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Alcohol consumption among men and women with tuberculosis in Tomsk, Russia

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Abstract

Drinking behavior among Russian women remains poorly described. We analyzed gender differences in alcohol use among 374 tuberculosis patients in Tomsk, Siberia. Twenty-six (28.3%) women had lifetime alcohol abuse or dependence, compared with 70.6% of men. Women with alcohol use disorders drank 12.7 ± 14.0 standard drinks per day and 34.6% drank \geq three days per week. Among individuals with a lifetime alcohol use disorder, age of onset and typical consumption did not differ significantly by gender. We conclude that Russian women with alcohol

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Conflict of Interest Statement

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use disorders consume almost as much alcohol as men and may be at greater risk for negative social and medical consequences.

Keywords

Women; gender; alcohol use disorders; tuberculosis; Russia; review

Introduction

With the greatest estimated consumption of alcohol per capita in the world, Russia and the Former Soviet Union (FSU) are among the regions most critically impacted by alcohol use disorders (AUDs) (1,2). While alcohol use and abuse has long been prevalent in Russia, rates of alcohol consumption rose dramatically after the collapse of the Soviet Union in 1991 (3). Subsequent market reforms permitted a further rise in alcohol sales; by 1995, 5–10% of people in adult age groups drank more than 100 grams of alcohol per day (4). In 1999, the number of officially reported individuals with alcohol dependence in Russia was 2.2 million, 1.5% of the total population (5). Because of under-reporting and the lack of internationally-validated criteria to classify alcohol use disorders, most experts agree that official reporting and survey data greatly underestimate the true prevalence of AUDs (6).

In fact, several studies using validated diagnostic instruments have confirmed higher rates of AUDs relative to official estimates. In a survey of 855 rural inhabitants seeking primary care in Udmurtia, Russia, 90.2% of the adult population reported alcohol use; among these, the lifetime prevalence of harmful alcohol use based on the tenth International Classification of Diseases (ICD-10) (7) criteria was 37.1% (8), of whom 31.9% had alcohol dependence. Of those who reportedly tried to stop drinking, only 5% were abstinent for more than 12 months (8). In a study conducted among urban patients seen at primary care clinics in St. Petersburg, only 2.4% of the total population reported abstinence, 16.3% were classified as hazardous drinkers, 9.1% as harmful drinkers, and 6.1% had alcohol dependence according to Diagnostic and Statistical Manual Fourth Edition (DSM-IV) criteria using the Composite International Diagnostic Interview (CIDI) (5,9,10).

Alcohol consumption has contributed to the marked rise in mortality in Russia over the past two decades. Between 1992 and 2001, it is estimated that an excess of 2.5–3 million Russian adults died in middle age than would be expected based on 1991 mortality estimates (11). By 2001, life expectancy had dropped to 66 years, compared with 78 years for U.S. residents (12). Most experts consider alcohol to be the most important factor driving Russian mortality trends; some estimate that alcohol is implicated directly or indirectly in approximately one-third of all Russian deaths (5,6,13–16). Because men disproportionately bear the burden of mortality due to alcohol, much of the literature on the “alcohol crisis” in Russia has focused on men (17–23). Little attention has been given to the fact that, among Russian women, the probability of dying between the ages of 15 and 60 is almost twice that of women in the United States (15.3% versus 8.2%) (12) and 4.7 out of 10,000 deaths among Russia women are directly due to alcohol (24).

