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Alcohol Drinking Pattern Is Associated with Demographic Features of Primary Health Care Patients in Poland: A Cross-Sectional Study

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Background: The Optimizing Delivery of Health Care Interventions (ODHIN) project focused on the implementation of screening and brief intervention for hazardous and harmful alcohol consumption in primary health care. The aim of the present study was to investigate whether alcohol drinking pattern is associated with demographic features of primary health care patients in Poland and if it is possible to identify groups at highest risk for hazardous and harmful drinking.

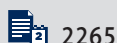
Material/Methods: The study enrolled 8805 adult (mean age 54.98±16.94, M/F – 3581/5224) patients reporting to 30 general practitioners working in 10 primary health care units located in urban and partially rural areas in Poland. The shortened, 3-item version of the Alcohol Use Disorders Identification Test (AUDIT-C) was the screening tool used.

Results: Place of residence was significantly associated with higher odds of hazardous and harmful drinking diagnosis, referred to as AUDIT-C (+). Age and sex were significantly associated with AUDIT-C (+) and suspicion of alcohol dependence, referred to as AUDIT-C ≥8 scores. Logistic regression revealed that males had 5-fold higher odds for hazardous and harmful drinking diagnosis and almost 28-fold higher odds for suspected alcohol dependence compared to females.

Conclusions: Demographic features are associated with drinking pattern of primary health patients in Poland. Young males and those inhabiting rural areas are at highest risk of being hazardous or harmful drinkers and of being alcohol dependent. There is a growing need for development of national guidelines to address the prevention of alcohol-related health problems by general practitioners.

MeSH Keywords: **Alcoholism • General Practitioners • Rural Population • Urban Population**

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Background

It is estimated that alcohol dependence (AD) affects almost 4.4% of the Polish adult population vs. 3.4% in Europe [1]. The prevalence of hazardous and harmful drinking in Poland is similar to percentages in other European countries (18% of males and 10% of the general adult population) [2]. According to the study 'Epidemiology of Mental Disorders and Access to Mental Health Care – EZOP', the most common mental disorder in Poland is alcohol abuse, which is significantly more prevalent in males (18.6%) than in females (3.3%) [3]. Excessive alcohol consumption contributes to a high proportion of premature deaths in Central and Eastern Europe [4]. It is estimated that there are 11 000 alcohol-related deaths in Poland; with death rates of 8.7 per 10 000 for males and 0.9 per 10 000 for females [5].

The importance of alcohol consumption prevention, screening, and brief intervention (BI) delivered by general practitioners (GPs) has recently been emphasized, and AD is rarely recognized and treated in the Polish population. It has been shown that only 15% of affected individuals seek specialized care for alcohol-related problems [2]. Thus, despite the high prevalence of alcohol use disorders in Poland, most affected individuals do not receive any treatment. One of the main reasons is that GPs do not diagnose mental disorders sufficiently, and thus neither treat nor refer the patients to specialized care [6]. Noticing the crucial role of GPs in alcohol prevention and treatment services resulted in collaboration studies in this area [7], such as the International Cluster Randomized Clinical Trial (c-RCT) focusing on strategies to increase the involvement of primary health care (PHC) providers.

The Optimizing Delivery of Health Care Interventions (ODHIN) study was a 4-year (from 2011 to 2014) project involving research institutions from 9 European countries, funded under the 7th European Union Framework Programme. The research focused on the implementation of screening and BI for hazardous and harmful alcohol consumption in PHC [8]. The ODHIN project's main results were published elsewhere [9]. This paper presents Polish results. The aim of this study was to investigate whether alcohol drinking pattern is associated with demographic features of PHC patients in Poland and if it is possible to identify groups at highest risk of hazardous and harmful drinking and/or possible AD.

Material and Methods

This study was approved by the Pomeranian Medical University in Szczecin Bioethics Commission (KB-0012/105/11 issued on 12 December 2011).

We conducted a cross-sectional study, which was a part of a larger randomized controlled trial, in 10 primary health care units (PHCUs) with approximately 5000–10 000 registered patients. There was a total of 62 515 patients supervised by these PHCUs. In Poland, since GPs normally operate as independent entities working with other physicians in a single location, 3 GPs and their staff working in 1 building were treated as 1 unit. The enrolled PHCUs were chosen randomly from the Pomeranian Medical University in Szczecin regional academic register of all PHCUs located in the northwestern part of the country, of which 7 were in highly urban areas and 3 were in partially rural areas. No stratifications of the PHCUs were used. All PHCUs approached (100%) by the study coordinator volunteered to participate in this research. Data were collected between December 2012 and December 2013.

