Organization has established the reduction of the harmful use of alcohol as a public health priority[3], promoting awareness of the magnitude and nature of the social, health and economic problems caused by such consumption.

Nationally, alcohol was the most widely consumed legal drug in 2015 (77.6%), according to the Survey into Alcohol and Drugs in Spain (*Encuesta sobre Alcohol y Drogas en España*, [EDADES])[4], with consumption typically beginning at the age of 16. The EDADES survey indicates that alcohol is considered the substance of least risk of all those consumed by people aged between 15 and 65 years. Furthermore, even though consumption trends have remained stable since 2005, there is an increasing pattern of binge drinking, or intake of more than six standard drinks (SDs), in one session in men or four SDs in women, considering one SD as the equivalent to 10 grams of pure alcohol[5].

Primary health care (PHC) providers play a key role in the approach of alcohol related problems[6] as they are on the front lines of healthcare[7]. According to the Clinician's Guide (2007)[8] by the US National Institute on Alcohol Abuse and Alcoholism, regular visits to PHC professionals that address alcohol consumption can lead to a significant improvement in patients who present hazardous drinking (a pattern of alcohol use that increases the risk of harmful consequence, corresponding to AUDIT-C questionnaire scores greater than 5 in men and 4 in women)[9].

The development of preventive strategies to reduce PHC professionals´ alcohol consumption encompasses several factors, among which professional's drinking habits stand out[10]. In their study, Frank et al.[11] point out that drinking patterns of health professionals correlate significantly with their clinical practice when offering advice and screening for hazardous drinking. Currently, there are several studies addressing the alcohol use among healthcare providers from different

health areas[12,13,14]. However, only a limited number of studies have analysed the alcohol consumption of PHC professionals [15,16, 17].

The objectives of this study were: 1) to estimate the prevalence of alcohol consumption among PHC providers; 2) to identify the current alcohol drinking patterns reported by these professionals; 3) to evaluate the relationship between the providers' socio-demographic and occupational variables and their level of consumption.

## Method

We designed an observational, cross-sectional, descriptive, multicentre study. The study population was comprised of providers working in PHC centres belonging to the Spanish National Health System (SNHS). The study lasted 24 months, with a recruitment period running from August 2014 to August 2016.

Study data was collected through an ad hoc questionnaire designed by members of the Córdoba Family and Community Medicine Teaching Unit, under guidance from PAPPS (Preventive Activities and Health Promotion Programme) Evaluation and Improvement Group of the Spanish Society of Family and Community Medicine (semFYC), and subjected to a consensus, apparent-logic and content validity process. The questionnaire was designed to be anonymously self-completed. The selection criteria were: PHC provider (primary care physician, nurse or medical resident of family and community medicine) working at the SNHS and who consented to participate in the study. The sample size was calculated assuming an alpha error of 5%, an accuracy of 3% and an expected prevalence of alcohol consumption of 50% ($p = q = 0.5$; maximum uncertainty). Consequently, it was necessary to include at least 1068 healthcare providers.

The study population was recruited by three ways:

1) Through participants from a previous study (CECC-AP study)[18], who were recruited through PAPPS and the semFYC Communication & Health Group.

2) By emailing the members of the semFYC and SEMERGEN (Spanish Society of Primary Care Physicians) databases and uploading the study survey to their websites, making it freely available for anyone who wished to complete it.

3) Through stratified random sampling of SNHS health centres, according to the number of centres in each Spanish region. An email was sent to the health centre managers, inviting both them and the other members of the PC team to participate, using a snowballing technique.

The sample was obtained from the catalogue developed by the Spanish Ministry of Health[19]. According to the 2014 database, there were 2,997 health centres and 10,168 PC clinics, with an estimated amount of 33,482 doctors working in public PHC. Considering that 75% of the selected centres would like to collaborate in the study, and an average of four health providers per health centre and two per local clinic would like to participate, a sample of at least 430 local health centres and clinics was deemed necessary.

The global response rate, considering the affiliation with scientific societies, was 6.3%. The survey was sent to 16,474 semFYC members and 8,000 SEMERGEN affiliates. Finally, 1110 semFYC members and 469 SEMERGEN affiliates completed the questionnaire.