Despite growing awareness and concern about AUDs in Russia, the problem of AUDs among women remains a “hidden epidemic” (25). While estimates from Russia and other FSU countries report less drinking among women compared with men (26), alcohol consumption is increasing among women, in particular among youth (27). Further, the magnitude of gender differences in AUD prevalence may be overestimated due to underreporting among women. For instance, while a national survey of Russian adults in 1996 found 9% of males and 35% of women to have reported abstinence in the past year,

alcohol experts estimated the true rate of past year abstinence to be 9% among males and only 8% among females (28). Laatikainen et al. observed lower rates of self-reported alcohol consumption among women in the Republic of Karelia, Russia versus North Karelia in Finland, while biological markers of drinking did not differ (29). This discordance between biological markers and self-report – observed only among Russian women and *not* among men – was interpreted as a greater propensity to under-report alcohol consumption among Russian women due to cultural differences of normative drinking behavior among men versus women (30). Several cohort studies suggest that habitual drinking and alcohol use disorders among women greatly exceed official and survey estimates. Kristjanson et al. found that 96% of women sampled from employment and educational centers reported consuming alcohol, and 42–55% of women were heavy to moderate drinkers (i.e. > 6.51 ml/d) (31). Similarly, Pakriev et al. found that 54.6% of women in rural Udmurtia were heavy to moderate drinkers and 10.3% had an AUD by ICD-10 criteria (7,8).

The cultural norms of drinking and gender roles in Russian society profoundly shape drinking behaviors, as well as reporting accuracy (32). While heavy alcohol consumption (especially binge drinking) is a normative pattern of male socialization in Russia (32), public drinking among women has traditionally been less acceptable (27). Studies exploring the social context of alcohol consumption by gender have shown mixed results. In a sample of Muskovites, Cockerham et al. found that psychological distress and economic deprivation were not associated with increased alcohol consumption in either gender, but rather, that heavy drinking was considered a positive social activity (33). On the other hand, Jukkala et al. reported that, among 1,190 Muskovites, economic and social influences were indeed predictors of binge drinking, but these relationships were strongly gender-dependent (34). Among men, economic strain was associated with binge drinking, whereas among women, the opposite was observed. Moreover, in this cohort, women were more influenced by their social network: being single and having regular contact with friends were both associated with binge drinking. In other words, unlike men, women who drank tended to be those most buffered from social and economic stress. Because both studies sampled well-educated Muskovites and did not consider the use of surrogate spirits – home-brewed alcohols that are less expensive and easily accessible – findings are not likely representative of the broader Russian population, many of whom are impoverished and marginalized.

Although the influence of gender on the health consequences of AUDs in Russia remains largely unexplored, a few studies highlight some gender-specific health consequences of alcohol consumption. While the global rate of fetal alcohol syndrome is 1.9 per 1000 live births (35), fetal alcohol syndrome in Russia is estimated at 53 to 145 per 1000 (36). In a survey of 200 pregnant women in St. Petersburg, 60% reported drinking even when they knew they were pregnant and 35% reported drinking in the past 30 days, despite adequate knowledge of the detrimental effects of alcohol on pregnancy outcomes (31). Similarly, among pregnant women in Moscow, Chambers et al. found that 52% reported alcohol consumption in the past month, including heavy drinking (≥ 3 drinks) in eleven percent.

While limited, these studies highlight the heightened vulnerability and needs of Russian women with AUDs. However, the drinking patterns and health seeking behavior of Russian women with AUDs have not been explored. In particular, gender differences in drinking behaviors and consequences have not been explored among patients seeking care for medical disorders including infectious diseases such as tuberculosis. Alcohol use disorders are prevalent among patients who seek treatment for TB (37,38) and adversely affect TB treatment outcomes (38–45). There is no current information on gender differences in drinking patterns and AUDs among individuals seeking treatment for TB. To address this knowledge gap, we analyzed gender differences in alcohol use patterns and disorders in a

prospective cohort study of men and women receiving tuberculosis treatment in Tomsk, Siberia.

Methods

Study setting

We carried out this study in Tomsk Oblast of Western Siberia, Russia, which has a population of 1,200,000. In 2007, the tuberculosis (TB) incidence in Tomsk was 102.7 per 100,000 and TB mortality was 12.2 per 100,000 (46). The Tomsk Oblast TB Services (TOTBS) provides TB care and management for all civilians in the in-patient TB Oblast Hospital, TB Day Hospital, and in the TB Polyclinic. Patients from outlying rural regions generally initiate treatment in the inpatient hospital, whereas residents of Tomsk City may start treatment as an inpatient or outpatient, depending on their clinical status.

