

Analysis of alcohol dependence in indigenous peoples in Northern Siberia

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Summary

Aim. This is a statistical and clinical analysis of overall morbidity, characteristics of alcohol dependence and alcohol psychosis of the indigenous population in North Siberia (Yamal-Nenets Autonomous District).

Subjects. The basic indices which characterize the dynamics of alcohol dependence and alcohol psychosis in the indigenous peoples of North Siberia are identified. As indicators of comparison, we looked at the mean age at onset of alcohol drinking, duration of the first stage of alcoholism, alcohol tolerance, the mean age of the appearance of drinking bouts, the mean age at first and the total number of hospitalizations, and the duration of remission.

Results. A more malignant course and main traits of alcohol dependence were observed in the indigenous population alongside a 147% increase in the number of patients with psychoses monitored for addiction over the period 2002–2012.

Discussion. Differences between the indigenous peoples and newcomers associated with specific metabolic features of the natives are the background for their progredient alcohol dependence. Easy access to alcohol in recent decades is a threat to health of the indigenous peoples.

Conclusions. A more severe course of alcoholism among the indigenous population of North Siberia leads to the destruction of traditional lifestyles and a reduction of the indigenous population in the northern territories of the Russian Federation.

alcohol dependence / alcohol psychosis / indigenous peoples of north Siberia

INTRODUCTION

Extreme weather conditions and relative isolation from the rest of the country have contributed to specific cultural, behavioural and even metabolic features of the native peoples of Siberia. Over the millennia, living in the far north, the indigenous peoples have consumed protein-lipid type of food, with a small amount

of carbohydrates. Food mostly depends on weather conditions with a short vegetation period, and only fish and deer are freely available. However, centuries-long lack of carbohydrates in the diet could lead to a deficiency of the alcohol-metabolizing enzyme and even to an inclination towards alcohol dependence.

Alcohol is metabolized by several pathways, but it is first converted to acetaldehyde by alcohol dehydrogenase (ADH) enzyme and then to acetate by aldehyde dehydrogenase (ALDH) enzyme. Recent studies revealed there are specific genes for alcoholism: the presence of such a gene reduces the ALDH enzyme's ability to convert acetaldehyde into acetate. The low-active enzyme allele *ALDH2*2* differ from its active counterpart,

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*ALDH2*1* by a single-point mutation [1, 2]. The low-active enzyme can cause rapid intoxication due to an accumulation of toxic byproducts. Genetic studies showed protective associations for alcohol dependence on chromosome 4. Genetic factor (*ADH2* polymorphisms etc.) is a main reason for distribution of tolerance to alcohol throughout the population [3, 4]. Certain activities of alcohol and aldehyde dehydrogenases provide a certain resistance to alcoholism in different nationalities [5]. Because of the heterogeneity of reasons for alcohol addiction, there is no pathogenetic therapy and a high level of relapse is a feature [6].

Many authors have emphasized that alcohol addiction takes the most malignant course in the indigenous peoples of the far north [7]. One of the reasons is the historical lack of traditions of alcohol production and consumption in those groups – there were no alcoholic beverages in traditional Siberian cuisine. However, the situation has changed for the worse during the past two centuries. Prolonged psycho-emotional pressures due to the stress of transition of north Siberian natives to sedentary and non-traditional work in the mid-twentieth century significantly contributed to the spread of alcoholism [8]. A similar situation has occurred for Native Americans [9, 10]. Nowadays, rapid changes in the traditional way of life due to industrial influences and an easy access to alcohol threatens the health of the indigenous people of northern Russia. In the literature, there are indications of very definite differences in the clinical and dynamic courses of alcoholism in different ethnic groups [11]. A significant incidence of alcohol dependence was found among the indigenous peoples of Canada, Alaska and the Taymyr Peninsula in Russia [12]. This problem is still relevant, because negative social and health consequences of alcoholism, including a high, whole-year-round risk of freezing to death while intoxicated [13].

Alcohol psychoses worsen the prognosis of chronic alcohol dependence. However, incidence of alcohol psychoses is directly related to the prevalence of alcohol dependence in the population and reflects cases of alcoholism “hidden” from primary medical statistics. The dynamics of alcohol psychosis enable a realistic assessment of alcohol dependence and its develop-

mental trends. Alcohol psychosis is a psychotic condition that occurs 12–72 hours after the cessation of alcohol intake, when the level of alcohol in the patient’s blood is reduced or absent. The clinical course of alcohol psychosis is determined by binge duration, the nature and severity of intoxication, comorbid diseases of the liver and the cardiovascular system, brain damage, psychiatric comorbidity, social status and age of the patient.

