

## ORIGINAL PAPER

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# Social and lifestyle determinants of depression, anxiety, sleeping disorders and self-evaluated quality of life in Russia

## A population-based study in Arkhangelsk

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**Abstract** *Background* The paper investigates social and lifestyle determinants of depression, anxiety, sleeping disorders and self-evaluated low quality of life in a population sample from the northwest of Russia. *Methods* Altogether 1968 men and 1737 women aged 18–90 years participated in a population-based study in Arkhangelsk, Russia, in the period 1999–2000. Depression, anxiety, and sleeping disorders were evaluated by a questionnaire with the formulations that have been previously used in population studies in Northern Norway. Alcohol dependence was diagnosed by the Alcohol Use Disorders Identification Test (AUDIT). Quality of life was evaluated by a 10-score Cantril Ladder. A score lower than five was defined as low quality of life. Relations between depression, anxiety, and sleeping disorders and socioeconomic/lifestyle factors were tested by logistic regression analyses. *Results* Women reported significantly higher prevalence of depression, anxiety and/or sleeping disorders than men: 68.7% and 32.3%, respectively. Depression, anxiety, sleeping disorders and low quality of life were positively associated with self-evaluation of nutrition as “poor”, low consumption of food, and with low-paid professional status. Depression and sleeping disorders were associated with smoking,

hazardous level of alcohol drinking and alcohol dependence. Anxiety and low quality of life were associated with alcohol dependence. Depression, anxiety, sleeping disorders and low quality of life had a strong positive association with circulatory diseases and gastrointestinal diseases, the association remained significant after adjustment for smoking and alcohol variables. *Conclusions* A considerable part of the examined Russian population experienced depression, anxiety, and sleeping disorders that were strongly positively associated with poor nutrition, low socioeconomic status and adverse health behaviors (alcohol use disorders, smoking).

**Key words** depression – anxiety – sleeping disorders – quality of life – Russia

### Introduction

Russia has experienced dramatic economical, political and social changes since the collapse of the Soviet Union. These changes have been followed by a devastating decline in public health. Life expectancy has decreased, especially in middle-aged men, and the gap between Russia and Western Europe is now more than 10 years for both sexes. Mortality rates have increased considerably since 1990, and are still rising (Goskomstat of Russia 2004; Notzon et al. 1998). External reasons (trauma, accidents, suicide, homicide) remain one of the leading causes of death. According to WHO data (2003), Russia is emerging as a world leader in suicides.

Cardiovascular diseases (CVD) also represent a major cause of death in Russia. In contrast to West-European countries, CVD mortality in Russia continues to increase. Several studies have shown that high cardiovascular mortality and its recent fluctuations in Russia could not be explained by the classic risk factors (Ginter 1995; Kuulasmaa et al. 2000; Perova et al. 1995; Averina et al. 2003, 2004). This “Russian paradox” still remains without explanation, although several hypotheses have been suggested. Some researchers have suggested

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that heavy alcohol consumption might be responsible both for the increase in CVD mortality and deaths from external causes (Chenet et al. 1998; Nemtsov 2002; Shkolnikov et al. 2001). Others point to the importance of mental distress as a result of increasing poverty and unemployment, declining social and medical support, and considerable fall in living standards (Kennedy and Kawachi 1998; Notson et al. 1998; Shkolnikov et al. 1998; Walberg et al. 1998). The MONICA study in Novosibirsk found that CVD mortality was associated with high alcohol consumption (Malyutina et al. 2002), whereas CVD morbidity was associated with anxiety and sleeping problems (Gafarov et al. 2003). Carlson (2001) found that self-rated health was closely related to indicators of economic difficulties in Russia. Economic difficulties were postulated to give rise to stress, anxiety and depression that could lead to ill health. Studies from other countries have shown that mental distress, negative emotions and low socioeconomic status contribute to the development of cardiovascular diseases and stroke (Hallqvist et al. 1998; Ketterer et al. 2000; Smith 2001; Truelsen et al. 2003). Life dissatisfaction and low social participation have been reported as risk factors for mortality in prospective studies (Dalgard and Håheim 1998; Koivumaa-Honkanen et al. 2000).