The study variables were sociodemographic (age, sex, autonomous region), occupational (type of provider, resident trainer, time working in PHC, membership of scientific societies, affiliation to PAPPS) and related to alcohol intake. Alcohol consumption among the PHC professionals was measured using the AUDIT-C questionnaire[20] (frequency of alcohol consumption, number of alcohol drinks on a typical day, frequency of consuming more than 6 SDs/day). AUDIT-C questionnaire uses the three items of the original AUDIT questionnaire. Each question was scored from 0-4, with a possible summary score from 0 to 12. Hazardous drinking (a pattern of alcohol use that increases the risk of harmful consequence) was defined using AUDIT-C criteria as scores greater than 5 in men and 4 in women[21,22,23]. However, it is crucial to bear in mind that the selection of the cut-off point is influenced by national and cultural standards, hence, hazardous drinking definition may vary in several countries.

PHC providers completed the on-line questionnaire via Google Drive. The data were statistically analysed using SPSS 17.0 and EPIDAT 3.1 software. Descriptive statistics and 95% confidence intervals (95% CI) were calculated for the main study estimators. Subsequently, a bivariate analysis was conducted to test the relationship between the independent variables and the alcohol consumption questions (chi-square test for qualitative variables, Student's t-test or ANOVA for quantitative variables, previous verification of normality with the Kolmogorov–Smirnov test). Bilateral hypothesis testing with a p-value $\leq 0.05$ was used. Finally, a multivariate analysis was performed to verify which variables were independently associated with alcohol consumption. To this end, the following variables: alcohol consumption (dichotomised variable: alcohol intake or non-alcohol intake; derived from the item ¨frequency of consumption¨; considering non-alcohol intake if the answer was -never-, and alcohol intake if the answer was any other option), age, sex, type of providers (which was treated as a dummy variable, taking as a reference category the lowest frequency of consumption in the bivariate analysis), time working in PHC, resident trainer and affiliation to PAPPS, were included in a maximum model. Those variables with a Wald test p-value $> 0.05$ were eliminated, obtaining the most parsimonious

model. The Hosmer–Lemeshow test was applied to check the model's goodness of fit. The project was approved by the Ethics Committee at the Reina Sofía University Hospital, Córdoba.

Patient Involvement

There were no patients involved in the development of the research question, the design of the study, the recruitment and the conduct of the research.

## Results

A total of 1,760 PHC providers participated in the study. The professionals' sociodemographic and occupational characteristics are shown in Table 1. Participants were predominantly female (62.9%; 95% CI:60.6–65.2); had an average age of 47.7 years (SD 11.24, range: 26 to 64 years; 95% CI: 47.17–48.22); and had worked in the PHC setting for an average of 14.10 years (SD 10.55; range: 1–39; 95% CI: 13.60–14.59).

**Table 1.**

**Sociodemographic and occupational characteristics of providers surveyed**

| Characteristics of providers | n (%) | 95% CI |
|---|---|---|
| Sex | | |
| Male | 653 (37.1) | 34.8-39.4 |
| Female | 1107 (62.9) | 60.6-65.2 |
| Age (years) | | |
| Less than 35 | 475 (27.2) | 24.9-29.1 |
| 36-45 | 432 (24.7) | 22.5-26.6 |
| 46-55 | 426 (24.4) | 22.2-26.2 |
| 56 or more | 415 (23.7) | 21.6-25.6 |
| Type of provider | | |
| Primary care physician | 1330 (75.6) | 73.5-77.6 |
| Nurse | 220 (12.5) | 10.9-14.1 |
| Medical Resident | 201 (11.4) | 9.9-12.9 |
| Resident Trainer | | |
| Yes | 588 (33.4) | 31.2-35.6 |

| | | |
|---|---|---|
| No | 1172 (66.6) | 64.4-68.8 |
| Affiliation with Scientific Societies | | |
| semFYC | 1117 (63.5) | 61.2-65.7 |
| SEMERGEN | 472 (26.8) | 24.7-28.9 |
| SEMG | 79 (4,5) | 3.5-5.5 |
| ASANEC | 21 (1.2) | 0.7-1.7 |
| Other | 71 (4.0) | 3.1-5.0 |
| Affiliation to specific programs: PAPPS * | 456 (25.9) | 23.8-28.0 |

