

The epidemiology of alcohol use in Izmir, Turkey: drinking pattern, impairment and help-seeking

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Abstract

Purpose There is no report on various patterns of alcohol drinking and related impairment, help-seeking in Turkey. We investigated the 12-month prevalence and correlates of drinking patterns and alcohol use disorders in the general population of Izmir-Turkey, with further analyses on role impairment and help-seeking.

Method A multi-stage clustered area probability sample of adult household residents in the Izmir Metropolitan Area was assessed using the Composite International Diagnostic Interview 2.1 ($n = 4011$). Estimation focused on prevalence and correlates of 12-month drinking pattern and DSM-IV alcohol use disorders. The 12-month drinking pattern included groups of non-regular users, regular non-heavy drinkers, regular heavy drinkers, and alcohol abuse disorder and alcohol dependence. All respondents were questioned about receiving 12-month treatment for any psychological complaints, the route of help-seeking, and were assessed with Short Form-36 for functional impairments. Multinomial logistic regression was used for underlying associations between the covariates and the drinking patterns.

Results The rate of lifetime alcohol abstinence was 52.3% while the prevalence of past-year users was 14.8%. The 12-month prevalence estimates of regular heavy drinkers, and alcohol abuse disorder and dependence were 2.5%, 3.2

and 1.6%, respectively. Any of the drinking patterns and alcohol use disorders was associated with male gender, and higher levels of education, monthly income and socio-economic status. Alcohol dependence was associated with mental health impairment but not with physical impairment. The 12-month rates of help-seeking in alcohol abuse and dependence were 11.6 and 16.5%.

Conclusion Although alcohol use disorders are lower than estimates of Western countries, alcohol use constitute a major reason of disability with prominent treatment gap.

Keywords Alcohol · Drinking · Epidemiology · Help-seeking · Role impairment

Introduction

The hazardous and harmful use of alcohol is globally one of the major contributing factors to death, disease and injury [1, 2]. Alcohol is associated also with many serious social issues, including violence, child neglect and abuse, and absenteeism in the social life [3–5]. Alcohol consumption and problems related to alcohol vary widely around the world, but the burden of disease remains significant in most countries [4]. 7.6 and 1.4% of the global burden of disease are attributable to alcohol consumption among men and women, respectively [4]. Alcohol use disorders accounted for 9.6% of disability adjusted life years caused by mental disorders [4].

The world's highest alcohol consumption levels are found in the developed world, particularly in Western and Eastern Europe [6]. However, it does not follow that high income and high consumption always translate into increased rates of alcohol-related problems and high-risk drinking [1, 5]. The highest consumption levels can also be

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found in Argentina, Australia and New Zealand [6] whereas medium consumption levels are reported in southern Africa and in South America [6]. Low consumption levels can be found in the countries of North Africa and sub-Saharan Africa, the Eastern Mediterranean region, and southern Asia and the Indian Ocean [1]. These regions represent large populations of the Islam, which have very high rates of abstinence [1, 6, 7].

Epidemiology of alcohol use disorders shows similarity to alcohol consumption levels [8]. The world's highest alcohol use disorder levels are found in the developed world [6]. Lifetime prevalence of alcohol abuse and dependence were 13.2 and 5.4%, respectively in United States [9], any lifetime alcohol use disorder was found between 1.3 and 13.5% among ten European countries [5]. Prevalence estimates of alcohol use disorders in Muslim countries are quite low compared to western societies [6]. The 12-month prevalence of alcohol use disorders in Afghanistan, Algeria, Bahrain, Iran, and Iraq in 2004 were between 0.09 and 1.07% [1, 6].

The geographical location of Turkey allows different cultural influences both from the Muslim countries where alcohol use is religiously and/or lawfully forbidden, and from the European countries where alcohol usage is highly prevalent [10]. According to the 2003 World Health Survey, the rate of lifetime abstainers was 81.1% (65.9% in males and 92.4% in females). In addition to religion related limits [11], the rate of abstinence and drinking patterns display temporal, regional and residential (urban vs. rural) variation. In 2014, WHO reported an abstinence rate of 79.6% and the 12-month prevalence estimates of alcohol use disorder and alcohol dependence were 2.7 and 0.8%, respectively in Turkey [10]. The rate of heavy and hazardous drinking (defined as average consumption of 40 g or more of pure alcohol a day for men and 20 g or more of pure alcohol a day for women) was 1.1% (1.9% in males and 0.5% in females) [12].

The number of epidemiological studies on alcohol use is limited in Turkey [13–16]. One comprehensive nationwide study conducted in 1995 reported the 12-month prevalence of alcohol dependence as 0.8% (1.7% in males, 0.1% in females) [17].

The aim of the study was to estimate one year prevalence and correlates of alcohol abuse and dependence with different drinking patterns in the general population of Izmir-Turkey, with further estimates on impairment and admission to mental health services.

Methods

The TürkSch study (Izmir Mental Health Survey for Gene-Environment Interaction in Psychoses) is a

prospective-longitudinal study to screen and follow-up mental health outcomes in a general population sample in Izmir, Turkey. The TürkSch consists of two separate screening waves (T_1 in 2008 and T_2 in 2014) and several stages of data collection. The present paper uses data collected in stage 1 of T_1 . The TürkSch-study has been described in more detail in previous papers [18–21].

Study population

The TürkSch study was approved by the Ege University ethics committee and has, therefore, been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The Turkish Institute of Statistics (TurkStat) randomly selected 6000 households in the wider Izmir metropolitan area. The sample covered 294 of the 348 administrative neighbourhoods in Izmir with an additional 8 rural neighbourhoods out of 35 rural neighbourhoods located at least 30 kilometres from the city centre. Addresses were contacted between November 2007 and October 2008 in T_1 . One household member aged between 15 and 64 years and available to complete the interview was randomly selected using the Kish within-household sampling method [22]. Out of 6000 addresses, 5242 households were eligible for interview. A total of 4011 individuals were successfully interviewed after providing informed consent, yielding a response rate of 76.5%. Compared to general population of Izmir metropolitan area, respondents included more females and older age groups. More details have been described elsewhere [18, 19].

Screening and diagnostic instrument

To assess mental health, screening and diagnoses were based on the relevant sections of the Composite International Diagnostic Interview (CIDI) 2.1 [23] which is a fully structured interview developed by the World Health Organization (WHO). CIDI-based screening of symptoms provides diagnoses in accordance with the definitions and criteria of the International Classification of Diseases, Tenth Revision (ICD-10), and the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV). Previous research reported acceptable-to-good concordance between the CIDI 2.1 diagnoses and other procedures for clinical diagnoses of alcohol use disorders [24, 25].

Mental health screening of the TürkSch included CIDI screening sections on tobacco, alcohol and drug use disorders (time frame 12-month), depressive and dysthymic disorders (time frame 12-month), manic and bipolar affective disorders (time frame 12-month), schizophrenia and other psychotic disorders (time frame lifetime), posttraumatic stress disorder (time frame lifetime), and two final sections

containing concluding questions, interviewer observations, and interviewer ratings [19].

Interviewers, interviewer training and quality control

Lay interviewers had at least high school education, a health-related profession, and/or were experienced in doing field surveys [18, 19]. Two-week training for the CIDI interview was carried out using official CIDI training material. Bimonthly briefing meetings were arranged to exchange and share experiences and prevent interviewer “drift”. To monitor and conduct quality checks of the visits and interviews over the entire data collection period, each interview was assessed using a standard procedure for formal consistency, appropriate recording and coding [19, 26].