The objective of this study was to evaluate the prevalence of depression, anxiety and sleeping disorders in a population-based study in Russia. Furthermore, the aim was to test how and to what degree depression, anxiety, sleeping disorders and low self-evaluated quality of life are associated with socioeconomic and lifestyle variables such as nutrition, alcohol consumption, smoking, education, occupational and civil status, and self-reported diseases.

## Subjects and methods

### ■ Study population

The study was conducted in Arkhangelsk – the center of the largest region in the northwest of Russia. In 1999, the population of the Arkhangelsk town consisted of 367000 residents (0.3% of the general Russian population). Total mortality and cardiovascular mortality rates in the Arkhangelsk region were similar to the figures for the whole Russian population in 2000 (the Goskomstat of Russia 2004).

No population register was available for medical research in Arkhangelsk. Primary healthcare departments (polyclinics) provide medical aid to the general population according to territorial and occupational principles. For this purpose, outpatient clinics possess a kind of register over the general population. Citizens are registered at the clinics on a population basis according to their home address or place of work. Therefore, we decided to consecutively recruit residents registered at one of the outpatient clinics in Arkhangelsk. All the participants were investigated at the same outpatient clinic by specially trained medical personnel, which made it possible to provide the same quality of investigation with a minimum of missing data. To avoid the “healthy volunteer effect”, participants were consecutively recruited. Prevalence of circulatory diseases in the study population was almost the same as in the general adult population in the northwest of Russia: 130.7 and 132.9 per 1000, respectively (Averina et al. 2003). From November 1999 to November 2000, altogether 1968 men and 1737 women aged 18 years and more participated in the study (1% of the town population, 0.3% of the Arkhangelsk region popula-

tion). Of those who were invited, 40 persons refused to participate (1.1%). Working population and students were consecutively invited either through the obligatory annual medical examination or through their places of work or study. Pensioners were recruited through the clinic’s register. Comparison of the study population with the general Arkhangelsk region population has been presented in our previous articles (Averina et al. 2003, 2004). The study population had higher level of education and lower number of unemployed men compared with the general Arkhangelsk region population. Other demographic characteristics of the study sample were close to those for the general Arkhangelsk region population, thus leaving us with a fairly representative sample.

### ■ Ethics

The Regional Ethical Committee, Norway, approved the study. No equivalent ethical committee existed in the Arkhangelsk region at the time of the study. Verbal informed consent was obtained from all participants.

### ■ Statistic analyses

A logistic regression analysis with dependent variables depression, anxiety, sleeping disorders and low life quality was performed using the SAS software package (D’Iorio and Hardy 1996). Characteristics on diet, alcohol consumption, education, occupational and civil status were included in the regression models as independent variables. The forward stepwise selection of variables was used with a 5% significance level for reminding or removal from the final regression model. The final results were presented as mutually adjusted odds ratios with 95% confidence intervals (CI). For comparison with other studies the Chi<sup>2</sup> test and the two-sample t-test were used.

### ■ Dependent variables

A six-page questionnaire (111 questions) was used in this population-based study. A part of the questionnaire was devoted to psychosocial aspects. We included in the questionnaire the same type of questions that were previously used in population-based studies in Norway (Westlund et al. 1993; Nilssen et al. 1999). The questionnaire was administered at the outpatient department with assistance from a specially trained nurse.

The following question was used for depression: Do you have long periods (2 weeks or more) during which you feel sad, blue or depressed (yes; no)? Similar formulation was used for sleeping disorders: Do you have long periods (2 weeks or more) during which you have problems with sleep (yes; no)? Sleeping disorders were defined in the questionnaire as: difficult to fall asleep in the evening; falling asleep too early in the evening; waking up several times during the night; waking up too early in the morning; waking up not rested in the morning; sleeping too long in the morning. Anxiety was estimated by the question: Do you experience now or did you experience during the last year anxiety (yes; no)?

Quality of life was self-evaluated by the Cantril Ladder (Cantril 1965) that was illustrated as a scale with ten levels: “Imagine that the highest level represents the highest quality of life, while the lowest level represents the worst quality of life. Which level, in your opinion, is in agreement with your current life?”. A score lower than five was defined as low life quality.

### ■ Independent variables

The following three questions on nutrition were used: How often do you eat fresh fruits or vegetables; fish or fish products; meat or meat products (rarely or never; once a week; 2–3 times a week; 4–5 times a week; almost daily)? These three variables were further dichotomized as “once a week or less” and “more than once a week”. The participants were also asked to evaluate their nutrition: How do you evaluate your

nutrition (good; satisfactory; poor)? If the answer was “poor nutrition”, the participant was defined as unsatisfied with nutrition.