Study participants

A total of 374 adults starting TB treatment in one of the three TB treatment sites in Tomsk, Russia were enrolled in this study between November 2005 and December 2008. All patients starting TB treatment during this period were referred for the study enrollment.

Data collection

TB physicians completed a standardized form providing baseline clinical and demographic data at the time of TB treatment initiation. This included baseline Alcohol Use Disorder Identification Test (AUDIT) score (47), as well as TB treatment history. We used the Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM) (5,10) to assess alcohol use disorders (alcohol abuse and dependence) according to DSM-IV criteria (9). Information on drug use disorders (abuse or dependence) based on DSM-IV criteria, social consequences of drinking and help-seeking behaviors for drinking were also derived from the CIDI interview. We calculated body mass index as the weight in kilograms divided by the square of the height in meters; a body mass index of less than 18.5 for women and less than 20 for men was considered low (48).

Data analysis

Data were entered and imported into an Access 2000 database (Microsoft Corporation, Seattle, WA). We used Statistical Analysis Software (SAS) version 9.1 (SAS Institute, Inc., Cary, NC) for analysis. We compared binary endpoints using the Chi-square test, or Fisher's exact test when the expected frequency of any cell was less than 5. For continuous variables, we used the t-test, or for non-normally distributed data the Wilcoxon two-sample test.

Results

Of the 374 individuals in this cohort of tuberculosis patients, 92 (24.6%) were women. As shown in Table 1, women starting TB treatment tended to be younger ($p=0.0007$) by approximately 4 years, and were less likely to have a history of incarceration ($p<0.0001$). Although they presented with a low body mass index more frequently ($p<0.0001$), they were less likely to have cavitory and bilateral lesions on radiograph ($p=0.01$) compared with their male counterparts.

Substance use patterns also differed by gender, as shown in Table 2. Smoking was more common and heavier among men ($p<0.0001$). Among men, 8.2% had a lifetime history of drug use disorder, compared with none of the women ($p=0.002$). Of the patients who completed the written AUDIT questionnaire, the mean score among women was 8.6 (\pm standard deviation 9.0) while men had a mean score of 14.7 ± 8.7 ($p<0.0001$). Based on the

CIDI questionnaire, 29.7% of women reported abstinence in the past year compared with 13.1% of the men, while 11% of all women and 35.8% of men reported drinking at least 3 days per week ($p<0.0001$). Women reported an average of 4.4 standard drinks on a typical drinking day, compared with 12.7 standard drinks among men ($p<0.0001$). According to the CIDI, 16 women (17.4%) had an AUD in the past year, while 26 (28.3%) had a lifetime diagnosis of an AUD, compared with 112 (39.7%) ($p<0.0001$) and 199 (70.6%) ($p<0.0001$), respectively, among men.

Among the 225 individuals diagnosed with a lifetime alcohol use disorder according to the CIDI, we compared consumption, consequences, and health seeking behaviors among men versus women (Table 3). A limitation of these comparisons is the small sample of 26 women. Although men began drinking an average of two years earlier than women ($p<0.0001$), the age of onset of alcohol abuse and dependence for men and women were comparable, in the mid-twenties for both sexes. Furthermore, the typical frequency ($p=0.79$) of consumption ($p=0.29$) was also comparable among men and women with AUDs, and there was no significant gender difference in the mean number of standard drinks per drinking day of 12.7 versus 16.2 in women and men, respectively ($p=0.29$). Although binge drinking on typical drinking days was more common among men ($p=0.04$), this behavior was still frequent among women, reported in 61.5% of female respondents versus 80.9% of male respondents. We also explored patients' reports of social consequences of drinking. While fewer women reported jeopardizing their safety due to drinking ($p=0.04$) or having problems with the police ($p=0.0006$), women were more likely to report negative consequences of drinking with their close relationships ($p=0.01$). Women were more likely to have attempted to cut down their drinking (61.5% versus 40.0%, $p=0.06$), although this difference did not reach statistical significance.