Measures

Assessment of drinking pattern

The alcohol module of CIDI 2.1 covers questions regarding alcohol use, drinking patterns, and related disturbances [24]. A participant that reported ever drinking alcohol was asked a question about the age of first alcohol intake, and was continued with the next question assessing regular drinking in the last 12-month with drinking at least 12 drinks per year. Only participants who reported regular drinking (at least 12 drinks in the last 12-month) continued with the next part of the alcohol module assessing symptoms of alcohol abuse and dependence, impairment due to these symptoms, and age of onset [25].

Guided by previous studies [27–29], alcohol drinking pattern was assessed in various steps. The first steps included never use and ever use groups. The second step included past-year users with ever-use respondents who consumed at least one drink in the last 12-month. Across heterogeneous subgroup of past-year users, we distinguished two subgroups: non-regular users who consumed less than 12 drinks and regular users who consumed at least 12 drinks in the last 12-month. Furthermore, regular users were grouped with non-heavy drinkers who consumed four or less drinks per month and had no impairment; heavy drinkers who consumed five or more drinks in a row for men and four or more drinks in a row for women, but no more often than two times per month; and participants with alcohol use disorders which qualify as separate alcohol-related disturbances among regular users, and were identified via the CIDI and its diagnostic algorithm’s application of DSM-IV (abuse and dependence) criteria.

Prevalence estimates were formed using total sample as a denominator for the proportion of each drinking pattern and disorder ranging from never user, ever but not last year user, non-regular user, regular non-heavy user,

regular heavy user to alcohol abuse disorder and alcohol dependence.

Role impairment

Each interview included the Short Form 36 (SF-36) to assess health status and functional impairments in eight scaled scores during the last four weeks [30]. These sections include vitality, physical functioning, bodily pain, general health perceptions, and physical role functioning, emotional role functioning, social role functioning, mental health.

12-month help-seeking

Respondents were questioned about receiving 12-month treatment for any psychological complaints, the route of help-seeking, as well as prescribed medicines and any hospitalization. Based on the collected data and guided by previous work [21], all visits and any routes of help-seeking (inpatient admissions or outpatient visits with a psychiatrist or psychologist; inpatient admissions or outpatient visits with another medical specialist, a primary care physician; any visits to any other health professional) due to any psychological complaint was classified as help-seeking. Furthermore, guided by previous work [31], treatment gap was defined as the proportion of those who need (12-month prevalence of alcohol use disorder) but do not receive care (any respondent with alcohol use disorder but without any help-seeking).

Sociodemographics

A sociodemographic data questionnaire was used to determine independent variables of age, marital status (married, single, divorced or widowed), educational level (below or above 8 years), employment status (employed, unemployed, and economically inactive including housewives, students, retired respondents), socioeconomic status (SES; current and at birth), household monthly income (tertiles: low, medium, high), health insurance (insured, and none or insurance for poverty), and urbanicity of current residence. Urban development level of the neighbourhood area which was provided by the Metropolitan Municipality of Izmir was used to classify current residency of the respondents as slum (including rural), lowly urbanized, and urbanized luxury areas.

Current SES was based on the respondent’s profession or profession of the head of household, and recoded to include three ordinal categories: high (professional and non-manual high employees, and owners of large businesses), medium (non-manual low employee, skilled workers, technicians, and owners of small businesses), and low

(manual workers). SES at birth was also recoded to these categories, using the highest professional position of father.

Statistical analysis

Prevalence estimates of each drinking pattern and disorder (never user, ever but not last year user, non-regular user, regular non-heavy user, regular heavy user, alcohol abuse disorder, and alcohol dependence) were calculated for the whole sample, age subgroups, and sociodemographic correlates. Descriptive statistics of Chi-square and *t* test were applied to the data to test for individual independent association ($p < 0.05$) between the independent and dependent variables, and proportions were presented in terms of the respondents who had particular drinking pattern.

Multinomial logistic regression was used for underlying associations between the covariates and the categories of drinking pattern. All independent variables were considered for the multinomial logistic regression where the reference group was never users. Independent variables of the regression analysis were sex (reference group female), age (reference group 15–24 years), marital status (reference group married), education (reference ≤ 8 years), income (reference low), health insurance (reference insured), current SES (reference high), SES at birth (reference high), employment (reference employed) and residency (reference slum area). Results are reported as odds-ratios (OR) with 95% confidence intervals (CIs). Data analyses were carried out with SPSS 15.0. For the multiple comparisons, the alpha level of significance was adjusted for the number of tests performed (i.e. Bonferroni correction; $0.05/6 = 0.008$).

To explore the impact of other psychiatric comorbidity in the sample, we further analysed rates of depressive disorder and psychotic disorders that possibly moderate help-seeking and impairment in alcohol use. The 12-month prevalence of depressive disorders and lifetime prevalence estimates of psychotic disorders were gathered through former articles of the TürkSch study [21, 26]. For the analyses, a logistic regression model was used to evaluate impact of depression and psychosis on the association between alcohol use and help-seeking, and impairment, respectively. Regression model was adjusted by gender, age and educational level. Each remaining independent variable was included separately into the model.

Results

Socio-demographic characteristics of the study sample have been described elsewhere [19, 20]. Briefly, there were more women (58%) than men in the sample, and younger ages were less represented. Approximately 2/3 of the subjects

had low/low-average education and only around 35% were employed (predominantly men).

Prevalence estimates of alcohol drinking patterns

Table 1 presents the drinking pattern and prevalence estimates of alcohol use disorder for the full sample and by sociodemographic characteristics. Lifetime alcohol abstinence was reported by 52.3% of the participants ($n = 2096$), while the prevalence of past-year users was 14.8% ($n = 594$) of which 17.1% were non-regular users (2.5% of the participants). 4.9% of the participants reported regular use of alcohol as non-heavy drinkers (less than 2 times a month). The 12-month prevalence estimates of regular heavy drinkers, and DSM-IV alcohol abuse and alcohol dependence were 2.5%, 3.2% and 1.6%, respectively.

Demographic and socioeconomic factors associated with drinking patterns

There were associations between drinking patterns and gender, age, educational level and marital status (Table 1). Non-users were mainly female (87%), less educated (65%) and older aged (32%). The rate of past-year users decreased with increasing age from 52.2% in 15–24 year olds to 12.1% among +65 year olds. Any of the 12-month drinking patterns and DSM-IV alcohol use disorders was higher in males with odds ratios increasing from 6.0 to 27.7 with increasing severity of drinking pattern (Table 3). There were various age-effects on drinking patterns: the rate of regular non-heavy use was higher in younger age groups while heavy users and alcohol use disorders were higher in older age groups. The prevalence estimates of alcohol abuse disorder were higher in unmarried and divorced respondents than married ones (5.0% and 4.6% vs. 2.4%) while prevalence of alcohol dependence were highest in divorced respondents (3.2%). Various indicators of socioeconomic status indicate a higher risk of regular alcohol use and alcohol use disorder among respondents with higher levels of education, monthly household income, and current SES and SES at birth (Table 1). All stages of drinking patterns and alcohol use were significantly more prevalent in employed respondents than unemployed and economically inactive respondents while alcohol abuse disorder was also prevalent among unemployed respondents. A similar association pattern was also present between urban development levels of the neighbourhoods; drinking and alcohol use disorders were more prevalent in urbanized neighbourhoods than low-urban or slum areas. After Bonferroni correction, the significance of age was disappeared among all drinking patterns and also significance of education, income and residency were disappeared for alcohol dependence.