Alcohol problems were examined by the Alcohol Use Disorders Identification Test (AUDIT) (Saunders 1993 a, 1993 b). This ten-item questionnaire includes three questions on quantity and frequency of alcohol consumption, three questions on abnormal drinking behavior and four questions on alcohol-related problems. The maximum possible AUDIT score is 40. A score of 8–12 indicates hazardous level of alcohol drinking and a score of 13 or more indicates alcohol dependence.

The variable smoking was dichotomized: “yes” (occasional and daily smokers) or “no” (non-smokers and ex-smokers). Self-reported circulatory diseases were assessed by three questions: Do you have now or have you had myocardial infarction; angina pectoris; stroke (yes; no; I don’t know)? Equal formulation was used for gastrointestinal diseases (stomach/duodenal ulcer, pancreatitis, hepatitis/cirrhosis, dyspepsia). The variables circulatory diseases and gastrointestinal diseases were further dichotomised: “yes” (if at least one of the diseases was reported) or “no” (if the answer was “no” or “I don’t know” about all the diseases).

Education was categorized as secondary (unfinished or completed secondary school), secondary professional, or high (unfinished or completed university education). Civil status comprised categories: married (registered marriage or cohabitant), unmarried, divorced, or widow/widower.

**Table 1** Age distribution of the study population compared with the total Russian adult population in 2000 (%)

Age	Russia <sup>a</sup> n = 54.59 x 10 <sup>6</sup>	Study population n = 1968	Russia <sup>a</sup> n = 64.37 x 10 <sup>6</sup>	Study population n = 1737
15–19 <sup>b</sup>	10.9	11.8	9.0	4.2
20–29	19.5	14.7	16.0	17.3
30–39	19.6	18.0	16.6	18.2
40–49	21.1	22.7	19.1	24.2
50–59	11.8	15.7	12.0	17.6
60+	17.1	16.9	27.3	18.5
Total	100.0	100.0	100.0	100.0

<sup>a</sup> Data of the Goskomstat for 2000 (the State Statistical Committee)

<sup>b</sup> The first age group for the whole Russian population includes participants younger than 18 years that were not included in our study

**Table 2** Prevalence (%) of depression, anxiety, and sleeping disorders

Age, years	Number	Depression	Sleeping disorders	Anxiety	Total <sup>a</sup>
<b>Men</b>					
18–19	234	6.4	4.3	15.8	23.5
20–29	290	7.2	3.1	17.9	24.1
30–39	357	6.4	5.6	20.2	26.1
40–49	447	9.4	9.2	19.9	30.2
50–59	308	14.6	15.9	22.4	37.0
60+	332	19.9	28.3	31.6	50.6
All	1968	10.8	11.3	21.5	32.3
Age-standardized <sup>b</sup>		10.5	10.8	21.4	31.8
<b>Women</b>					
18–19	73	31.5	15.1	38.4	54.8
20–29	302	26.5	15.9	41.4	56.0
30–39	317	35.0	30.9	51.4	66.6
40–49	420	33.1	29.5	53.6	67.4
50–59	305	32.8	41.0	58.4	71.8
60+	320	41.3	62.2	63.4	84.7
All	1737	33.7	34.8	53.1	68.7
Age-standardized <sup>b</sup>		34.4	35.6	53.2	69.6

<sup>a</sup> “Yes” on at least one of the three other variables

<sup>b</sup> Age-standardized to the general Russian population in 2000

The participants reported their professional status: students, pensioners, civil employees (white collars), industry workers, seamen/mariners, housewives, or other (unemployed). Income level was defined according to the official data on the average salary level in different professions (Goskomstat 2004): professions with high income (seamen), average income (industry workers), and low income (civil employees). According to the Goskomstat data for the year 2000, civil employees earned 40% of the average salary in industry; the mean retirement pension in Russia was below the officially established survival level and was lower than the average salary (Goskomstat 2004). Pensioners were included in the analyses as a separate group with low income. There were no definite data on average income in students, housewives and unemployed; therefore, these groups were included in the analysis as a group without known income.