The study enrolled 8805 adult (age range 18–89 years, mean age 54.98±16.94, 3581 males and 5224 females) patients reporting to 30 GPs working in 10 PHCUs (7603 patients from urban areas and 1202 patients from partially rural areas). All patients were consulted because of the most common conditions treated in terms of PHC, like chronic diseases or infections, and not because of reasons related to alcohol consumption only. Physicians were asked to screen all eligible patients (44 383 individuals ≥18 years of age) during the aforementioned measurement periods. All individuals screened (~20% of eligible patients) were enrolled. Participants were stratified according to demographic features: males vs. females; age range 18–29 vs. 30–39, 40–49, 50–59, 60–69, 70–79, and 80–89 age ranges; and inhabitants of bigger cities (population over 400 000) vs. inhabitants of smaller cities and rural areas. The eastern part of Poland is mostly rural, while the western part is predominantly urban. Thus, there is no single region fully representing the situation of the whole country. The northwestern part of the country, where this study was conducted, is 31% rural by population, which is why 3 out of 10 (30%) PHCUs were located within rural areas.

The shortened, 3-item version of the Alcohol Use Disorders Identification Test (AUDIT-C) was the screening tool used, with cutoff points of ≥4 for women and ≥5 for men indicating positive cases – AUDIT-C (+). Patients identified as hazardous or harmful drinkers (positive cases) received a BI or e-BI according to the specific guidelines. A score of AUDIT-C ≥8 was regarded as possible AD in accordance with World Health Organization (WHO). In Poland, where national guidelines do not exist, the European guidelines developed by the Primary Health Care European Project on Alcohol (PHEPA) were used for AUDIT-C results assessment and intervention [10,11].

Statistical analysis

Statistica, v. 12.0 PL (StatSoft, Tulsa, USA) was used to perform statistical analysis. Pearson's chi-squared test was applied to

Table 1. Association between alcohol drinking pattern and sex.

AUDIT-C questions	Males		Females		p*
	n	%	n	%	
Frequency of drinking**					
Never	354	9.9	919	17.6	0.0007
Monthly or less	1416	39.5	3231	61.9	<0.0001
2–4 times per month	1194	33.3	920	17.6	<0.0001
2–3 times per week	367	10.3	130	2.5	0.0055
≥4 times per week	250	7.0	24	0.5	NS
Typical quantity***					
1–2	1684	47.0	3959	75.8	<0.0001
3–4	1123	31.4	1093	20.9	<0.0001
5–6	510	14.2	145	2.8	0.0002
7–9	164	4.6	21	0.4	NS
≥10	100	2.8	6	0.1	NS
Frequency of heavy drinking****					
Never	1856	51.8	4477	85.7	<0.0001
Less than monthly	1183	33.0	658	12.6	<0.0001
Monthly	376	10.5	75	1.4	0.0119
Weekly	134	3.7	12	0.2	NS
Daily or almost daily	32	0.9	2	0.04	NS

* p-value calculated by Pearson's chi-squared test; ** How often do you have a drink containing alcohol?; *** How many units of alcohol do you drink on a typical day when you are drinking?; **** How often do you have 6 or more units on one occasion?

demonstrate the potential associations between defined categories. In the case of the 'age' category, the first interval (the youngest) was the arbitrary reference point for further comparisons. For the assessment of the multifactorial effect of the studied parameters on patient AUDIT-C responses, logistic regression models were used. Both the matching of the model and significance of the parameters were evaluated. P value <0.05 was considered as statistically significant.

Results

Table 1 presents the association between responses to AUDIT-C questions varying by patient sex. It was shown that women were more likely to declare that they never drink alcohol in comparison to men (17.6% vs. 9.9%, $p=0.0007$). Moreover, women were drinking significantly less frequently and drank smaller amounts of alcohol than did men. Most women and half of screened men denied heavy drinking. These differences were statistically significant (85.7% vs. 47.0%, $p<0.0001$). The association between drinking pattern and patient age range is presented in Table 2. The age range 18–29 years was used as the reference point for further analysis. We found that elderly patients (60–89 years) were significantly more likely to be abstainers than were younger

individuals (18–49 years). Interestingly, after taking into consideration those who stated they consume alcohol, there were no differences between age ranges of individuals drinking ≥ 4 standard portions per week. Younger patients tended to drink more units of alcohol on a typical drinking day and on a single occasion. We found that place of residence was also associated with drinking pattern (Table 3). Patients living in urban areas generally drank less often, tended to consume smaller amounts of alcohol, and had lower frequency of heavy drinking. Among patients living in urban areas, 73.3% claimed that they never drank 6 units of alcohol on a single occasion, in comparison to 63.0% living in smaller cities and rural areas ($p<0.0001$).