Table 1 Prevalence estimates of 12-month drinking pattern and DSM-IV alcohol use disorders

| 12-month drinking pattern and DSM-IV alcohol use disorders | | | | | | | | | | | | | | | | | | |
|------------------------------------------------------------|--------|-----------------------|------------------|--------|-----------------------|------------------------|-----------|-----------------------|--------------------|-----------|-----------------------|------------------------|-----------|-----------------------|--------------------|-----------|-----------------------|--------|
| Ever but not last year | | | Non-regular user | | | Regular non-heavy user | | | Regular heavy user | | | Alcohol Abuse Disorder | | | Alcohol Dependence | | | |
| <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | |
| <i>Total</i> | 4011 | 1321 | 32.9 (0.7) | 102 | 2.5 (0.2) | 198 | 4.9 (0.3) | | 99 | 2.5 (0.2) | | 129 | 3.2 (0.3) | | 66 | 1.6 (0.2) | | |
| <i>Sex</i> | | | | | | | | | | | | | | | | | | |
| Female | 2328 | 578 | 24.8 | 28 | 1.2 | <0.001 | 52 | 2.2 | <0.001 | 25 | 1.1 | <0.001 | 17 | 0.7 | <0.001 | 9 | 0.4 | <0.001 |
| Male | 1683 | 743 | 44.2 | 74 | 4.4 | | 146 | 8.7 | | 74 | 4.4 | | 112 | 6.6 | | 57 | 3.4 | |
| <i>Age</i> | | | | | | | | | | | | | | | | | | |
| 15–24 | 792 | 239 | 30.2 | 23 | 2.9 | 0.12 | 51 | 6.4 | <0.05* | 25 | 3.2 | 0.64 | 27 | 3.4 | 0.28 | 7 | 0.9 | <0.05* |
| 25–34 | 1088 | 376 | 34.6 | 36 | 3.3 | | 51 | 4.7 | | 21 | 1.9 | | 42 | 2.9 | | 13 | 1.2 | |
| 35–44 | 849 | 296 | 34.9 | 23 | 2.7 | | 45 | 5.3 | | 19 | 2.2 | | 27 | 3.2 | | 14 | 1.6 | |
| 45–54 | 720 | 235 | 32.6 | 13 | 1.8 | | 20 | 4.0 | | 20 | 2.8 | | 21 | 2.9 | | 20 | 2.8 | |
| 55–64 | 562 | 175 | 31.1 | 7 | 1.3 | | 14 | 3.9 | | 14 | 2.5 | | 12 | 2.1 | | 12 | 2.1 | |
| <i>Marital status</i> | | | | | | | | | | | | | | | | | | |
| Married | 2669 | 867 | 32.5 | 56 | 2.1 | <0.001 | 101 | 3.8 | <0.001 | 58 | 2.2 | <0.05* | 63 | 2.4 | <0.001 | 40 | 1.5 | 0.07 |
| Unmarried | 974 | 357 | 36.7 | 38 | 3.9 | | 80 | 8.2 | | 33 | 3.4 | | 49 | 5.0 | | 14 | 1.4 | |
| Divorced | 368 | 97 | 26.4 | 8 | 2.2 | | 17 | 4.6 | | 8 | 2.2 | | 17 | 4.6 | | 12 | 3.2 | |
| <i>Education (years)</i> | | | | | | | | | | | | | | | | | | |
| ≤8 | 2352 | 615 | 26.2 | 39 | 1.7 | <0.001 | 45 | 1.9 | <0.001 | 23 | 1.0 | <0.001 | 45 | 1.9 | <0.001 | 39 | 1.6 | <0.05* |
| >8 | 1659 | 706 | 42.6 | 63 | 3.8 | | 153 | 9.2 | | 76 | 4.6 | | 84 | 5.1 | | 27 | 1.6 | |
| <i>Income</i> | | | | | | | | | | | | | | | | | | |
| Low | 1345 | 331 | 24.6 | 18 | 1.3 | <0.001 | 29 | 2.2 | <0.001 | 12 | 0.9 | <0.001 | 25 | 1.9 | <0.001 | 18 | 1.3 | <0.05* |
| Medium | 1347 | 445 | 33.0 | 33 | 2.5 | | 60 | 4.5 | | 24 | 2.4 | | 32 | 2.4 | | 21 | 1.6 | |
| High | 1286 | 536 | 41.7 | 51 | 4.0 | | 105 | 8.2 | | 60 | 5.6 | | 72 | 5.6 | | 26 | 2.0 | |
| <i>Health Insurance</i> | | | | | | | | | | | | | | | | | | |
| Insured | 3376 | 1157 | 34.3 | 88 | 2.6 | <0.001 | 171 | 5.1 | 0.27 | 86 | 2.6 | 0.22 | 106 | 3.2 | 0.97 | 48 | 1.4 | 0.05 |
| Non-insured | 635 | 164 | 25.8 | 14 | 2.2 | | 27 | 4.2 | | 13 | 2.1 | | 23 | 3.6 | | 18 | 2.8 | |
| <i>SES current</i> | | | | | | | | | | | | | | | | | | |
| High | 1094 | 451 | 41.2 | 48 | 4.4 | <0.001 | 90 | 8.2 | <0.001 | 57 | 5.2 | <0.001 | 57 | 5.2 | <0.001 | 15 | 1.4 | <0.001 |
| Medium | 1523 | 488 | 32.0 | 30 | 2.0 | | 76 | 5.0 | | 26 | 1.7 | | 49 | 3.2 | | 36 | 2.4 | |
| Low | 1394 | 382 | 27.4 | 24 | 1.7 | | 32 | 2.3 | | 16 | 1.2 | | 23 | 1.7 | | 15 | 1.1 | |
| <i>SES at birth</i> | | | | | | | | | | | | | | | | | | |
| High | 563 | 257 | 45.7 | 21 | 3.7 | <0.001 | 51 | 9.1 | <0.001 | 26 | 4.6 | <0.001 | 33 | 5.9 | <0.001 | 14 | 2.5 | <0.001 |
| Medium | 2141 | 650 | 30.4 | 52 | 2.4 | | 98 | 5.0 | | 56 | 2.6 | | 58 | 2.7 | | 35 | 1.6 | |
| Low | 1307 | 414 | 31.7 | 29 | 2.2 | | 49 | 3.7 | | 17 | 1.3 | | 38 | 2.9 | | 17 | 1.3 | |
| <i>Employment</i> | | | | | | | | | | | | | | | | | | |

Table 1 (continued)

| | 12-month drinking pattern and DSM-IV alcohol use disorders | | | | | | | | | | | | | | | | | |
|------------------|------------------------------------------------------------|--------|-----------------------|------------------|--------|-----------------------|------------------------|--------|-----------------------|--------------------|--------|-----------------------|------------------------|--------|-----------------------|--------------------|--------|-----------------------|
| | Ever but not last year | | | Non-regular user | | | Regular non-heavy user | | | Regular heavy user | | | Alcohol Abuse Disorder | | | Alcohol Dependence | | |
| | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) | <i>n</i> | % (SE) | <i>p</i> (χ^2) |
| Employed | 1375 | 43.4 | <0.001 | 59 | 4.3 | <0.001 | 106 | 7.7 | <0.001 | 56 | 4.1 | <0.001 | 78 | 5.7 | <0.001 | 41 | 3.0 | <0.001 |
| Unemployed | 208 | 45.2 | | 11 | 5.3 | | 11 | 5.3 | | 5 | 2.4 | | 11 | 5.3 | | 4 | 1.9 | |
| Inactive | 2428 | 26.0 | | 32 | 1.3 | | 81 | 3.3 | | 38 | 1.6 | | 40 | 1.7 | | 21 | 0.9 | |
| <i>Residency</i> | | | | | | | | | | | | | | | | | | |
| Slum | 614 | 21.0 | <0.001 | 10 | 1.6 | <0.05* | 14 | 2.3 | <0.001 | 8 | 1.3 | <0.001 | 15 | 2.4 | <0.001 | 11 | 1.8 | <0.05* |
| Low urban | 1189 | 30.6 | | 29 | 2.4 | | 32 | 2.7 | | 17 | 1.4 | | 15 | 1.3 | | 14 | 1.2 | |
| Urban or luxury | 2208 | 37.5 | | 63 | 2.8 | | 152 | 6.9 | | 74 | 3.4 | | 99 | 2.5 | | 41 | 1.9 | |