## Results

The age structure of the study population was close to the age distribution in the entire Russian adult population in 2000 (Table 1). Table 2 shows that one-third of

men and more than half of women reported depression, sleeping disorders and/or anxiety. About 20% of men and 30% of women reported low quality of life (Table 3). The results were age-standardized using the direct method (the entire Russian adult population in 2000 was chosen as a standard population). Age standardization did not substantially change the results.

Table 4 shows that a considerable part of the study population reported low consumption of fruits/vegetables, fish, and meat. These nutritional variables were significantly associated with self-evaluation of nutrition as "poor". Age- and sex-adjusted Pearson correlation coefficients between self-evaluated "poor nutrition" and low consumption of food items were 0.26 ( $p < 0.0001$ ) for low fruit/vegetable consumption, 0.23 ( $p < 0.0001$ ) for low fish consumption and 0.22 ( $p < 0.0001$ ) for low meat consumption.

More than one-third of the men met the criteria for alcohol use disorders. The prevalence of hazardous level of alcohol drinking and alcohol dependence was 4–5 times higher in men than in women. Prevalence of smoking was twice as high in men compared with women.

Tables 5 and 6 present the results of logistic regression analyses with depression, anxiety, sleeping disorders and low quality of life as dependent variables. Women had significantly higher odds for depression, anxiety and sleeping disorders compared with men. Low consumption of food items was positively associated with depression, anxiety, sleeping disorders and low quality of life. Thus, the odds for sleeping disorders were 60% higher for those who ate few fruits or vegetables compared with those who consumed fruits or vegetables more than once per week. Participants who evaluated their nutrition as poor also had significantly higher odds for depression, anxiety, sleeping disorders and low quality of life.

Three categories were considered for alcohol use disorders (no alcohol use disorder, hazardous level of alcohol drinking and alcohol dependence). The first category was chosen as a reference group and the two others

**Table 3** The Cantril Ladder and prevalence of low self-evaluated quality of life (Cantril Ladder < 5)

Age, years	Cantril Ladder Mean (SD)		Low life quality, %	
	Men	Women	Men	Women
18–19	6.0 (1.6)	6.0 (1.7)	16.2	15.1
20–29	6.4 (1.7)	6.1 (1.6)	10.3	15.9
30–39	5.9 (1.8)	5.5 (1.8)	17.7	27.8
40–49	5.9 (1.6)	5.4 (1.8)	15.0	26.2
50–59	5.6 (1.8)	5.0 (1.6)	23.1	31.8
60+	4.9 (1.7)	4.3 (1.8)	40.7	55.9
All	5.8 (1.8)	5.3 (1.8)	20.5	30.7
Age-standardized <sup>a</sup>	5.8	5.2	20.1	32.6

<sup>a</sup> Age-standardized to the general Russian population in 2000

**Table 4** Several characteristics of the study population

	Men n = 1968	Women n = 1737
Age, mean (SD)	41.8 (16.3)	44.2 (15.9)
Consumption once a week or less, %:		
Fruits or vegetables	40.3	36.0
Fish or fish product	33.8	49.0
Meat or meat product	15.0	24.4
Unsatisfied with nutrition, %	10.8	21.9
Alcohol use disorders <sup>a</sup> , %		
Hazardous level of alcohol drinking	26.1	7.2
Alcohol dependence	12.5	2.4
Smoking, %	56.6	21.3
Circulatory diseases <sup>b</sup> , %	9.4	12.6
Gastrointestinal diseases <sup>c</sup> , %	23.1	50.7
Education, %:		
High	21.0	32.5
Secondary professional	56.4	41.5
Secondary	22.6	26.0
Income, %:		
High salary	54.4	2.1
Average salary	7.4	11.2
Low salary	7.3	44.7
Retirement pension	15.4	23.5
Other <sup>d</sup> (unknown income)	15.5	18.5
Civil status, %:		
Married/co-habitant	71.3	58.3
Unmarried	21.2	17.2
Divorced	4.2	11.0
Widow/widower	3.3	13.5

<sup>a</sup> Based on the AUDIT

<sup>b</sup> Angina pectoris, myocardial infarction and/or stroke

<sup>c</sup> Stomach/duodenal ulcer, pancreatitis, hepatitis/cirrhosis, and/or dyspepsia

<sup>d</sup> Student, housewife, unemployed

were included in the model as indicator variables. Alcohol dependence was strongly positively associated with depression, sleeping disorders, anxiety and low quality of life. Smoking and hazardous level of alcohol drinking were positively associated with depression and sleeping disorders.