Analysis of associations between AUDIT-C score and patient demographic features revealed that there were significantly more 'case positives' among males than females (26.17% vs. 6.78%) and that there were significantly more males with AUDIT-C score ≥ 8 than females (4.52% vs. 0.17%) (Table 4). Interestingly, there were significantly more 'case positives' among patients in smaller cities and rural areas than among urban patients. The proportion of patients with AUDIT-C score ≥ 8 did not differ in this subgroup. The significantly higher proportions of AUDIT-C (+) and AUDIT-score ≥ 8 cases were observed in the younger age ranges (Table 5).

Table 2. Association between alcohol drinking pattern and age.

AUDIT-C questions	Age																			
	18–29*			30–39			40–49			50–59			60–69			70–79			80–89	
Question 1	n	%	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**
Never	68	5.3	109	8.6	NS	120	9.4	NS	178	14.0	0.06	283	22.2	0.002	299	23.5	0.0007	216	17.0	0.02
Mo*** or less	333	7.2	530	11.4	0.04	636	13.7	0.02	893	19.2	<0.0001	1134	24.4	<0.0001	850	18.3	<0.0001	271	5.8	NS
2–4 per month	268	12.7	440	20.8	0.005	417	19.7	0.08	405	19.2	0.02	384	18.2	0.05	152	7.2	0.08	48	2.3	0.03
2–3 per week	36	7.2	75	15.1	0.02	98	19.7	0.01	115	24.1	0.002	102	20.5	0.004	54	10.9	0.06	17	3.4	NS
≥4 per week	7	2.6	30	11.0	NS	46	16.8	NS	58	21.2	NS	84	30.7	NS	41	15.0	NS	8	2.9	NS
Question 2	n	%	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**
1–2	341	6.0	637	11.3	0.006	746	13.2	0.003	976	17.3	<0.0001	1314	23.3	0.0004	1133	20.0	<0.0001	496	8.8	NS
3–4	259	11.7	367	16.6	0.08	388	17.5	NS	460	20.8	0.002	485	21.9	0.0005	209	9.4	NS	48	2.2	0.04
5–6	68	10.4	119	18.2	NS	124	18.9	<0.0001	151	23.1	0.02	143	21.8	0.04	36	5.5	NS	14	2.1	NS
7–9	28	15.1	38	20.5	NS	37	20.0	NS	37	20.0	NS	29	15.7	NS	14	7.6	NS	2	1.1	NS
≥10	16	15.1	23	21.7	NS	22	20.8	NS	25	23.6	NS	16	15.1	NS	4	3.8	NS	0	0.0	NS
Question 3	n	%	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**	n	%	p**
Never	427	6.8	734	11.6	0.07	845	13.3	0.03	1107	17.5	<0.0001	1475	23.3	<0.0001	1221	19.3	<0.0001	524	8.3	0.04
Less than mo***	205	11.1	338	18.4	0.02	342	18.6	NS	396	21.5	0.001	398	21.6	0.001	133	7.2	NS	29	1.6	NS
Monthly	56	12.4	77	17.1	NS	100	22.2	NS	107	23.7	0.07	75	16.6	NS	32	7.1	NS	4	0.9	NS
Weekly	23	15.8	28	19.2	NS	26	17.8	NS	28	19.2	NS	32	21.9	NS	6	4.1	NS	3	2.1	NS
Daily/ almost daily	1	3.0	7	20.6	NS	4	11.8	NS	11	32.4	0.01	7	20.6	NS	4	11.8	NS	0	0.0	NS

* 18–29 – age range treated as a point of reference for further analysis; ** p-value calculated by Pearson's chi-squared test; *** Mo/ monthly; Question 1: How often do you have a drink containing alcohol? Question 2: How many units of alcohol do you drink on a typical day when you are drinking? Question 3: How often do you have 6 or more units on one occasion?

Logistic regression analysis showed that place of residence was a significant factor associated with higher odds of AUDIT-C (+) (Table 6). Age was a significant factor associated with AUDIT-C (+) and AUDIT-C ≥8 scores, mainly because of amounts of alcohol consumed (younger age was associated with higher alcohol intake). Sex was significantly associated with every aspect of alcohol consumption – frequency, amounts, and number of heavy drinking episodes – resulting in a strong association with AUDIT-C (+) and AUDIT-C ≥8 scores. Males had 5-fold higher odds of AUDIT-C (+) and almost 28-fold higher odds of being diagnosed as AD (AUDIT-C ≥8) than females.