*These associations were not significant after adjusting the alpha level for the number of tests (0.008). SE: standard error

Role impairment and help-seeking

The correlations of drinking pattern in the last 12-months with role impairment, help-seeking and age at-first drink were presented in Table 2. As the frequency and amount of drinking increased, the mean age at-first alcohol intake shows a gradual decrease from 19.7 (SD=5.1) in the group “ever but not last year” to 17.0 (SD=3.6) in the group with a diagnosis of alcohol use disorder. However, mean age rises to 18.1 (SD=7.6) in the respondents with DSM-IV alcohol dependence. There was no difference in the last 12-month help-seeking between groups. Only 16.5% of the respondents with alcohol dependence reported any admission for help-seeking due to any psychological complaint in the last 12-month. Furthermore, help-seeking rate in the alcohol abuse disorder was 11.6% which is lower than the 13.2% rate of the whole sample.

Despite low rates of help-seeking, the role impairment, particularly impairment in mental health and social functioning were prominent among respondents with alcohol dependence ($p < 0.001$). However, there was no difference in SF-36 items of daily physical functioning, physical role function, energy/fatigue and general health between respondents with alcohol dependence and never use group. Indicators of daily physical functioning were worse in the regular users and respondents with alcohol abuse than never use group ($p < 0.001$).

Impact of other psychiatric comorbidity on help-seeking

To explore the impact of psychiatric comorbidity on the help-seeking and the impairment in alcohol use, we used prevalence estimates of DSM-IV depressive disorders and psychotic disorders taken from former articles of the TürkSch study. The 12-month prevalence of DSM-IV depressive disorders and lifetime prevalence estimates of psychotic disorders (schizophrenia and other psychotic disorders, affective psychosis, and psychotic disorders due to substance and/or somatic disorders) were 8.2% ($n = 330$) and 2.5% ($n = 99$) respectively. The 12-month prevalence of depressive disorder was 10.2% ($n = 20$) among individuals with alcohol use disorder (abuse and dependence) ($n = 195$), and the rate of help-seeking was 30.0% among respondents with comorbidity of depression and alcohol use disorder. Also lifetime prevalence of psychotic disorders among individuals with alcohol use disorder ($n = 195$) was 3.6% ($n = 7$), and the rate of help-seeking was 71.4% among respondents with comorbidity of psychotic disorder and alcohol use disorder.

Table 2 Sub-group specific age at first intake, help-seeking, and role impairment based on 12-month drinking pattern and DSM-IV alcohol use disorders

| | Never | | 12-month drinking pattern and DSM-IV alcohol use disorders | | | | | | | | | | | | | | | | | |
|-----------------------------|-------|------|------------------------------------------------------------|------|----------------|------------------|------|----------------|------------------------|------|----------------|--------------------|------|----------------|-------------------------|------|----------------|--------------------|------|----------------|
| | | | Ever but not last year | | | Non-regular user | | | Regular non-heavy user | | | Regular heavy user | | | Alcohol Abuse dis-order | | | Alcohol dependence | | |
| | | | n | % | p (χ^2) | n | % | p (χ^2) | n | % | p (χ^2) | n | % | p (χ^2) | n | % | p (χ^2) | n | % | p (χ^2) |
| <i>Any help-seeking</i> | | | | | | | | | | | | | | | | | | | | |
| None | 3482 | 1145 | 32.9 | 0.64 | 94 | 2.7 | 0.08 | 178 | 5.1 | 0.13 | 91 | 2.6 | 0.10 | 114 | 3.3 | 0.47 | 55 | 1.6 | 0.44 | |
| At least once | 529 | 176 | 33.3 | | 8 | 1.5 | | 20 | 3.8 | | 8 | 1.5 | | 15 | 2.8 | | 11 | 2.1 | | |
| Mean | SD | Mean | SD | p | Mean | SD | p | Mean | SD | p | Mean | SD | p | Mean | SD | p | Mean | SD | p | |
| – | – | 19.7 | 5.1 | | 18.0 | 4.6 | | 18.1 | 4.2 | | 17.4 | 3.6 | | 17.0 | 3.6 | | 18.1 | 7.6 | | |
| <i>Age at first intake*</i> | | | | | | | | | | | | | | | | | | | | |
| <i>SF-36*</i> | | | | | | | | | | | | | | | | | | | | |
| Physical functioning | 85.3 | 21.5 | 91.1 | 16.9 | <0.001 | 94.8 | 10.4 | <0.001 | 94.9 | 11.7 | <0.001 | 94.5 | 10.9 | <0.001 | 91.8 | 15.9 | <0.001 | 88.3 | 21.7 | 0.90 |
| Role function physical | 75.7 | 40.3 | 81.9 | 35.9 | <0.001 | 83.1 | 34.7 | <0.05* | 85.5 | 32.2 | <0.001 | 92.7 | 24.3 | <0.001 | 80.1 | 35.5 | 0.05 | 77.6 | 40.5 | 0.97 |
| Role function emotional | 76.1 | 40.8 | 81.5 | 36.8 | <0.001 | 88.9 | 28.3 | <0.001 | 84.0 | 34.0 | <0.05* | 83.5 | 35.4 | 0.06 | 73.1 | 41.9 | 0.68 | 74.2 | 42.5 | 0.65 |
| Energy/fatigue | 56.1 | 22.5 | 60.8 | 21.2 | <0.05* | 59.2 | 18.8 | <0.05* | 63.5 | 20.4 | 0.07 | 63.8 | 20.7 | 0.26 | 58.6 | 23.2 | 0.64 | 56.7 | 24.9 | 0.25 |
| Mental health | 68.7 | 21.8 | 71.3 | 19.5 | <0.001 | 72.5 | 19.6 | 0.15 | 73.1 | 19.1 | <0.05* | 73.6 | 10.2 | 0.31 | 66.2 | 20.6 | 0.38 | 59.3 | 29.2 | <0.001 |
| Social functioning | 86.0 | 22.8 | 88.9 | 20.8 | <0.001 | 90.8 | 20.7 | 0.20 | 89.4 | 21.7 | 0.37 | 93.2 | 18.1 | <0.05* | 88.8 | 21.9 | 0.53 | 78.0 | 32.5 | <0.001 |
| Pain | 74.9 | 29.6 | 81.6 | 25.1 | <0.001 | 77.6 | 30.1 | 0.85 | 86.3 | 21.1 | <0.001 | 85.3 | 22.6 | <0.05* | 83.9 | 23.0 | <0.001 | 83.5 | 27.8 | 0.48 |
| General health | 66.7 | 22.3 | 71.6 | 19.9 | <0.001 | 76.3 | 17.5 | <0.05* | 75.8 | 17.6 | <0.001 | 76.0 | 19.2 | 0.05 | 70.4 | 21.4 | 0.05 | 69.2 | 23.2 | 0.64 |
| Health change | 50.5 | 19.3 | 51.7 | 19.5 | 0.72 | 53.2 | 18.5 | 0.54 | 53.5 | 17.6 | 0.08 | 52.8 | 17.1 | 0.10 | 48.4 | 17.0 | 0.05 | 51.1 | 20.3 | 0.57 |