The odds for depression, sleeping disorders and anxiety were significantly higher for participants with circulatory and gastrointestinal diseases compared with those without such diseases. This association remained significant after adjustment for smoking and alcohol use disorders. There was also a strong positive association between low life quality and circulatory/gastrointestinal diseases.

The variables "income", "education" and "civil status" had three or more categories, one of them was chosen as a reference group and the others were included in the model as indicator variables. Professions with low income and pensioners had higher odds for depression, anxiety and sleeping disorders compared with the high-income group. The group of pensioners had especially high odds for low quality of life.

Education and civil status had no association with low quality of life. Persons with secondary professional

**Table 5** Logistic regression analysis of depression, anxiety and sleeping disorder with mutually adjusted odds ratios (OR) and 95% confidence intervals (CI)

Variables	Depression OR (95% CI)	Sleeping disorders OR (95% CI)	Anxiety OR (95% CI)
Gender: women vs. men	3.6 (2.8–4.7)****	3.9 (3.0–5.0)****	3.3 (2.7–4.0)****
Age, 10 years	1.1 (0.9–1.2)	1.3 (1.2–1.5)****	1.0 (0.9–1.1)
Low consumption of:			
Fruits or vegetables <sup>a</sup> :	1.4 (1.2–1.7)***	1.6 (1.3–1.9)****	1.1 (0.9–1.3)
Fish or fish products <sup>a</sup> :	1.4 (1.2–1.7)***	1.2 (1.0–1.4)	1.2 (1.03–1.4)*
Meat or meat products <sup>a</sup> :	1.2 (1.0–1.5)	1.0 (0.8–1.3)	1.3 (1.03–1.5)*
Unsatisfied with nutrition: yes vs. no	2.1 (1.7–2.7)****	1.9 (1.5–2.4)****	1.7 (1.4–2.1)****
Alcohol use disorders <sup>b</sup> :			
Hazardous level of alcohol drinking <sup>c</sup>	1.4 (1.1–1.8)*	1.3 (1.01–1.8)*	1.2 (0.9–1.5)
Alcohol dependence <sup>d</sup>	1.8 (1.3–2.6)***	2.0 (1.4–2.9)***	1.6 (1.2–2.1)**
Smoking (yes vs. no)	1.6 (1.3–2.0)****	1.4 (1.1–1.8)**	1.1 (0.9–1.3)
Circulatory diseases (yes vs. no)	2.0 (1.5–2.6)****	2.1 (1.6–2.8)****	2.2 (1.7–2.9)****
Gastrointestinal diseases (yes vs. no)	1.7 (1.4–2.0)****	1.4 (1.2–1.7)***	1.4 (1.2–1.6)****
Education (secondary is a reference):			
Secondary professional	0.8 (0.7–1.0)	0.7 (0.6–0.9)**	0.8 (0.7–1.0)
High	0.9 (0.7–1.1)	1.0 (0.8–1.3)	0.8 (0.7–1.1)
Income <sup>e</sup> (high salary is a reference):			
Average salary	1.5 (1.02–2.2)*	1.4 (0.9–2.0)	1.3 (0.9–1.7)
Low salary	1.5 (1.04–2.0)*	1.8 (1.3–2.6)***	1.4 (1.1–1.8)*
Retirement pension	1.5 (1.02–2.3)*	1.8 (1.2–2.7)**	1.4 (1.03–2.0)*
Other (unknown income)	1.3 (0.9–2.0)	1.2 (0.8–1.8)	1.2 (0.9–1.6)
Civil status (married is a reference):			
Unmarried	1.0 (0.7–1.3)	1.0 (0.7–1.4)	0.7 (0.5–0.9)**
Divorced	1.2 (0.9–1.6)	0.9 (0.7–1.3)	0.9 (0.7–1.1)
Widow/widower	1.4 (1.0–1.9)	1.3 (1.0–1.8)	1.0 (0.8–1.4)

<sup>a</sup> Once a week or less (yes vs. no)

<sup>b</sup> Reference group is AUDIT-score ≤ 7

<sup>c</sup> AUDIT-score 8–12

<sup>d</sup> AUDIT-score ≥ 13

<sup>e</sup> High salary (seamen), average income (industry workers), low salary (civil employees), retirement pension (pensioners), other (students, housewives and unemployed)

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; \*\*\*\* p < 0.0001

education had lower odds for sleeping disorders than those who had only secondary school education. Odds for anxiety were lower in unmarried persons compared with married ones.