Discussion

Prevention and health promotion are key activities of GPs worldwide. In Poland, cardiovascular and diabetes prevention programs are being implemented by PHC providers. Alcohol screening and BI are not a part of routine Polish GP activity, and national guidelines regarding alcohol consumption to reduce the health risk are lacking. The main results of our study suggest that drinking pattern is associated with demographic features of Polish PHC patients. Younger individuals, males, and inhabitants of rural areas drink more frequently and consume higher amounts of alcohol than do older individuals, females, and inhabitants of urban areas. The prevalence of hazardous and harmful drinkers was 26.17% among

Table 3. Association between alcohol drinking pattern and place of residence.

AUDIT-C questions	Urban area		Rural area		p*
	n	%	n	%	
Frequency of drinking**					
Never	1136	14.9	137	11.4	NS
Monthly or less	4099	53.9	548	45.6	0.0003
2–4 times per month	1722	22.7	392	32.6	<0.0001
2–3 times per week	409	5.4	88	7.3	NS
≥4 times per week	237	3.1	37	3.1	NS
Typical quantity***					
1–2	4962	65.3	681	56.7	<0.0001
3–4	1867	24.6	349	29.0	0.0826
5–6	536	7.1	119	9.9	NS
7–9	147	1.9	38	3.2	NS
≥10	91	1.2	15	1.3	NS
Frequency of heavy drinking****					
Never	5576	73.3	757	63.0	<0.0001
Less than monthly	1510	19.9	331	27.6	0.0019
Monthly	359	4.7	92	7.7	NS
Weekly	127	1.7	19	1.6	NS
Daily or almost daily	31	0.4	3	0.3	NS

* p-value calculated by Pearson's chi-squared test; ** How often do you have a drink containing alcohol?; *** How many units of alcohol do you drink on a typical day when you are drinking?; ****How often do you have 6 or more units on one occasion?

males and 6.78% among females. AD was found in 4.52% of males and 0.17% of females. Young males and those inhabiting rural areas are most likely to be hazardous or harmful drinkers and to have AD.

The associations between drinking pattern and demographic features, like age and sex, as well as neighborhood contextual factors, have been observed. A study of 15 197 young adults living in the USA has shown that more advantaged and educated people living in urban neighborhoods with higher densities of places selling alcohol have higher alcohol involvement among people 18–26 years olds [12]. However, a recent study among young white and black women in the USA revealed that ethno-cultural diversity also significantly influences alcohol use [13]. These observations cannot be directly generalized to Poland. Since the Second World War, national minority groups in Poland have been small, despite the recent immigration of refugees from Asia. Thus, sex, age, and place of residence are the main demographic features differentiating the Polish population.

Drinking pattern affects injuries, sexual activities, emotions, and depression in young adults. A cross-sectional, retrospective analysis of 440 patients 18–24 years old utilizing emergency medical services revealed that 30.6% of injured patients had consumed alcohol prior to their injury and that 60% of this group were individuals younger than 21 years. Alcohol users presented a specific injury pattern, including trauma secondary to assault, fall/trip, and unknown mechanism. In addition, sex was associated with both alcohol use and injury type, and multiple logistic regression analysis showed that acute alcohol consumption increased the risk of head/neck injury by almost 6-fold, and male sex increased the risk by almost 1.5-fold [14]. A systematic literature review and meta-analysis performed by Taylor et al. revealed that injury increases non-linearly with increasing alcohol consumption in a dose-response manner [15]. However, many authors emphasize that confounding factors, including demographic features, should also be considered [16]. Pikala et al., in a Polish study, noted that patterns of mortality correspond to average alcohol consumption and are therefore different for men and women, for different age groups, and in

Table 4. The association between AUDIT-C score and patients' gender as well as place of residence.

AUDIT-C score	Demographic feature				p*
	Males		Females		
	n	%	n	%	
AUDIT-C (+)**	937	26.17	354	6.78	<0.0001
AUDIT-C (-)	2644	73.83	4870	93.22	
AUDIT-C ≥8***	162	4.52	9	0.17	<0.0001
AUDIT-C <8	3419	95.48	5215	99.83	
	Urban area		Rural area		p*
	n	%	n	%	
	AUDIT-C (+)**	1040	13.68	251	
AUDIT-C (-)	6563	86.32	951	79.12	
AUDIT-C ≥8***	142	1.87	29	2.41	NS
AUDIT-C <8	7461	98.13	1173	97.59	

* p-value calculated by Pearson's chi-squared test; ** AUDIT-C (+): for males ≥5 and for females ≥4; *** AUDIT-C (≥8): for males or females ≥8.

Table 5. Association between AUDIT-C* score and patients' age range.