Each comparison included “never users” and the group (ever but not last year OR non-regular users OR regular non-heavy users OR regular heavy users OR alcohol abuse disorder OR alcohol dependence) under comparison. *t* test was performed for group comparisons. *These associations were not significant after adjusting the alpha level for the number of tests (0.008). SD: standard deviation

Associations of alcohol-related outcomes

Associations and odds ratios between independent variables and alcohol-related outcomes are presented in Table 3. There is a robust impact of male gender on 12-month drinking pattern and alcohol use disorders. Alcohol dependence was predicted by being above age 45, being divorced, having high income. Furthermore, risk of alcohol dependence was lower among respondents from low and medium SES at birth than the respondents from high SES at birth. Alcohol abuse disorder was associated with being divorced, having high educational level and monthly income; where risk of alcohol abuse disorder was lower in the low (current) and medium (at birth) SES groups than high SES. Higher levels of education and income were associated with any pattern of drinking. Also the risk of alcohol drinking, from non-regular to heavy regular drinking was lower in low SES (current and parental).

Discussion

In an epidemiological survey of a representative sample of the adult general population in the Izmir Metropolitan Area, Turkey, this is the first study to explore drinking patterns, alcohol-related outcomes, and related impairment and help-seeking. Compared to European countries, the rate of abstinence was high and the prevalence estimates of various stages of drinking pattern and alcohol-related outcomes were low. However, alcohol-related disturbances were related with role impairment and with quite high gap in help-seeking. Socioeconomic characteristics reflect impact of religion based culture, where drinking and alcohol-related outcomes were more prevalent among individuals who were male, and with higher levels of education, higher income, and living in more urbanized areas, and from higher SES. Alcohol-related outcomes were mainly related with impairment in self-report mental health issues where physical functioning was relatively spared, which consequently led to lower rates of any help-seeking.

Globally, 48% of the world's population has never consumed alcohol; in addition, 13.7% have not consumed alcohol during the last 12-months [10]. Although the rate of abstinence is higher than the global average in our study, there is considerable variation in prevalence of abstinence across countries, regions and studies [2, 10]. Compared to the lowest lifetime abstinence rates in the western societies (region of Americas and European Region; 20.6% and 18.9% respectively), Turkey and in particular Izmir have higher abstinence rates [10]. However, abstinence rate in Izmir lies between Europe and Middle-east, where lifetime abstinence rate increases up to 89.9% [2, 10].

On the other hand, the abstinence rate of Izmir is lower than the former average rates of Turkey [10, 16]. The average rate of lifetime abstinence is over 75%, increasing up to 81% with temporal and regional variation [10, 32, 33]. Concordantly to abstinence rates in Izmir, also prevalence estimates of alcohol abuse and dependence were higher than the prevalence rates of former studies and reports in Turkey, and also other Muslim countries [34]. In a nationwide study, the 12-month prevalence of alcohol dependence was 0.8% in Turkey [10] and prevalence rates of alcohol use disorders were between 0.09% and 1.07% in Muslim countries [10]. In our study, we found the prevalence of alcohol dependence 1.6% and alcohol abuse 3.2%. Although our findings were higher than average rates of Turkey and other Muslim countries, our prevalence estimates were lower than developing countries, United States and European countries [27, 28, 35]. When compared to other parts of Turkey, relative low rate of abstinence and high rate of alcohol use disorders in Izmir may be associated with the geographical location and cultural features of the city. Izmir is in the western part of Turkey and located by the Aegean Sea. Cultural fabric of Izmir is relatively more close to western culture.

Previous and recent researchers have identified a wide array of risk factors for alcohol use, abuse, and dependence, including several sociodemographic factors that show consistent associations across different population-based investigations [35]. In our study 12-month drinking pattern and alcohol use disorders were strongly related with male sex, and alcohol dependence was associated with being middle-age, divorced, from medium SES. Also alcohol abuse disorder was associated with having high monthly income. Furthermore, risk of alcohol use disorders was lower in the low (current) and medium (parental) SES groups than high SES. Higher levels of education and income were associated with any pattern of drinking. Also the risk of alcohol drinking, from non-regular to heavy regular drinking was lower in low SES (current and parental).

In particular, heavier alcohol use is more frequent among males and unmarried or divorced persons [32, 33]. Our findings were consistent with previous reports regarding gender and marital status but in contrast with the literature regarding education, income and being employed [10, 28]. We found in our sample that, higher levels of education and income and being employed were associated with any pattern of drinking. One of the reasons of this finding could be because of high tax rates of alcohol in Turkey: the special consumption tax for alcohol in Turkey is relatively high. Increased alcohol sales taxes are as effective as excise taxes in reducing alcohol consumption and related problems [36]. For instance the special consumption tax for wine in Turkey is 360% more than other European countries. Although special consumption tax for alcohol is very

Table 3 Associations of sociodemographic risk factors for 12-month drinking pattern and DSM-IV alcohol use disorders*