### ■ Comparison with other studies

Our results were compared with two population-based studies from Northern Norway that used the same formulations of questions for depression and quality of life. Before the comparison, the results from Arkhangelsk were age-standardized to these Norwegian population samples (data not shown). Women in our study had significantly higher prevalence of self-reported depression ( $p < 0.0001$ ) compared with Norwegian women in the Finnmark study (11.3%) and the Svalbard study (15.6%) (Westlund et al. 1993; Nilssen et al. 1999). In men, the prevalence of depression was the same as on Svalbard (10.7%), but higher than in Finnmark (6.3%,  $p < 0.0001$ ). The average score of life quality was significantly lower ( $p < 0.0001$ ) in our study population compared with the Norwegians on Svalbard (7.6 and 7.0 for women and men, respectively).

## Discussion

### ■ Study limitations

It is difficult to draw a population sample representative for the whole of Russia (about 144 million citizens, more than 100 nationalities and 11 time zones). The present study was conducted in the northwest of Russia, in the region where mortality rates were similar to the figures for the entire area of Russia. The study was limited to the working population, students, housewives and pensioners. The unemployed were underrepresented in this study.

The main limitation of the study was that findings were based on self-reports of depression, anxiety and sleeping disorders. Study subjects may understand questions and report their condition differently. A different pattern of results might have been obtained if diagnostic interviews had been utilized. However, it is time- and resource-consuming to incorporate such interviews in a large-scale population study. Therefore, we included in the questionnaire the formulations that were used in other population studies and compared our results only with reports from these studies.

**Table 6** Logistic regression analysis of low life quality (Cantril Ladder < 5) with mutually adjusted odds ratios (OR) and 95% confidence intervals (CI)

Variables	Low life quality OR (95% CI)
Gender: women vs. men	1.2 (0.9–1.5)
Age, 10 years	1.2 (1.1–1.3)**
Low consumption of:	
Fruits or vegetables <sup>a</sup> :	1.6 (1.4–2.0)****
Fish or fish products <sup>a</sup> :	1.4 (1.2–2.7)****
Meat or meat products <sup>a</sup> :	1.3 (1.02–1.5)*
Unsatisfied with nutrition: yes vs. no	3.8 (3.1–4.7)****
Alcohol use disorders <sup>b</sup> :	
Hazardous level of alcohol drinking <sup>c</sup> :	0.9 (0.7–1.2)
Alcohol dependence <sup>d</sup> :	1.7 (1.3–2.3)***
Smoking (yes vs. no)	1.0 (0.8–1.2)
Circulatory diseases (yes vs. no)	1.7 (1.3–2.2)***
Gastrointestinal diseases (yes vs. no)	1.3 (1.1–1.5)**
Education (secondary is a reference):	
Secondary professional	1.1 (0.9–1.4)
High	1.1 (0.8–1.4)
Income <sup>e</sup> (high salary is a reference):	
Average salary	1.6 (1.2–2.3)**
Low salary	1.1 (0.8–1.5)
Retirement pension	2.0 (1.4–2.8)***
Other (unknown income)	1.2 (0.9–1.7)
Civil status (married is a reference):	
Unmarried	0.9 (0.6–1.2)
Divorced	1.3 (1.0–1.8)
Widow/widower	1.3 (0.9–1.8)

<sup>a</sup> Once a week or less (yes vs. no)

<sup>b</sup> Reference group is AUDIT-score ≤ 7

<sup>c</sup> AUDIT-score 8–12

<sup>d</sup> AUDIT-score ≥ 13

<sup>e</sup> High salary (seamen), average salary (industry workers), low salary (civil employees), other (students, housewives and unemployed)

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; \*\*\*\* p < 0.0001

Language and cultural differences in the perception of questions may apply when a “western” questionnaire is translated into Russian. However, when comparing answers on other questions (diet, use of medicines), no evidence of misunderstanding or “eager to please” response pattern was found. The standard back-translation procedure by the two independent translators was applied to assure the accuracy of the translation.