This paper presents a comparative analysis of a wide range of clinical indicators of alcoholism in the dynamics of two groups of patients: the study group – indigenous nationalities of north Siberia and the control group – newcomers.

MATERIALS AND METHOD

Initial data on the prevalence of alcohol dependence of the indigenous people in the Yamal-Nenets Autonomous District (a major gas producing region of Russia, characterized by extreme natural conditions) were summarized and statistically processed. Patients of indigenous nationalities who received hospital treatment between 2002 and 2012 were included. Additionally, to identify the characteristics of the course, specific traits and heredity of alcohol dependence, 135 patients with alcoholism were examined. They were divided into the study group (indigenous nationalities of the north) comprising 50 patients and the control group (newcomers) of 85 patients. All participants had been treated in hospital for mental and behavioural disorders due to alcohol abuse. The inclusion criteria were age 18–60 years (to eliminate the influence of extreme age characteristics) and a verified diagnosis of a mental and behavioural disorder due to alcohol use. Exclusion criteria were: comorbid psychiatric disorders such as schizophrenia, manic-depressive psychosis, epilepsy, intellectual disability; acute alcohol paranoia, Korsakoff’s psychosis, Gayet-Wernicke encephalopathy (due to the fact that these disorders are rare and we did not have sufficient numbers of patients for the correct comparison and statistical processing); and the presence of a severe physical illness that could significantly influence the clinical manifestation of alcohol

psychosis, such as liver disease (hepatitis, cirrhosis), severe diseases of the cardiovascular system (hypertension 2B, myocarditis, cardiopulmonary failure), kidney disease (glomerulonephritis, pyelonephritis).

and Behavioural Disorders, class V, adapted for use in the Russian Federation). Diagnoses in the study groups were formulated as mental and behavioural disorders due to the use of alcohol, alcohol dependence (F10.2); withdraw-

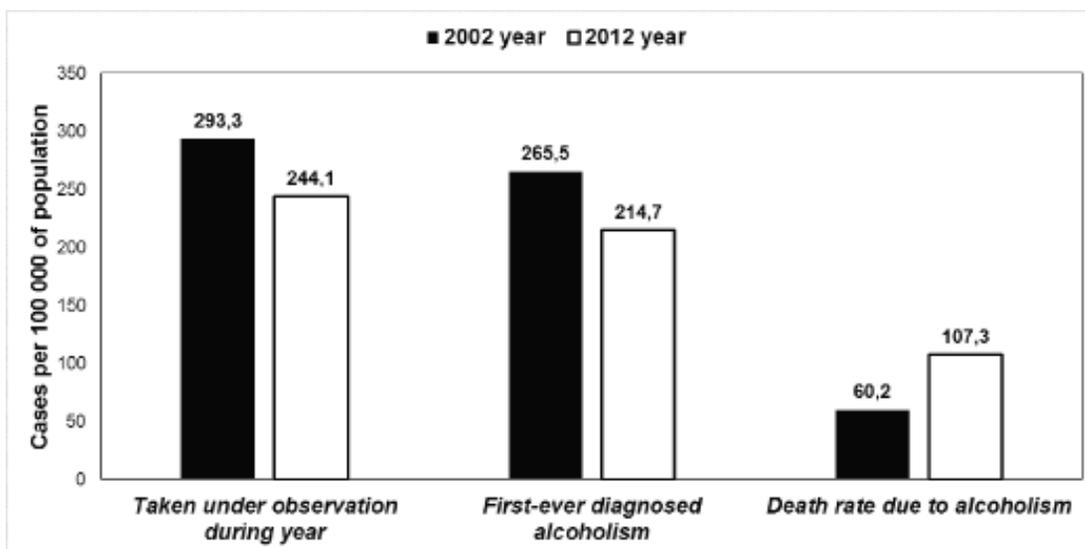


Figure 1. Parameters of registered cases of alcoholism (indigenous nationalities) in 2002–2012. Growing tendency of mortality.