* Program of Preventive Activities and Health Promotion (semFYC); 95% CI: 95% confidence interval

The frequency of alcohol consumption in PHC providers was: teetotaller 12% (95% CI: 10.4–13.5); 1 or 2 SDs per month in 26% (95% CI: 23.8–27.9); and 2 to 4 SDs every month in 32.2% (95% CI: 29.7–34.1); 2-3/ per week 17.9 (95% CI: 16-19.6); 4 or more/ per week 11.9% (95% CI: 10.3–13.3) (Table 2). Considering the number of alcoholic drinks on a typical day, 45.6% (95% CI: 42.9–47.6) reported drinking 0 SD, whereas 47.3% (95% CI: 44.6–49.3) said they consumed 1 or 2 SDs. With regards to binge drinking, 19.5% (95% CI: 17.5–21.2) confirmed they drank 6 or more SDs at least once a month. Furthermore, hazardous drinking was recorded in 32.0% (95% CI: 26.7–37.3) of the surveyed PHC providers, based on AUDIT-C criteria. Considering the gender of PHC professionals, 24% (95% CI: 22.4–27.5) of the female providers and 34.2% (95% CI: 30.6–37.9) of the male professionals had hazardous drinking.

**Table 2.**

**Alcohol consumption of Primary Health Care providers.**

| Alcohol consumption | n (%) | 95% CI |
|---|---|---|
| Frequency of consumption | | |
| Never | 210 (12.0) | 10.4-13.5 |
| 1-2/ per month | 455 (26.0) | 23.8-27.9 |
| 2-4/ per month | 562 (32.2) | 29.7-34.1 |
| 2-3/ per week | 313 (17.9) | 16.0-19.6 |
| 4 or more/ per week | 208 (11.9) | 10.3-13.3 |
| Number of alcoholic drinks on a typical day | | |

| | | |
|---|---|---|
| 0 | 797 (45.6) | 42.9-47.6 |
| 1-2 | 827 (47.3) | 44.6-49.3 |
| 3-4 | 113 (6.5) | 5.3-7.6 |
| 5-6 | 9 (0.5) | 0.2-0.8 |
| 10 or more | 2 (0.1) | 0.01-0.4 |
| Drinking 6 or more drinks in one day | | |
| Never | 1325 (75.8) | 73.2-77.3 |
| Less than monthly | 341 (19.5) | 17.5-21.2 |
| Monthly | 59 (3.4) | 2.5-4.2 |
| Weekly | 21 (1.2) | 0.7-1.7 |
| Daily | 2 (0.1) | 0.01-0.4 |

95% CI: 95% Confidence Interval

There was a statistically significant relationship between the variables age and frequency of alcoholic drink consumption (Chi-square= 191.16, p<0.001) (Table 3); older professionals tended to drink more frequently. In contrast, the data revealed younger medical providers drank a greater number of drinks on a typical day (Chi-square= 74.18, p<0.001) (Table 4). Binge drinking was more prevalent among younger PHC providers (Chi-square= 78.45, p<0.001) (Table 5).

**Table 3.**

**Frequency of alcohol consumption of Primary Health Care providers**

| Variable | | Never n (%) | 1 o less/ per month n (%) | 2-4/per month n (%) | 2-3/per week n (%) | 4 or more/per week n (%) | p Value* |
|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 60 (12.6) | 137 (28.8) | 193 (40.6) | 70 (14.7) | 15 (3.2) | <0.001 |
| | 36-45 | 80 (18.5) | 120 (27.8) | 147 (34) | 62 (14.4) | 23 (5.3) | |
| | 46-55 | 42 (9.9) | 115 (27.0) | 127 (29.8) | 80 (18.8) | 62 (14.6) | |
| | More than 55 | 28 (6.7) | 83 (20.0) | 95 (22.9) | 101 (24.3) | 108 (26.0) | |
| Sex | Male | 40 (6.2) | 137(21.1) | 172 (26.5) | 151 (23.3) | 149 (23.0) | < 0.001 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Female | 170 (15.5) | 318 (28.9) | 390 (35.5) | 162 (14.7) | 59 (5.4) | |
| Type of provider | Primary care physician | 135 (10.2) | 323 (24.4) | 413 (31.2) | 257 (19.4) | 194 (14.7) | < 0.001 |
| | Medical Resident | 27 (13.0) | 69 (33.2) | 83 (39.9) | 25 (12.0) | 4 (1.9) | |
| | Nurse | 48 (22.0) | 63 (28.9) | 66 (30.3) | 31 (14.2) | 10 (4.6) | |
| Resident Trainer | Yes | 50 (8.6) | 126 (21.6) | 173 (29.6) | 129 (22.1) | 106 (18.2) | <0.001 |
| | No | 160 (13.7) | 329 (28.3) | 389 (33.4) | 184 (15.8) | 102 (8.8) | |