Discussion

In this cohort of individuals starting TB treatment in Tomsk, Siberia, we observed a high prevalence of lifetime AUDs (60.2%). Approximately 28% of women had a lifetime diagnosis of alcohol abuse or dependence, compared with 71% of all men. To our knowledge, this is the first report to show that, among Russians with lifetime AUDs, women may consume almost as much alcohol as men. In our cohort, drinking patterns among women were not significantly different from those of men, in terms of age of AUD onset, as well as amount of alcohol typically consumed. On the other hand, women in this cohort first began drinking at a later age than men. Our findings are similar to previous reports that have found that women have a 'telescoping' course of alcohol dependence, and that in spite of initiation of use at a later age, the interval from first use to the onset of dependence is shorter than for men (49,50). However, whereas previous studies from alcohol treatment trials have typically found that daily consumption among women is lower than among men (50,51), we found that among those with lifetime AUDs, there was no statistically discernible gender difference in average daily consumption. It is possible that the gender equivalence in mean daily consumption among Russian patients with AUDs seeking treatment for TB, compared with lower reported daily consumption among women compared with men in U.S. alcohol treatment trials, is due to differences in cultural norms (32,52–55) or to other differences in consumption patterns in this population of individuals with co-occurring TB and AUDs. An alternative explanation of the apparent gender equivalence is the low statistical power of this comparison (and others in our study) due to the relatively small number of women with alcohol use disorders ($n=26$).

Women with AUDs reported high levels of consumption overall, consuming an average of 13 standard drinks per typical drinking day, compared to an average of 16 for men with AUDs. One-third of women with AUDs drank at least three days per week (in comparison to

almost half of the men), with 19% of women drinking nearly every day. Given that the threshold of alcohol consumption associated with increased risk of alcohol-related problems is lower for women compared with men (≥ 1 drinks per day for women, ≥ 2 drinks per day for men (56)), the women in this cohort are clearly at greater risk for negative health and social consequences of drinking compared to their male counterparts.

The consequences of drinking differed by gender. Although work-related problems due to drinking were common with both genders, women tended to perceive greater social consequences of drinking (for instance, negative effects on relationships). Conversely, men were more likely to jeopardize their safety or have problems with police while drinking. Women tended to be more active in their attempts to curb their drinking. These results suggest that women with lifetime AUDs in this population could be more receptive to receiving treatment for their drinking. It is possible that efforts to help reduce drinking among women receiving health care for other medical issues (e.g. women's health, tuberculosis, etc.) may be highly effective. Interventions tailored to women that are integrated into primary health care or other medical services may also have the added benefit of diminishing stigma and socio-legal consequences (e.g. loss of child custody, coercive treatment, or employment loss) for women who would otherwise avoid being referred for alcohol treatment in separate, specialized addiction services.

Our study had several limitations. Our cohort was comprised of TB patients in Siberia, thereby limiting the potential generalizability of our findings to other populations in Russia or to populations receiving TB care in other countries. However, because patients with tuberculosis often represent the most vulnerable and socioeconomically disenfranchised individuals in many societies (57), we feel that these findings are all the more important to highlight the heightened vulnerability of individuals with co-occurring TB and alcohol use disorders, particularly among women. As previously mentioned, the number of women with alcohol use disorders may have limited our ability to determine statistical significance in some gender comparisons among individuals with AUDs.

In the United States and elsewhere, efforts to better understand gender differences in the antecedents and consequences of alcohol use disorders have informed the design of gender-appropriate interventions to effectively treat AUDs (58–60). To our knowledge, aside from efforts to prevent fetal alcohol syndrome (36), we know of no published efforts to target alcohol interventions specifically for Russian women. Our findings provide additional insight into the characteristics and drinking behavior of women with alcohol use disorders in a highly vulnerable population of Siberian tuberculosis patients. We hope that integrating AUD care into TB services in a gender-sensitive manner will be an effective means of improving health outcomes and psychosocial well-being among marginalized Russian women with AUDs.