| 12-month drinking pattern and DSM-IV alcohol use disorders | | | | | | | | | | | | | | | | | | |
|------------------------------------------------------------|--------|----------------|------------------|--------|---------------|------------------------|--------|----------------|--------------------|---------------|-----------|------------------------|--------|---------------|--------------------|---------------|-----------|-------|
| Ever but not last year | | | Non-regular user | | | Regular non-heavy user | | | Regular heavy user | | | Alcohol Abuse Disorder | | | Alcohol Dependence | | | |
| OR | 95% CI | p | OR | 95% CI | p | OR | 95% CI | p | OR | 95% CI | p | OR | 95% CI | p | OR | 95% CI | p | |
| <i>Sex</i> | | | | | | | | | | | | | | | | | | |
| Female | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Male | 1.42 | 1.23–1.61 | <0.001 | 2.12 | 1.61–2.64 | <0.001 | 2.31 | 1.92–2.70 | <0.001 | 2.26 | 1.73–2.79 | <0.001 | 3.26 | 2.68–3.85 | <0.001 | 3.19 | 2.36–4.03 | <0.01 |
| <i>Age</i> | | | | | | | | | | | | | | | | | | |
| 15–24 | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| 25–34 | 0.42 | 0.13–0.71 | 0.005 | 0.45 | -0.25 to 1.15 | 0.20 | 0.26 | -0.29 to 0.81 | 0.36 | -0.36 to 0.42 | 0.36 | -0.65 to 1.32 | 0.053 | -0.08 to 1.32 | 0.55 | -0.55 to 1.65 | 0.33 | |
| 35–44 | 0.50 | 0.18–0.81 | 0.002 | 0.37 | -0.44 to 1.19 | 0.36 | 0.53 | -0.10 to 1.15 | 0.10 | -0.15 to 0.73 | 0.71 | -0.54 to 1.33 | 0.17 | -0.23 to 1.33 | 0.84 | -0.36 to 2.03 | 0.17 | |
| 45–54 | 0.44 | 0.12–0.77 | 0.007 | 0.01 | -0.88 to 0.89 | 0.99 | 0.28 | -0.37 to 0.94 | 0.40 | 0.09 to 0.98 | 0.84 | -0.44 to 1.24 | 0.28 | -0.35 to 1.24 | 1.50 | 0.35–3.64 | 0.01 | |
| 55–64 | 0.33 | -0.12–0.68 | 0.58 | -0.42 | -1.47 to 0.62 | 0.42 | 0.22 | -0.61 to 0.83 | 0.76 | -0.13 to 0.85 | 0.79 | -0.05 to 0.86 | 0.91 | -0.05 to 0.86 | 1.28 | 0.01–2.51 | 0.04 | |
| <i>Marital status</i> | | | | | | | | | | | | | | | | | | |
| Married | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Unmarried | 0.24 | -0.01 to 0.50 | 0.062 | 0.55 | -0.05 to 1.15 | 0.07 | 0.72 | 0.24–1.20 | 0.003 | 0.27 to 0.97 | 0.45 | 0.65 to 1.23 | 0.025 | 0.08–1.23 | 0.16 | -0.70 to 1.03 | 0.71 | |
| Divorced | 0.13 | -0.15 to 0.42 | 0.36 | 0.82 | 0.91–1.69 | 0.04 | 0.81 | 0.22–1.42 | 0.007 | 0.45 to 1.31 | 0.29 | 1.58 to 2.22 | <0.001 | 0.93–2.22 | 1.46 | 0.71–2.21 | <0.01 | |
| <i>Education (years)</i> | | | | | | | | | | | | | | | | | | |
| ≤8 | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| >8 | 0.65 | 0.46–0.83 | <0.001 | 0.62 | 0.12–1.11 | 0.01 | 1.55 | 1.14–1.96 | <0.001 | 1.39 | 0.82–1.96 | <0.001 | 0.79 | 0.33–1.25 | 0.34 | -0.29 to 0.97 | 0.29 | |
| <i>Income</i> | | | | | | | | | | | | | | | | | | |
| Low | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Medium | 0.19 | -0.01 to 0.39 | 0.053 | 0.42 | -0.19 to 1.04 | 0.18 | 0.30 | -0.18 to 0.79 | 0.22 | 0.34 to 1.07 | 0.36 | 0.01 to 0.58 | 0.97 | -0.56 to 0.89 | 0.20 | -0.49 to 0.89 | 0.56 | |
| High | 0.51 | 0.28–0.74 | <0.001 | 0.86 | 0.19–1.51 | 0.01 | 0.68 | 0.17–1.19 | 0.009 | 1.01 to 1.74 | 0.008 | 0.76 to 1.35 | 0.01 | 0.18–1.35 | 0.77 | 0.03–1.52 | 0.04 | |
| <i>Health insurance</i> | | | | | | | | | | | | | | | | | | |
| Insured | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Non-insured | -0.28 | -0.52 to -0.05 | 0.018 | -0.32 | -0.98 to 0.33 | 0.33 | -0.02 | -0.53 to -0.48 | 0.98 | 0.24 to 0.92 | 0.48 | 0.05 to 0.61 | 0.19 | -0.50 to 0.61 | 0.62 | -0.05 to 1.28 | 0.07 | |
| <i>SES current</i> | | | | | | | | | | | | | | | | | | |
| High | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |

Table 3 (continued)

| 12-month drinking pattern and DSM-IV alcohol use disorders | | | | | | | | | | | | | | | | | | |
|------------------------------------------------------------|--------|------------------|--------|----------------|------------------------|-------|----------------|--------------------|-------|----------------|------------------------|-------|----------------|--------------------|-------|---------------|----------------|-------|
| Ever but not last year | | Non-regular user | | | Regular non-heavy user | | | Regular heavy user | | | Alcohol Abuse Disorder | | | Alcohol Dependence | | | | |
| OR | 95% CI | <i>p</i> | OR | 95% CI | <i>p</i> | OR | 95% CI | <i>p</i> | OR | 95% CI | <i>p</i> | OR | 95% CI | <i>p</i> | | | | |
| Medium | -0.21 | -0.43 to 0.07 | -1.01 | -1.56 to -0.44 | <0.001 | -0.26 | -0.67 to 0.15 | 0.21 | -0.95 | -1.53 to -0.37 | 0.001 | -0.41 | -0.91 to 0.08 | 0.10 | 0.68 | -0.69 to 1.44 | 0.07 | |
| Low | -0.23 | -0.48 to 0.02 | -0.93 | -1.59 to -0.27 | 0.005 | -0.57 | -1.11 to -0.02 | 0.04 | -0.77 | -1.50 to -0.04 | 0.03 | -0.85 | -1.51 to -0.20 | 0.01 | -0.08 | -1.01 to 0.84 | 0.86 | |
| <i>SES at birth</i> | | | | | | | | | | | | | | | | | | |
| High | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Medium | -0.59 | -0.85 to -0.33 | <0.001 | -0.20 | -0.80 to 0.40 | 0.51 | -0.47 | -0.91 to -0.03 | 0.03 | -0.27 | -0.84 to 0.29 | 0.35 | -0.60 | -1.14 to -0.05 | 0.02 | -1.15 | -1.89 to -0.41 | 0.002 |
| Low | -0.47 | -0.75 to -0.19 | 0.001 | -0.26 | -0.92 to 0.40 | 0.44 | -0.56 | -1.07 to -0.05 | 0.03 | -0.81 | -1.54 to -0.09 | 0.02 | -0.35 | -0.94 to 0.24 | 0.24 | -1.14 | -1.97 to -0.31 | 0.007 |
| <i>Employment</i> | | | | | | | | | | | | | | | | | | |
| Employed | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Unemployed | 0.42 | 0.05–0.79 | 0.02 | -0.06 to 1.49 | 0.07 | -0.01 | -0.78 to 0.76 | 0.98 | -0.03 | -1.06 to 1.01 | 0.95 | 0.44 | -0.33 to 1.22 | 0.26 | -0.21 | -1.37 to 0.94 | 0.71 | |
| Inactive | -0.32 | -0.53 to -0.12 | 0.002 | -1.19 to -0.08 | 0.02 | -0.30 | -0.71 to 0.10 | 0.14 | -0.69 | -1.23 to -0.14 | 0.01 | -0.44 | -0.97 to 0.07 | 0.09 | -0.65 | -1.34 to 0.02 | 0.059 | |
| <i>Residency</i> | | | | | | | | | | | | | | | | | | |
| Slum | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - | Ref | - |
| Low urban | 0.28 | 0.02–0.53 | 0.03 | -0.54 to 0.96 | 0.58 | -0.02 | -0.71 to 0.66 | 0.95 | -0.14 | -1.02 to 0.73 | 0.78 | -0.80 | -1.55 to -0.04 | 0.038 | -0.36 | -1.20 to 0.46 | 0.39 | |
| Urban or luxury | 0.65 | 0.40–0.90 | <0.001 | -0.25 to 1.20 | 0.20 | 0.95 | 0.33–1.58 | 0.003 | -0.51 | -0.29 to 1.32 | 0.21 | 0.61 | 0.01–1.24 | 0.05 | 0.27 | -1.97 to 1.02 | 0.47 | |

Numbers in bold are significant at level $p < 0.05$

*Multinomial logistic regression; reference were “never users”. All values are odds ratio (OR) estimates with 95% confidence intervals (CI)

high, the income per capita according to gross national income is lower than European countries [37]. Therefore, it could be easy to reach and use alcohol for the persons with high education, income and being employed.

As the drinking pattern, average age at first intake is mainly associated with sociocultural differences [38]. Average age at first intake decreases in the western societies, however, it is still relatively older in developing eastern countries [39]. In our study, average age at first intake points to mid-adolescence; however, average age decreases with the increasing severity of drinking pattern. Our finding is similar with a previous study which was conducted in Turkey [12] and with a study from a socioeconomically similar area, Sao Paulo, Brasil [28]. However, when we compare our finding with international and particularly European studies, average age at first intake was relatively high [2]. As the frequency and amount of drinking increased, the mean age at-first alcohol intake shows a gradual decrease in our study.