*Chi-square Test

**Table 4.**

**Number of Standard Drinking Units (SD) of alcohol consumed by Primary Health Care providers on a typical day**

| Variable | | None n (%) | 1 -2 SDs n (%) | 3-4 SDs n (%) | 5-6 SDs n (%) | 7-9 SDs n (%) | 10 or more SDs n (%) | p Value* |
|---|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 230 (48.4) | 203 (42.7) | 35 (7.4) | 7 (1.5) | 0 (0.0) | 0 (0.0) | < 0.001 |
| | 36-45 | 240 (55.6) | 168 (38.9) | 20 (4.6) | 1 (0.2) | 1 (0.2) | 2 (0.5) | |
| | 46-55 | 196 (46.0) | 203 (47.7) | 26 (6.1) | 1 (0.2) | 0 (0.0) | 0 (0.0) | |
| | More than 55 | 131 (31.6) | 253 (61.0) | 31 (7.5) | 0 (0) | 0 (0.0) | 0 (0.0) | |
| Sex | Male | 206 (31.7) | 374 (57.3) | 63 (9.7) | 6 (0.9) | 0 (0.0) | 0 (0.0) | <0.001 |
| | Female | 591 (53.8) | 453 (41.2) | 49 (4.3) | 3 (0.3) | 1 (0.2) | 2 (0.2) | |
| Type of provider | Primary care physician | 574 (43.4) | 655 (49.5) | 85 (6.4) | 6 (0.5) | 0 (0.0) | 2 (0.2) | 0.086 |
| | Medical Resident | 104 (50.0) | 87 (41.8) | 14 (7.0) | 2 (1.0) | 1 (0.2) | 0 (0.0) | |
| | Nurse | 119 (54.6) | 85 (39.0) | 13 (6.0) | 1 (0.2) | 0 (0.0) | 0 (0.0) | |
| Resident Trainer | Yes | 224 (38.4) | 322 (55.0) | 36 (6.0) | 1 (0.2) | 1 (0.2) | 1 (0.2) | 0.001 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | 573 (49.2) | 505 (43.4) | 77 (6.6) | 8 (0.7) | 0 (0.0) | 1 (0.1) |

SD: Standar Drink; * Chi-square Test.

**Table 5.**

**Binge drinking frequency of Primary Health Care providers**

| Variable | | Never n (%) | Less than once per month n (%) | Monthly n (%) | Weekly n (%) | Daily n (%) | p Value* |
|---|---|---|---|---|---|---|---|
| Age (years) | Less than 35 | 299 (62.9) | 137 (28.8) | 32 (6.7) | 6 (1.3) | 1 (0.2) | < 0.001 |
| | 36-45 | 344 (79.6) | 75 (17.4) | 9 (2.1) | 3 (0.7) | 1 (0.2) | |
| | 46-55 | 350 (82.2) | 69 (16.2) | 5 (1.2) | 2 (0.5) | 0 (0.0) | |
| | More than 56 | 332 (80.0) | 60 (14.5) | 13 (3.1) | 10 (2.4) | 0 (0.0) | |
| Sex | Male | 418 (64.4) | 183 (28.2) | 33 (5.1) | 15 (2.3) | 0 (0.0) | < 0.001 |
| | Female | 907 (82.5) | 158 (14.4) | 26 (2.4) | 6 (0.5) | 0 (0.0) | |
| Type of provider | Primary care physician | 1007 (76.2) | 258 (19.5) | 42 (3.2) | 3(1) | 2 (0.2) | < 0.001 |
| | Medical Resident | 132 (76.2) | 61 (29.3) | 12 (5.8) | 3 (1.4) | 0 (0.0) | |
| | Nurse | 186 (85.3) | 22 (10.1) | 5 (2.3) | 5 (2.3) | 0 (0.0) | |
| Resident trainer | Yes | 462 (79.1) | 107 (18.3) | 8 (1.4) | 6 (1) | 1 (0.2) | 0.012 |
| | No | 863 (74.1) | 234 (20.1) | 51 (4.4) | 15 (1.3) | 1 (0.1) | |