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Glossary

Alcohol Use Disorder (as defined by the DSM-IV)

1. A maladaptive pattern of alcohol abuse leading to clinically significant impairment or distress, as manifested by one or more of the following, occurring within a 12-month period:

- a. Recurrent alcohol use resulting in failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions or expulsions from school; or neglect of children or household).
 - b. Recurrent alcohol use in situations in which it is physically hazardous (e.g, driving an automobile or operating a machine).
 - c. Recurrent alcohol-related legal problems (e.g., arrests for alcohol-related disorderly conduct).
 - d. Continued alcohol use despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol (e.g., arguments with spouse about consequences of intoxication or physical fights).
2. These symptoms must never have met the criteria for alcohol dependence

**Alcohol
Dependence**

a cluster of behavioral, cognitive, and physiological phenomena that may develop after repeated alcohol use. Typically, these phenomena include a strong desire to consume alcohol, impaired control over its use, persistent drinking despite harmful consequences, a higher priority given to drinking than to other activities and obligations, increased alcohol tolerance, and a physical withdrawal reaction when alcohol use is discontinued

**Alcohol Use
Disorder
Identification Test
(AUDIT)**

A method of screening, via brief assessment, for excessive drinking, alcohol dependence, and consequences of harmful drinking published by the World Health Organization (WHO)

**Composite
International
Diagnostic
Interview-
Substance Abuse
Module (CIDI-
SAM)**

a structured clinical interview consisting of questions that are based on the DSM-IV diagnostic criteria for alcohol use disorders

**Diagnostic and
Statistical Manual
of Mental Disorders**

Fourth Edition (DSM-IV), the standard classification manual of currently recognized mental disorders published by the American Psychiatric Association (APA)

**International
Statistical
Classification of
Diseases and
Related Health
Problems 10th
Revision (ICD-10)**

a coding of diseases and signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases, as classified by the World Health Organization (WHO)

Tuberculosis (TB)

an infectious bacterial disease caused by *Mycobacterium tuberculosis*, which most commonly affects the lungs. It is transmitted from person to person via droplets from the throat and lungs of people with the active respiratory disease. TB is treatable with a six-month course of antibiotics

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Table 1

Baseline clinical and demographic characteristics of cohort (N=374)

Variable (N, if not complete cohort)	Female N=92	Male N=282	p-value
Age (Mean \pm STD)	36.4 \pm 11.4	41.1 \pm 11.2	0.0007
Civil status, N=373			0.05
Married	29 (31.5)	77 (27.3)	
Separated	2 (2.2)	30 (10.6)	
Divorced	18 (19.6)	72 (25.5)	
Widowed	7 (7.6)	16 (5.7)	
Never married	36 (39.1)	86 (30.5)	
Unemployed, N=364	54 (58.7)	163 (59.9)	0.84
Disability pension, N=364	6 (6.5)	19 (7.0)	1.00
Prior incarceration, N=364	5 (5.4)	77 (28.3)	<0.0001
Medical conditions			
Cardiovascular and/or cerebrovascular disorder	4 (4.4)	17 (6.0)	0.79
HIV, N=357	0 (0)	1 (0.4)	1.00
Chronic HBV	2 (2.2)	2 (0.7)	0.25
Elevated liver function tests, N=363	31 (33.7)	101 (37.3)	0.54
Low body mass index, N=364	40 (43.5)	51 (18.8)	<0.0001
TB condition			
No prior TB treatment	80 (86.9)	220 (78.0)	0.06
Bilateral and cavitary abnormalities on chest radiograph, N=363	28 (30.4)	124 (45.8)	0.01

Table 2

Baseline substance use history, N=374.