Age	AUDIT-C (+)		AUDIT-C (-)		p**	AUDIT-C ≥8		AUDIT-C <8		p**
	n	%	n	%		n	%	n	%	
18–29***	151	21.21	561	78.79		24	3.37	688	96.63	
30–39	246	20.78	938	79.22	NS	28	2.36	1156	97.64	NS
40–49	251	19.06	1066	80.94	NS	32	2.43	1285	97.57	NS
50–59	294	17.83	1355	82.17	NS	41	2.49	1608	97.51	NS
60–69	245	12.33	1742	87.67	0.0184	37	1.86	1950	98.14	NS
70–79	82	5.87	1314	94.13	0.0022	7	0.50	1389	99.50	NS
80–89	22	3.93	538	96.07	0.0536	2	0.36	558	99.64	NS

* AUDIT-C (+): for males ≥5 and for females ≥4; AUDIT-C (≥8): for males or females ≥8; ** p-value calculated by Pearson's chi-squared test; *** 18–29 age range treated as a point of reference for further analysis.

urban vs. rural areas. They concluded that a decrease in mortality in the group with the lowest level of education could be achieved through limiting alcohol consumption [17]. A 2002 review by Wozniak et al. showed that 19% out of 64% Polish drinking patients seeking routine PHC consultation were alcohol-dependent and/or consumed 5 or more standard drinks per day [5]. In our study, 12.6% of individuals who stated they drink alcohol consumed 5 or more standard drinks per typical drinking occasion. Wozniak et al. also confirm that individuals seeking emergency care are usually younger males, injured, and meet criteria for alcohol use disorders [5].

In spite of the fact that males drink more alcohol, drinking among women should not be underestimated. Although that European Union reported that 1 in 7 deaths in males involved alcohol intake, females are not free from this burden. It is estimated that 1 in 14 deaths in females is related to alcohol [18]. A Swedish follow-up study, which enrolled 6916 women aged 50–59 years, found that alcohol intake has a J-shaped curve in relationship with mortality. Observations lasted for 17 years or until death and also considered confounding factors. Interestingly, no alcohol consumption was associated with increased mortality, but levels of alcohol intake ≥12 grams per day resulted in a dramatic increase in death risk [19].

Table 6. Logistic regression analysis of the demographic features in regard to AUDIT-C* answers and scores.

Variables	Sex			Age			Place of residence		
	OR	95%CI	p**	OR	95%CI	p**	OR	95%CI	p**
Question 1***	1.97	1.73–2.25	<0.0001	1.03	1.03–1.04	<0.0001	1.13	0.93–1.37	NS
Question 2****	3.83	3.48–4.21	<0.0001	1.03	1.03–1.04	<0.0001	1.21	1.06–1.38	0.005
Question 3*****	6.21	5.58–6.92	<0.0001	1.03	1.03–1.04	<0.0001	1.36	1.18–1.57	<0.0001
AUDIT-C (+)	5.06	4.43–5.79	<0.0001	1.03	1.03–1.03	<0.0001	1.41	1.20–1.66	<0.0001
AUDIT-C ≥8	27.89	14.19–54.79	<0.0001	1.29	1.18–1.42	<0.0001	1.01	0.79–1.29	NS

* AUDIT-C (+): for males ≥5 and for females ≥4; AUDIT-C (≥8): for males or females ≥8; ** p-value calculated with logistic regression model; *** How often do you have a drink containing alcohol?; **** How many units of alcohol do you drink on a typical day when you are drinking?; ***** How often do you have 6 or more units on one occasion?

GPs are key for improvement of primary care services, especially in regard to health problems related with mental disorders, including alcoholism [7,20]. A study by Gual et al., enrolling 4250 individuals (18–65 years of age), showed that, similar to Poland, alcohol consumption is highly prevalent in Spain and 22.1% of the adult population is classified as risky drinkers, with a higher proportion in males. However, the majority of the studied population agreed that GPs are well prepared for treating alcohol problems and this belief was stronger among females and older individuals [21].

The strengths of the present study are the large number of patients enrolled and that all prevention activities (screening and brief intervention) targeting patients were compatible with European standards. Therefore, these results could be valuable for policy makers and for developing national alcohol guidelines. Although enrolled PHCUs were volunteers

drawn from the regional academic registry, they were comparable with the other PHCUs enrolled in the ODHIN project.

Conclusions

Demographic features are associated with drinking patterns of primary health care patients in Poland. Young males and those inhabiting rural areas are at highest risk of being hazardous or harmful drinkers and of possibly being AD. There is a growing need for development of national guidelines to address the prevention of alcohol-related health problems by general practitioners.

Conflict of interests

None.

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