* Chi-square Test.

Evaluation of the frequency of alcohol intake with respect to gender (Table 3) showed that women had a higher abstention rate than men (15.5% vs. 6.2%) (Chi-square=171.98, p<0.001). On the other hand, a higher percentage of men (57.3%) consumed 1 or 2 drinks/day than women (41.2%) (Chi-square=88.00, p<0.001) (Table 4). In terms of binge drinking, women have a higher abstention rate than men (82.5% vs. 64.4%) (Chi-square= 78.33, p<0.001) (Table 5).

Analysing the frequency of alcohol consumption according to the type of PHC professional, data revealed that 33.2% of medical residents drink alcohol 1 or less times per month, in contrast to primary care physicians, who had a higher rate of alcohol intake with a frequency of 4 or more times per week (14.7%) (Chi-square= 75.59, p<0.001). With respect to binge drinking, nurses presented the highest percentage of abstention from this drinking pattern. On the other hand, it was observed that residents had a higher percentage of intensive intake monthly (5.8%), compared to primary care physicians (3.2%) and nurses (2.3%) (Chi-square=34.87, p<0.001) (Table 5).

Focusing on the resident trainer group, the percentage of 1-2 SDs consumed on a typical day was higher in this group than non-trainer group (55.0% vs 43.4%) (Chi-square= 23.81, p<0.001) (Table 4) and, also, the resident trainer group drank alcohol more frequently on a weekly basis (21.1% vs. 15.8%) (Chi-square= 54.99, p<0.001) (Table 3). However, resident trainers reported a higher rate of abstention from binge drinking pattern (79.15%) (Chi-square= 12.81, p=0.012) (Table 5).

As shown in Table 6, the variables associated with alcohol intake by means of multivariate analysis, and after adjusting the model for the rest of the variables under consideration, were: age (greater consumption in older participants), sex (men drank more) and type of provider (highest alcohol intake was observed in medical residents and primary care physicians).

**Table 6.**

**Variables associated with alcohol consumption. Multivariate analysis.**

| Variable | OR | 95% CI | p Value |
|---|---|---|---|
| Age | 1.02 | 1.01-1.03 | <0.001 |
| Sex (Male vs. Female) | 2.26 | 1.83-2.79 | <0.001 |
| Type of provider | -- | -- | 0.028 |
| -Primary care physician vs. Nurse | 1.44 | 1.07-1.93 | 0.016 |
| -Medical Resident vs. Nurse | 1.67 | 1.09-2.54 | 0.017 |

Dependent variable: alcohol consumption (Yes vs Not); OR: Odds Ratio; 95% CI: 95% Confidence Interval;

Hosmer-Lemeshow Test: 18,266; p = 0.019

## Discussion

This study represents the first national analysis of alcohol consumption patterns among PHC providers in Spain. Therefore, it can be used to make comparisons against studies conducted in the Spanish general population, as well as, with health professionals worldwide.

There are currently several regional studies dealing with the alcohol drinking patterns of PHC providers, among which stand out those published by Rodríguez et al.[15] and Aubá et al.[16] These studies highlighted the need to quantify alcohol intake among PHC professionals. In addition, Galatea Foundation have conducted local studies towards PHC providers´ lifestyle habits, including alcohol consumption, and working conditions in Catalonia[17]. In this regard, Saeys and Cammu[24] suggested the behaviour of health care professionals demonstrated at work affected patient attitudes and their motivation towards making lifestyle changes, including the reduction or abstention from drug substances such as alcohol.