Variable (N, if not complete cohort)	Female N=92	Male N=282	p-value
Tobacco use			<0.0001
Current	56 (60.9)	242 (85.8)	
Ex-smoker	9 (9.8)	28 (9.9)	
Never smoker	27 (29.4)	12 (4.3)	
Pack-years, N=319	10.7 ± 9.9	20.8 ± 17.4	<0.0001
Drug use disorder (DSM-IV)	0 (0)	7 (2.5)	0.34
Drug use disorder (year)	0 (0)	2 (0.7)	1.00
Drug use disorder (lifetime)	0 (0)	23 (8.2)	0.002
AUDIT score (mean ± STD) N=364	8.6 ± 9.0	14.7 ± 8.7	<0.0001
Frequency alcohol consumption, past year, N=372			<0.0001
Nearly every day	5 (5.5)	57 (20.2)	
3–4 days per week	6 (5.5)	44 (15.6)	
1–2 days per week	8 (8.8)	50 (17.7)	
1–3 days per month	18 (19.8)	60 (21.3)	
Less than once a month	27 (29.7)	33 (11.7)	
Did not drink in past year	27 (29.7)	37 (13.1)	
Average standard drinks on drinking days, N=373	4.4 ± 9.4	12.7 ± 15.0	<0.0001
Alcohol use disorder, any (past year)	16 (17.4)	112 (39.7)	<0.0001
Alcohol dependence	9 (9.8)	74 (26.2)	0.0008
Alcohol abuse	7 (7.6)	38 (13.5)	0.14
Alcohol use disorder, any (lifetime)	26 (28.3)	199 (70.6)	<0.0001
Alcohol dependence	12 (13.0)	94 (33.3)	0.0001
Alcohol abuse	14 (15.2)	105 (37.2)	<0.0001

Table 3

Alcohol use patterns among those with DSM-IV lifetime alcohol use disorder, N=225.

Variable (N, if not complete cohort)	Female N=26	Male N=199	p-value
Patterns of drinking behavior			
AUDIT score, mean \pm STD, N=216	17.5 \pm 9.0	17.1 \pm 8.1	0.80
Age first began drinking, N=224	16.5 \pm 1.9	14.2 \pm 3.9	<0.0001
Age onset, alcohol dependence, N=99	27.6 \pm 10.4	26.8 \pm 7.9	0.77
Age onset, alcohol abuse, N=217	27.4 \pm 8.5	25.1 \pm 8.3	0.20
Frequency alcohol consumption, past year			0.79
Nearly every day	5 (19.2)	52 (26.1)	
3–4 days per week	4 (15.4)	43 (21.6)	
1–2 days per week	6 (23.1)	37 (18.6)	
1–3 days per month	7 (26.9)	44 (22.1)	
Less than once a month	3 (11.5)	13 (6.5)	
Did not drink in past year	1 (3.9)	10 (5.0)	
Average standard drinks on drinking days	12.7 \pm 14.0	16.2 \pm 15.9	0.29
Binge drinking on drinking days ^a	16 (61.5)	161 (80.9)	0.04
Social consequences in past year, among those actively drinking			
Problems with family and/or friends	20 (76.9)	130 (65.3)	0.28
Interfered with close relationships, N=109	7 (50.0)	17 (17.9)	0.01
Interfered with social life, N=102	7 (53.9)	28 (31.5)	0.13
Interfered with work	21 (80.8)	144 (72.4)	0.35
Jeopardized safety	9 (34.6)	115 (57.8)	0.04
Problems with police	5 (19.2)	112 (56.3)	0.0006
Help-seeking behavior			
Tried but not able to stop/cut down, N=224	16 (61.5)	80 (40.0)	0.06
Talk to health professional	10 (38.5)	50 (25.1)	0.16
Among those who spoke with a health professional, found treatment to be helpful or effective, N=60	7 (70.0)	26 (52.0)	0.49
Among those who spoke with a professional, hospitalized for substance use, N=60	4 (40.0)	16 (32.0)	0.72
Among those who spoke with a professional, attended self-help group, N=60	1 (10.0)	1 (2.0)	0.31

^a At least 4 drinks for women, at least 5 drinks for men