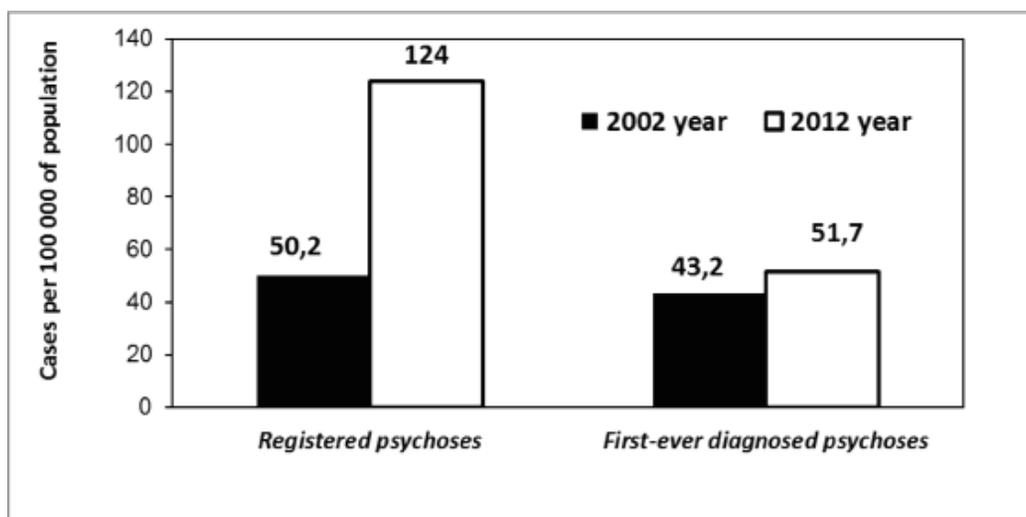


Figure 2. Dynamics of patients (indigenous nationalities) with a diagnosis of alcohol psychosis from 2002 to 2012.

The study group consisted of 50 patients with a mean age of 41.77 ± 7.55 years, treated for mental and behavioural disorders due to alcohol use (F10). The control group consisted of 85 patients of the European (immigrant) population with a mean age of 40.3 ± 11.58 years, also treated for mental and behavioural disorders due to alcohol use (F10). The clinical diagnosis was in accordance with the International Classification of Diseases 10th Revision (Mental

al state (F10.3); withdrawal state with delirium (F10.4); psychotic disorder predominantly hallucinatory (F10.52); psychotic disorder predominantly polymorphic (F10.53).

As indicators of comparison, we looked at a mean age at the onset of alcohol drinking, duration of the first stage of alcoholism, alcohol tolerance, mean age at the appearance of drinking bouts, mean age at first and the total number of hospitalizations, duration of remis-

sion, and the number and type of psychoses. The results of the research were statistically processed and presented as mean \pm SD.

RESULTS AND DISCUSSION

Comparative statistics of indigenous patients with alcohol dependence syndrome under observation during the period 2002–2012 are shown in Figure 1. The number of patients with a diagnosis of alcoholism taken under observation in this period decreased by 16.8% ($p < 0.05$): first-time diagnosis decreased by 19.2% ($p < 0.05$), but the death rate increased 1.8 times based on the prospective follow-up of patients from 2002. The number of patients under observation increased 1.4 times (2002 – 2117.8 cases, 2012 – 2990.0 cases per 100th population; $p < 0.05$).

The dynamics of registered and first-time registered patients (indigenous nationalities) with a diagnosis of alcohol psychosis are shown in Figure 2. This shows that the number of patients with a diagnosis of alcohol psychosis under observation from 2002 to 2012 increased 2.5 times (from 50.2 cases in 2002 to 124.0 cases in 2012 per 100th population; $p < 0.05$), while first-time diagnosed psychosis increased by 4.8% (in 2002 – 43.2 cases, in 2012 – 45.3 cases per 100th population, $p < 0.05$).

A comparison of morbidity levels among the indigenous peoples of the Yamal-Nenets District with those of the indigenous ethnic groups of Kamchatka [11] showed that unrecorded alcohol morbidity among Koryaks amounts to 3050 cases (per 100th of Koryak population), among Evenks 2840 cases and among Aleuts and Itelmens 1600 cases (per 100th of the ethnic population). For indigenous peoples of Yakutia [7], alcohol morbidity affects 1743.8 cases per 100th population, which is significantly lower than among the indigenous people of the Yamal-Nenets District (2067.7 cases in 2002 and 2866.0 cases in 2012 per 100th population). These figures indicate that alcohol morbidity among the indigenous peoples of the Yamal-Nenets District is slightly lower than among similar Koryaks, but significantly higher than in Aleuts and Itelmens. A comparison of the characteristics of alcoholism in

the native and newcomer population showed a number of features characteristic to people of north Siberia. Extreme weather conditions of the area have a direct influence on the social behaviour and lifestyle of the native inhabitants and thus alcohol consumption may also be enhanced by extreme geo-climatic factors. For newcomers, both the social-psychological changes and adaptation to extreme geo-climatic factors contribute to the emergence of alcoholism [14].