Although our study has no information on the primary cause of help-seeking, help-seeking behaviour among individuals with alcohol use disorders was lower than European countries [2, 5]. Only 16.5% of the respondents with alcohol dependence reported any admission for help-seeking due to any psychological complaint in the last 12-month in our sample. Furthermore, help-seeking rate in the alcohol abuse disorder was 11.6% in our study, which was 22.3% in a comprehensive European study [3, 5]. The primary reason for relative low rate of help-seeking in our sample might be a consequence of stigmatization in an Islamic cultural climate [11, 34]. Although alcohol use disorders and heavy drinking were associated with role impairment, particularly in psychological well-being, low rate of help-seeking for mental health was striking in our study. Furthermore, psychiatric comorbidity, particularly depression and psychotic symptoms increases the likelihood of help-seeking in alcohol use disorders [40–42]. Mental health-related impairment such as depression and psychosis might be stimulating interest in seeking help in addition to heavy drinking and alcohol-related problems. Since the rate of help-seeking was strikingly higher in respondents with comorbidity of psychosis and alcohol use disorder, our results partially point to the importance of symptom related impairment in alcohol related help-seeking. There is a well-established link between alcohol use disorders and role-impairment [43, 44]. The evidence demonstrating that alcohol use disorders lead to impairments in general health, mental and physical health and social functioning is strong [45]. However, the primary focus of role impairment changes according to drinking pattern and associated health consequences [46]. In our study, role-impairment was significantly higher in dimensions of mental health, whereas individuals under risk of alcohol use disorder and individuals with alcohol

use disorders reported almost similar physical impairment with the abstainers, which may also indicate neglect of mental health consequences of alcohol in individual level and stigmatization at the social level.

The results of this study must be considered in the context of some limitations. Our sample was restricted to residents of a large urbanized area, which precludes generalization of our findings to the general population living in whole Turkey. Although response rate may be regarded as high, non-responders might have higher or lower alcohol use than our sample. Women were over represented in our sample compared to population of Izmir Metropolitan area [19], which may have changed the prevalence estimate of alcohol use disorders. Although the TürkSch is a longitudinal study, the reported results were based on cross-sectional screening of the sample, which tempers interpretation of its main findings on measures and alcohol outcomes. Future analysis involving longitudinal data of the sample can explore the probable causal mechanisms that accounts for the heterogeneous associations and male-variations observed across alcohol outcomes in this study.

Conclusion

In this study, we reported drinking pattern and prevalence estimates of alcohol use disorders in a highly urbanized area of Turkey. Our results constitute one of the first reports to investigate various drinking patterns in the general population of Turkey. As noted above, access to alcohol may be a major issue in Turkey due to religious, cultural and economic reasons. Although the prevalence estimates of alcohol use disorders in Izmir were lower than estimates of Western countries, help-seeking was low which may indicate a treatment gap due to stigmatization and neglect. If this is the case in Izmir, one important policy measure would be; increase the awareness of mental health outcomes associated with alcohol use and decrease stigmatization. We are hopeful that our results may help guide future directions for public health work along these lines.

Compliance with ethical standards

Conflict of interest None of the authors has a financial or personal relationship with a third party whose interests could be positively or negatively influenced by the article's content.

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Ethical standards The TürkSch study was approved by the Ege University ethics committee and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed consent All respondents gave informed consent prior to interview.

References

- World Health Organization (2010) Global strategy to reduce the harmful use of alcohol. World Health Organization, Geneva
- World Health Organization, Regional Office for Europe. (2011) European status report on alcohol and health 2010. World Health Organization, Copenhagen
- Rehm J, Allamani A, Elekes Z, Jakubczyk A, Manthey J, Probst C, Struzzo P, Della Vedova R, Gual A, Wojnar M (2015) Alcohol dependence and treatment utilization in Europe—a representative cross-sectional study in primary care. *BMC Fam Pract* 16:90. doi:10.1186/s12875-015-0308-8
- Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J (2009) Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet* 373(9682):2223–2233. doi:10.1016/S0140-6736(09)60746-7
- Rehm J, Zatonksi W, Taylor B, Anderson P (2011) Epidemiology and alcohol policy in Europe. *Addiction* 106(Suppl 1):11–19. doi:10.1111/j.1360-0443.2010.03326.x
- World Health Organization, Regional Office for Europe (2010) Atlas on substance use (2010): resources for the prevention and treatment of substance use disorders
- Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, Charlson FJ, Norman RE, Flaxman AD, Johns N, Burstein R, Murray CJ, Vos T (2013) Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet* 382(9904):1575–1586. doi:10.1016/S0140-6736(13)61611-6
- Greenfield TK, Kerr WC (2008) Alcohol measurement methodology in epidemiology: recent advances and opportunities. *Addiction* 103(7):1082–1099. doi:10.1111/j.1360-0443.2008.02197.x
- Kalaydjian A, Swendsen J, Chiu WT, Dierker L, Degenhardt L, Glatz M, Merikangas KR, Sampson N, Kessler R (2009) Sociodemographic predictors of transitions across stages of alcohol use, disorders, and remission in the National Comorbidity Survey Replication. *Compr Psychiatry* 50(4):299–306. doi:10.1016/j.comppsy.2008.09.012
- World Health Organization (2014) Global status report on alcohol and health. World Health Organization
- Celen A (2015) Influence of Holy Month Ramadan on Alcohol Consumption in Turkey. *J Relig Health* 54(6):2122–2133. doi:10.1007/s10943-014-9875-6
- Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü (2014) Türkiye Nüfus ve Sağlık Araştırması 2013. Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü, T.C. Kalkınma Bakanlığı, TÜBİTAK, Ankara
- Erhan Deveci S, Acik Y, Ferdane Oguzoncul A, Deveci F (2010) Prevalence and factors affecting the use of tobacco, alcohol and addictive substance among university students in eastern Turkey. *Southeast Asian J Trop Med Public Health* 41(4):996–1007
- Ozgur Ilhan I, Yildirim F, Demirbas H, Dogan YB (2008) Alcohol use prevalence and sociodemographic correlates of alcohol use in a university student sample in Turkey. *Soc Psychiatry Psychiatr Epidemiol* 43(7):575–583. doi:10.1007/s00127-008-0335-z
- Ogel K, Corapcioglu A, Sir A, Tamar M, Tot S, Dogan O, Uguz S, Yenilmez C, Bilici M, Tamar D, Liman O (2004) [Tobacco, alcohol and substance use prevalence among elementary and secondary school students in nine cities of Turkey]. *Turk Psikiyatri Derg* 15(2):112–118
- Akvardar Y, Turkcan A, Yazman U, Aytacilar S, Ergor G, Cakmak D (2003) Prevalence of alcohol use in Istanbul. *Psychol Rep* 92(3 Pt 2):1081–1088. doi:10.2466/pr0.2003.92.3c.1081
- Kılıç C (1998) Türkiye Ruh Sağlığı Profili: Erişkin nüfusta ruhsal hastalıkların yaygınlığı, ilişkili faktörler, yetiyitimi ve ruh sağlığı hizmeti kullanımı sonuçları. Ankara: TC Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü:77–98
- Binbay T, Drukker M, Alptekin K, Elbi H, Aksu Tanik F, Ozkinay F, Onay H, Zagli N, van Os J (2012) Evidence that the wider social environment moderates the association between familial liability and psychosis spectrum outcome. *Psychol Med* 42(12):2499–2510. doi:10.1017/S0033291712000700
- Binbay T, Elbi H, Alptekin K, Aksu Tanik F, Drukker M, Onay H, Ozkinay F, Zagli N, Van Os J (2011) Izmir mental health survey for gene-environment interaction in psychoses (TurkSch): objectives and methodology. *Turk Psikiyatri Derg* 22(2):65–76
- Binbay T, Drukker M, Elbi H, Tanik FA, Ozkinay F, Onay H, Zagli N, van Os J, Alptekin K (2012) Testing the psychosis continuum: differential impact of genetic and nongenetic risk factors and comorbid psychopathology across the entire spectrum of psychosis. *Schizophr Bull* 38(5):992–1002. doi:10.1093/schbul/sbr003
- Topuzoglu A, Binbay T, Ulas H, Elbi H, Tanik FA, Zagli N, Alptekin K (2015) The epidemiology of major depressive disorder and subthreshold depression in Izmir, Turkey: Prevalence, socioeconomic differences, impairment and help-seeking. *J Affect Disord* 181:78–86. doi:10.1016/j.jad.2015.04.017
- Kish L (1949) A procedure for objective respondent selection within the household. *J Amer Statistical Assoc* 44(247):380–387
- Andrews G, Peters L (1998) The psychometric properties of the composite international diagnostic interview. *Soc Psychiatry Psychiatr Epidemiol* 33(2):80–88
- Pull CB, Saunders JB, Mavreas V, Cottler LB, Grant BF, Hasin DS, Blaine J, Mager D, Ustun BT (1997) Concordance between ICD-10 alcohol and drug use disorder criteria and diagnoses as measured by the AUDADIS-ADR, CIDI and SCAN: results of a cross-national study. *Drug Alcohol Depend* 47(3):207–216
- Cottler LB, Grant BF, Blaine J, Mavreas V, Pull C, Hasin D, Compton WM, Rubio-Stipec M, Mager D (1997) Concordance of DSM-IV alcohol and drug use disorder criteria and diagnoses as measured by AUDADIS-ADR, CIDI and SCAN. *Drug Alcohol Depend* 47(3):195–205
- Binbay T, Alptekin K, Elbi H, Zagli N, Drukker M, Aksu Tanik F, Ozkinay F, Onay H, Van Os J (2012) Lifetime prevalence and correlates of schizophrenia and disorders with psychotic symptoms in the general population of Izmir, Turkey. *Turk Psikiyatri Derg* 23(3):149–160
- Silveira CM, Viana MC, Siu ER, de Andrade AG, Anthony JC, Andrade LH (2011) Sociodemographic correlates of transitions from alcohol use to disorders and remission in the Sao Paulo megacity mental health survey, Brazil. *Alcohol Alcohol* 46(3):324–332. doi:10.1093/alcac/agr007
- Silveira CM, Siu ER, Anthony JC, Saito LP, de Andrade AG, Kutschenko A, Viana MC, Wang YP, Martins SS, Andrade LH (2014) Drinking patterns and alcohol use disorders in Sao Paulo, Brazil: the role of neighborhood social deprivation and socioeconomic status. *PLoS One* 9(10):e108355. doi:10.1371/journal.pone.0108355
- Esan O, Makanjuola V, Oladeji B, Gureje O (2013) Determinants of transition across the spectrum of alcohol use and misuse in Nigeria. *Alcohol* 47(3):249–255. doi:10.1016/j.alcohol.2012.12.011
- Ware JE Jr, Sherbourne CD (1992) The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 30(6):473–483