One of the most relevant aspects of this research is the quantification of hazardous drinking, derived from the AUDIT-C questionnaire, which has been introduced in other national studies[25]. Rosta[26] detected a percentage of 16-18% of professionals with hazardous drinking, a value which is clearly below the one obtained in this study (32%). Whereas, Antoni Gual[27] stated, in a study conducted on a sample of 4,250 individuals, that 22% of the Spanish adult general population asserted they consumed alcohol above hazard threshold.

The high percentage of hazardous drinking among PHC providers[28], in comparison with the general population, can be explained by the presence of several factors analysed in our study: age, sex, type of PHC provider, time worked or to be trainer. With respect to gender differences, the results of the present study agree with the previous surveys carried out in Spain[15,16,17], which also emphasised a higher incidence of consumption among men. Furthermore, the results of our study are consistent with those obtained from EDADES and the European Health Survey (EESE)[29], referring to the Spanish population. Both observed a male predominance with respect to binge drinking, as well as higher levels of this intensive consumption pattern among younger participants.

Similarly to the Spanish population, alcohol intake detected in PHC professionals increased with age, although it was remarkable that younger participants drank a greater number of drinks on a typical day. This higher number of drinks consumed by the younger population correlates with the increasing prevalence of binge drinking observed among youth in recent years. Thus, the Spanish National Health Survey (ENS)[30] 2011–2012 already indicated this finding, identifying that the number of drinks on a typical day was higher in the younger population (11% of men and 5.5% of women aged between 15 and 24 years).

One of the striking results of the study is alcohol drinking pattern that PHC professionals show; thus, a third of the providers presented a frequency of consumption of 2-4 times a month, followed by 26% consuming 1 or less times a month. In regional studies, such as Rodriguez[15], the predominant pattern was occasional intake (32%). These data obtained for PHC professional contrast with those from the ENS 2011–2012 survey in which 38.3% of respondents drunk alcohol at least once per week.

Our data reveal differences between different type of professionals; primary care physicians drink more frequently, while resident doctors consume a higher number of drinks on a typical day, and nurses show the highest level of abstention. There are no studies available that allow us to compare these data in the context of PHC. Hence, future research is needed to evaluate differences in alcohol consumption among PHC professionals.

Additionally, alcohol intake can be influenced by other factors: occupational conditions[31] (number of shifts, occupational burnout syndrome, or the number of hours worked per week), degree of job satisfaction, organisational climate, personal situation (marital status, number of children) and area of medical specialisation[32]. Rosta evaluated these factors in a sample of 1,917 German doctors working in different specialties within a hospital context, finding approximately 20% of hazardous drinkers. In the study conducted by Oreskovich[23], with a sample of 7197 surgeons, 15.4% of hazardous drinkers were found, identifying as predisposing factors for high consumption: burnout (OR 1.25, 1.06-1.48 CI 95%), depression (OR 1.48, 1.26-1.73 IC 95%), or medical malpractice (OR 1.45, 1.17-1.78 IC 95%). Therefore, integral care programs for PHC professionals should be encouraged to ensure the quality of healthcare interventions. Nationwide, the Comprehensive Program for the Sick Doctor (PAIME)[33] promotes specialized assistance for sick professionals, including those with risky alcohol consumption.

This study includes some limitations that must be considered. One of the difficulties encountered in the measurement of alcohol consumption lies in the validity and comparability of the data, given the wide disparity in the volume of alcohol intake registered in the literature and the self-reported providers´ alcohol use, which could have underestimated the prevalence of the alcohol consumption[34]. On the other hand, another limitation of this study, derived from its design, lies in the impossibility of establishing the trend of alcohol consumption among PHC providers. This would require a non-cross-sectional and long-term study. Likewise, it is necessary to bear in mind the selection bias, given the willingness to respond to the questionnaire, with the most motivated professionals in the subject being the most likely to answer it, which could distort the true prevalence of alcohol consumption. In addition, the impact of social desirability bias should be considered, particularly due to the fact that PHC providers work in a safety-sensitive environment, where hazardous alcohol use might be concerning, and many of the professionals were individuals in training who may fear how their responses would impact their evaluations.