Thus, we found that patients in the study group (indigenous people) have started to drink alcohol earlier than controls, at 16.26 ± 1.75 years compared with 19.0 ± 1.7 years in the control group (Table 1). The analysis of marital status of patients revealed that the study group was made up predominantly of divorced (40.0%, $p < 0.05$), married (34.0%, $p < 0.05$), cohabiting (16.0%, $p < 0.05$) and single (10%, $p < 0.05$) patients, whereas the control group consisted predominantly of married (34.2%, $p < 0.05$), single (29.4%, $p < 0.05$) and cohabiting (23.5%, $p < 0.05$) patients.

The study group patients mostly live in nomad camps (48.0%, $p < 0.05$) or in dormitories (38.0%, $p < 0.05$), whereas the control group reside mostly in dormitories (50.6%, $p < 0.05$), blocks of flats (36.5%, $p < 0.05$) or in private homes (10.5%, $p < 0.05$).

A hereditary burden of alcoholism based on family history in indigenous peoples was noted in 62.0% of cases, in 12.0% there was a risk of suicide, in 12.0% alcohol psychosis, in 2.0% epilepsy. Only 4.0% of cases revealed no hereditary influence. In the control group hereditary alcoholism was noted in 60.0% of cases but alcohol psychosis in only 7.1% of cases.

Obviously, the burden of alcohol dependence was equal in both groups, whereas the burden of suicidal behaviour and alcohol psychoses was much more significant for indigenous people of the north as compared with newcomer controls. The mean age of regular alcohol consumption in patients of indigenous nationality was also lower than in the control group (Table 1). The most common drink in both groups is vodka – a strong drink containing 40% ethanol. It was found that in the study group the mean duration of the initial stage of alcohol dependence, from the beginning of systematic al-

cohol abuse until the occurrence of withdrawal symptoms, was 2.06 ± 1.09 years, which was significantly less than in the control group (4.8 ± 0.98 years).

Alcohol withdrawal syndrome emerged at a much earlier age in the study group (22.61 ± 3.30 years) than the control group (30.1 ± 2.34 years), which is one of the signs of an early onset of

stage 2 alcohol dependence. Comparison of single-dose tolerance to alcohol revealed that in the study group the rate was 0.25 ± 0.20 L of 100% alcohol, which is significantly less than the control group (0.51 ± 0.30 L of 100% alcohol). Differences were even more significant in maximum daily tolerance to alcohol: 1.39 ± 0.70 L of 100%

Table 1. Comparison of indicators of alcohol dependence syndrome in different groups of indigenous and newcomer population of north Siberia ($p < 0.05$)

	Indigenous people (n=50)	Control group (n=85)
Mean age of onset of drinking (years)	16.26 ± 1.75	19.0 ± 1.73
Mean age of regular drinking (years)	20.55 ± 2.39	25.3 ± 1.56
Mean age of palimpsest syndrome occurrence (years)	25.61 ± 1.94	31.7 ± 1.84
Mean age of formation of withdrawal syndrome (years)	22.61 ± 3.30	30.1 ± 2.34
Duration of withdrawal syndrome (days)	8.10 ± 2.59	5.2 ± 1.58
Mean age of binges occurrence	26.94 ± 2.95	32.6 ± 10.54
Mean duration of first stage of alcoholism (years)	2.06 ± 1.09	4.8 ± 0.98
Maximum single dose tolerance to alcohol (liters of 100% alcohol)	0.25 ± 0.20	0.51 ± 0.30
Maximum daily tolerance to alcohol (liters of 100% alcohol)	1.39 ± 0.70	3.56 ± 0.48
Mean age of first hospitalization.	30.00 ± 3.25	35.9 ± 11.80
Mean number of hospitalizations	3.32 ± 2.30	3.3 ± 2.51
Mean maximum duration of remission (days)	44.48 ± 2.74	23.7 ± 8.11
Mean number of alcoholic psychoses	1.94 ± 0.68	0.4 ± 0.02