31. Kohn R, Saxena S, Levav I, Saraceno B (2004) The treatment gap in mental health care. *Bull World Health Organ* 82(11):858–866
32. Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü (2004) Türkiye Nüfus ve Sağlık Araştırması TDHS-2003. Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü, Ankara
33. Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü (2008) Türkiye Nüfus ve Sağlık Araştırması (TDHS) 2007. Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü, Ankara
34. Kalema D, Vanderplasschen W, Vindevogel S, Derluyn I (2016) The role of religion in alcohol consumption and demand reduction in Muslim majority countries (MMC). *Addiction* 111(10):1716–1718. doi:10.1111/add.13333
35. Glantz MD, Medina-Mora ME, Petukhova M, Andrade LH, Anthony JC, de Girolamo G, de Graaf R, Degenhardt L, Demyttenaere K, Florescu S, Gureje O, Haro JM, Horiguchi I, Karam EG, Kostyuchenko S, Lee S, Lepine JP, Matschinger H, Neumarck Y, Posada-Villa J, Sagar R, Stein DJ, Tomov T, Wells JE, Chatterji S, Kessler RC (2014) Alcohol abuse in developed and developing countries in the World Mental Health Surveys: Socially defined consequences or psychiatric disorder? *Am J Addict* 23(2):145–155. doi:10.1111/j.1521-0391.2013.12082.x
36. Esser MB, Waters H, Smart M, Jernigan DH (2016) Impact of Maryland's 2011 alcohol sales tax increase on alcoholic beverage sales. *Am J Drug Alcohol Abuse* 42(4):404–411. doi:10.3109/00952990.2016.1150485
37. Onat A, Hergenc G, Kucukdurmaz Z, Ugur M, Kaya Z, Can G, Yuksel H (2009) Moderate and heavy alcohol consumption among Turks: long-term impact on mortality and cardiometabolic risk. *Turk Kardiyol Dern Ars* 37(2):83–90
38. DeWit DJ, Adlaf EM, Offord DR, Ogborne AC (2000) Age at first alcohol use: a risk factor for the development of alcohol disorders. *Am J Psychiatry* 157(5):745–750. doi:10.1176/appi.ajp.157.5.745
39. Nair UR, Vidhukumar K, Prabhakaran A (2016) Age at onset of alcohol use and alcohol use disorder: time-trend study in patients seeking de-addiction services in Kerala. *Indian J Psychol Med* 38(4):315–319. doi:10.4103/0253-7176.185958
40. Cellucci T, Krogh J, Vik P (2006) Help seeking for alcohol problems in a college population. *J Gen Psychol* 133(4):421–433. doi:10.3200/GENP.133.4.421-433
41. Buscemi J, Murphy JG, Martens MP, McDevitt-Murphy ME, Dennhardt AA, Demographic T Health Survey (TDHS) (2010) Help-seeking for alcohol-related problems in college students: correlates and preferred resources. *Psychol Addict Behav* 24(4):571–580. doi:10.1037/a0021122
42. Carney R, Yung AR, Amminger GP, Bradshaw T, Glozier N, Hermens DF, Hickie IB, Killackey E, McGorry P, Pantelis C, Wood SJ, Purcell R (2016) Substance use in youth at risk for psychosis. *Schizophr Res*. doi:10.1016/j.schres.2016.08.026
43. Daeppen JB, Faouzi M, Sanchez N, Rahhali N, Bineau S, Bertholet N (2014) Quality of life depends on the drinking pattern in alcohol-dependent patients. *Alcohol Alcohol* 49(4):457–465. doi:10.1093/alcalc/agu027
44. Foster JH, Peters TJ, Marshall EJ (2000) Quality of life measures and outcome in alcohol-dependent men and women. *Alcohol* 22(1):45–52
45. Levola J, Kaskela T, Holopainen A, Sabariego C, Tourunen J, Cieza A, Pitkanen T (2014) Psychosocial difficulties in alcohol dependence: a systematic review of activity limitations and participation restrictions. *Disabil Rehabil* 36(15):1227–1239. doi:10.3109/09638288.2013.837104
46. Levola J, Aalto M, Holopainen A, Cieza A, Pitkanen T (2014) Health-related quality of life in alcohol dependence: a systematic literature review with a specific focus on the role of depression and other psychopathology. *Nord J Psychiatry* 68(6):369–384. doi:10.3109/08039488.2013.852242