To analyse the representativeness of the sample with respect to the study population, we compared our data according to age and sex, against 2015 data published by the Spanish Organisation of Medical Colleges (OMC)[34]. The proportion of female primary care physicians in Spain was 54.2% and this percentage rises to 62.9% in our study, therefore, an overrepresentation of female doctors may be deemed. Besides, given that the prevalence of alcohol consumption in women is known to be less than in men, an underestimation of the overall alcohol intake should be estimated. Regarding age, a greater proportion of young professionals has been observed among the providers in the present study. In this setting, considering a higher level of consumption has been observed among younger professionals, it is possible to suspect that this could have caused an overestimation of the overall prevalence of alcohol consumption. On the other hand, the sample size of the present study is considered representative of PHC professionals, since more than 95% worked for the SNHS.

One of the strengths of our study, in comparison with others published in this area, lies in its sample size, due to the fact that it is a nationwide study with one of the broadest samples to date. However, there are international studies with a greater sample size, highlighting publications by Hughes[35] with 9,600 professionals and Juntumen[36] with 3,476.

In conclusion, our study highlights the current situation of alcohol consumption among Spanish PHC providers, showing a higher prevalence than general population, and being consistent with others international studies. This problem constitutes an issue in which preventive strategies and awareness-raising and training interventions must be developed. The responsible for occupational health of the SNHS should become conscious of the magnitude of the problem, offering the necessary advice and help to providers with hazardous drinking through occupational health care units or services[33].

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## Footnotes

**Contributors** ERR, LPT, JFG, JPR, ARV, FCG conceived of the study, participated in its design and implementation, and wrote the manuscript. LPT and ERR analysed the data. All authors read and approved the final manuscript.

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**Competing interests** None declared.

**Data sharing statement** No additional data available.

# Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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| | | Reporting Item | Page Number |
|---|---|---|---|
| Title | #1a | Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| Abstract | #1b | Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |

| | | | |
|---|---|---|---|
| Background / rationale | #2 | Explain the scientific background and rationale for the investigation being reported | 3-4 |
| Objectives | #3 | State specific objectives, including any prespecified hypotheses | 4 |
| Study design | #4 | Present key elements of study design early in the paper | 4 |
| Setting | #5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 4 |
| Eligibility criteria | #6a | Give the eligibility criteria, and the sources and methods of selection of participants. | 4 |
| | #7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| Data sources / measurement | #8 | For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable. | 5 |
| Bias | #9 | Describe any efforts to address potential sources of bias | 4-5 |
| Study size | #10 | Explain how the study size was arrived at | 5 |

| | | | |
|---|---|---|---|
| Quantitative variables | #11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why | 5 |
| Statistical methods | #12a | Describe all statistical methods, including those used to control for confounding | 4-5 |
| | #12b | Describe any methods used to examine subgroups and interactions | 4-5 |
| | #12c | Explain how missing data were addressed | n/a |
| | #12d | If applicable, describe analytical methods taking account of sampling strategy | 4-5 |
| | #12e | Describe any sensitivity analyses | n/a |
| Participants | #13a | Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for exposed and unexposed groups if applicable. | 5-6 |
| | #13b | Give reasons for non-participation at each stage | n/a |
| | #13c | Consider use of a flow diagram | n/a |
| Descriptive data | #14a | Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential | 5-6 |

| | | | |
|---|---|---|---|
| | | confounders. Give information separately for exposed and unexposed groups if applicable. | |
| | #14b | Indicate number of participants with missing data for each variable of interest | n/a |
| Outcome data | #15 | Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable. | 5-11 |
| Main results | #16a | Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 5-6 |
| | #16b | Report category boundaries when continuous variables were categorized | 5 |
| | #16c | If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | 5-6 |
| Other analyses | #17 | Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses | 5-11 |
| Key results | #18 | Summarise key results with reference to study objectives | 12-14 |
| Limitations | #19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias. | 13-14 |

| | | | |
|---|---|---|---|
| Interpretation | #20 | Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence. | 12-14 |
| Generalisability | #21 | Discuss the generalisability (external validity) of the study results | 14 |
| Funding | #22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 18 |

## Author notes

1. Discusion (11-14)

 This checklist was completed on 19. May 2018 using http://www.goodreports.org/, a tool made by the EQUATOR Network in collaboration with Penelope.ai