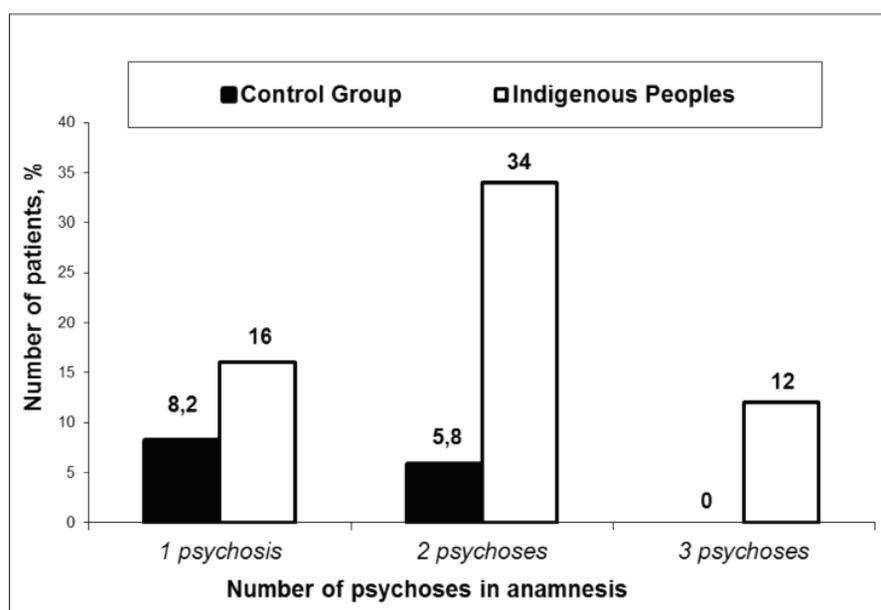


Figure 3. Alcohol psychoses in both patient groups.

alcohol in the study group, which is significantly less than in the control group (3.56 ± 0.48 L of 100% alcohol). However, low alcohol tolerance is a specific trait for the northern peoples of Siberia and for Mongolian races overall [15]. Alcohol intoxication in the study group was characterized by predominantly affective symptoms, mostly dysphoric and depressive symptoms. Patients pester and are violent towards others, and when fighting they are out of control. This often leads to crime. An unfavourable course of the disease is indicated by the number of alcohol psychoses in patients' history (Figure 3) [12]. Indigenous peoples more often had a history of two or more cases of alcohol psychosis. In contrast, patients in the control group mostly suffered from one, rarely two instances of alcohol psychosis.

In most cases, alcohol psychoses worsen the prognosis and are accompanied by neurohumoral, immunological and neurological disorders. In both groups patients most frequently display delirium tremens (more than 60% of acute psychoses), and significantly less often – acute alcohol hallucinosis. Low population density and isolation from major regional centres often result in late detection of alcoholism, which is also a risk factor for alcoholic psychosis in north Siberia. The basic structure of hallucinosis is related to archaic superstitions on the conditions of life in the north. The analysis of comorbid somatic pathology in in the two groups revealed that the most common conditions were diseases of the gastrointestinal tract and the cardiovascular system. These are typical complications of alcoholism and are not specific to indigenous peoples of north Siberia. However, indigenous patients often turned to traditional healers for help (shamans etc.), which makes it difficult to identify and account for these patients by psychiatric services at the initial stages of alcoholism, and delays medical treatment of alcohol psychoses and comorbid pathology. Superstitious beliefs among indigenous peoples reflect an increased suggestibility, and propensity to form a psychological and physical addiction in general and alcoholism in particular. A greater risk of suicide in indigenous peoples is also considered an ethno-cultural factor. On the other hand, people coming to the north are more likely to suffer various kinds of psychological breakdowns and crises that may be associated with a change in their way of life and be an effect of chal-

lenging climatic and geographic factors – the so-called polar stress. The indigenous population is less susceptible to these factors, but despite this, the prevalence and severity of alcoholism is higher in indigenous peoples.

Comparatively lower consumption of alcohol by the indigenous peoples is mainly explained by enzymatic features, which worsen prognosis. Other important factor in the spread of alcoholism among the peoples of northern Siberia is a long historical isolation from alcohol and the drinking customs of the Europeans. Consequently, the traditional culture lacks restrictions and prohibitions linked to alcohol. Regarding this, more attention should be given to prophylaxis and restrictions on selling alcoholic beverages in places with a particularly high concentration of the indigenous peoples of north Siberia. Other measures should enhance the management of alcoholics, who are likely continuing their drinking after treatment. In this context, new pathogenic medications are needed for the prevention and treatment of alcohol dependence and the correction of severe comorbid disorders.

CONCLUSIONS

The clinical complications of alcohol dependence among indigenous peoples of north Siberia are much more severe than in the control group comprising European nationals. Alcohol intoxication in the indigenous people is characterized by a predominance of affective symptoms, which exacerbates criminal consequences. The following features characterize morbidity among the indigenous population of the Yamal-Nenets Autonomous District: a 147% increase over the period from 2002 to 2012 in the number of patients with alcohol psychosis, alcohol dependence formed at an earlier age and taking a highly progredient form with more alcohol psychoses, which leads to the destruction of traditional lifestyles and reduction of the indigenous population in the northern territories of the Russian Federation.

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