### ■ Interpretation of the main results

The gender difference in prevalence of depression and sleeping problems was higher in Russia than in the Norwegian population in Finnmark and on Svalbard. This finding may reflect the weak position of women in the Russian society. Although Russian laws guarantee gender equality, in real life, women are the first to be fired and usually receive a lower salary than men even if they are more educated and skilled (Human Rights Watch 1995). The majority of unemployed people in Russia are women (WHO 2002). Women are also concentrated in

low-paid sectors of the economy. The same situation is seen in other countries from the ex-Soviet Union (Alyanak 1999).

Depression, anxiety and sleeping disorders were strongly associated with nutrition variables (unsatisfied with own nutrition; low consumption of fruits and vegetables, fish, meat). This probably means that some food types are not available to the general population to the extent they would have preferred. Although fresh fruits, vegetables, fish and meat are easily accessible in Arkhangelsk, they are expensive, at least for all those with low salaries and retirement pensions. Nutrition may be an important indicator of socioeconomic status in our data. Other potential indicators of socioeconomic status are level of education and occupational status. The low odds for sleeping disorders among people with secondary professional education may suggest that they cope better with the difficult economic situation. Surprisingly, higher education showed no negative association with depression, anxiety and sleeping disorders. This might be explained by the fact that nowadays many people with high education in Russia are employed in low-paid sectors of the economy where salaries are substantially lower than in industry. Among the working population in this study, 67% of those with secondary professional education were seamen or industry workers, while the majority with high education were low-paid civil employees (65%). Civil employees and pensioners had the highest odds for depression, sleeping disorders and anxiety. Poor economy and health problems may be the reason for the decrease in life quality with age. In the 1990s, the high inflation in Russia substantially depreciated the level of retirement pensions. At the beginning of 2000, the mean monthly pension in Russia was one-half of the established poverty level (Goskomstat of Russia 2004). According to the study of the elderly in the 1990s (Rush and Welch 1996), 57% of Russian pensioners complained about lack of money to buy food, 50% consumed less than half a kilogram of fruit per week, and 40% consumed less than half a kilogram of meat per week.

Depression and sleeping disorders were positively associated with alcohol dependence, hazardous level of alcohol drinking and smoking. Anxiety was positively associated with alcohol dependence. The comorbidity of depression and anxiety with alcohol use disorders has been shown in other studies (Sloan et al. 2003; Grant et al. 2004). This cross-sectional study does not determine the casual mechanisms underlying the relationship between alcohol use disorders and depression, anxiety and sleeping disorders. Psychosocial factors may have an adverse effect on health-related behaviors and result in increased smoking and alcohol drinking. When alcohol dependence develops, the positive AUDIT reveals substantial problems with job, family relationships, and with health. The cluster of social problems associated with alcohol dependence might contribute to further depression and anxiety.

Low self-evaluated quality of life was positively asso-

ciated with alcohol dependence, but showed no association with hazardous level of alcohol drinking. In fact, the frequency of alcohol consumption alone (the first question of AUDIT) was negatively associated with low life quality (data not shown). The possibility to buy and drink alcohol is obviously judged as a marker of a good life standard and, thus, is not associated with lower quality of life, at least before any manifestation of alcohol-related problems.

Even though our study points to a strong association between mental distress/low life quality and self-reported circulatory and gastrointestinal diseases, the cross-sectional design does not allow us to draw any conclusions about causality. Disease itself can be a reason for depression, anxiety, sleeping problems and lower quality of life. On the other hand, mental distress and life dissatisfaction have been reported as risk factors for diseases and predictors for mortality (Ketterer et al. 2000; Koivumaa-Honkanen et al. 2000; Smith 2001; Truelsen et al. 2003). The most striking rises in Russian mortality occurred after the collapse of the Soviet Union and after the crisis in the Russian economy in 1998, which were both followed by a significant increase in individual poverty and mental distress. Leon & Shkolnikov (1998) wrote in their paper about the mortality crisis in Russia that "social stresses... appear to have played such a central part in the recent crisis". Further prospective studies are required to test this hypothesis.

## Conclusions

Our study provides evidence that a considerable part of the Russian population suffers from depression, anxiety and sleeping disorders that are strongly associated with low socioeconomic status, poor nutrition, smoking, alcohol use disorders and history of circulatory and gastrointestinal diseases.

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