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Jeļena Vrubļevska

PREVALENCE OF DEPRESSION IN THE GENERAL POPULATION OF LATVIA AND PRIMARY CARE SAMPLE IN RIGA AND RIGA DISTRICT

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Scientific supervisors:
Dr. med., Professor **Elmārs Rancāns**, Rīga Stradiņš University, Latvia

Scientific consultant:
Mārcis Trapencieris, Institute of Sociology and Philosophy,
University of Latvia

Official reviewers:
Dr. med., Associate Professor **Anita Villeruša,** Rīga Stradiņš University, Latvia
Dr. psych., Professor **Sandra Beatrice Sebre**, University of Latvia

MD, PhD, Professor of Psychiatry **Konstantinos N. Fountoulakis**,
3rd Department of Psychiatry, Division of Neurosciences School of Medicine, Aristotle University of Thessaloniki, Greece

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Dr. med. Professor **Ģirts Briģis**

ABBREVIATION

AUC	Area under curve
CI	Confidence Interval
DSM	Diagnostic and Statistical Manual of Mental Disorders, $4^{th}/^{5th}$ Edition)
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
MINI	The Mini International Neuropsychiatric Interview
OR	Odds ratio
PHQ-9	The Patient Health Questionnaire-9
SD	Standard Devition
WHO	World Health Organization
$\chi 2$	Chi-squared test

CONTENTS

1 INTRODUCTION

1.1 The actuality of the problem

Depression is a major public health problem and significantly contributes to the burden of disease in health care systems worldwide. In the European countries, depression is the third most prevalent mental disorder after anxiety disorders and insomnia accounting for 30 million of the general population (Wittchen et al., 2011). By 2020, depression is expected to become the second leading cause of disability adjusted life years (DAYLY's), after cardio-vascular disease (Murray, 1996). Depression is the most disabling condition among the mental disorders and other brain disorders (Wittchen et al., 2011). In 2010, the research in prevalence of depression in Europe using data from 30 European countries based on 25 studies showed a 12-month prevalence of 6.9% (Wittchen et al., 2011). Unfortunately, Latvia was lacking reliable epidemiological data on the prevalence of depression at that time and an expert opinion was given instead.

In one of the largest community epidemiological surveys with a total sample size of 9,282 respondents aged 18 years or above has been conducted in the USA (United States of America), the 12-month prevalence of depression was reported at 9.5% (Kessler et al., 2005b). In the European Study of the Epidemiology of Mental Disorders (ESEMeD) that was conducted in a representative sample of 21 425 adults aged 18 years or older living in Belgium, France, Germany, Italy, the Netherlands and Spain, the 12-month prevalence of depression was estimated at 4.2% (Alonso et al., 2004).

Despite the ample data on estimates of depression in the society coming from Western Europe, there is a need for epidemiological studies from Eastern Europe and Baltic countries, because of different health care systems and the level of welfare. For example, studies of the prevalence of depression in

Lithuania have not been conducted so far, but the prevalence of depression in Estonia was estimated last in 2006, and since then, no new studies have been conducted.

Depression causes substantial impairment of daily functioning. Social functioning decreases in correlation with the severity of depression as 18% of patients with minor depression and 52% of patients with major depression have major problems in functioning. In general, patients with depression have 23-fold risk of social functioning impairment compared to the general population (Lépine and Briley, 2011).

Depressed patients have a 2-fold risk of mortality compared with the general population due to direct (e.g., suicide) and indirect (e.g., somatic diseases) causes (Cuijpers and Smit, 2002).

People with depression are at a 1.8 times greater risk of developing a somatic disease one year after diagnosing depression. Hospitalized cardiovascular patients with comorbid depression have a significantly greater risk of mortality due to cardiovascular causes within 10 years after hospitalization (Cuijpers and Smit, 2002; Cuijpers et al., 2014; Lépine and Briley, 2011). Moreover, it has been reported that depression in somatically healthy individuals is a significant risk factor for development of cardiovascular and cerebrovascular diseases (Nicholson et al., 2006).

Depression is associated with gender differences and accounts for male/female ratio 1:1.6–3.1. Moreover, a greater disparity has been found in Western Europe and the USA with the onset at the age of 27 in average (Alonso et al., 2004).

Over the past few decades, the theory and research on depression have increasingly focused on the recurrent and chronic nature of the disorder. A recurrence of an episode 6 months after recovery from the previous episode of depression is found in 25% of patients, while in 58% of patients, recurrent episodes of depression may be expected within 5 years, and in 85% of patients –

during the following 15 years after recovery from previous depression (Kessler et al., 2003). In addition, in people with two episodes of depression, it is linked to a 70% risk of having further episodes, while for those with three episodes, the likelihood of episodes in the future amounts to 90% (Kupfer, 1991). A large share of patients with depression experience a chronic course of disease with a fluctuating severity of depressive symptoms. Two-thirds of patients with depression recover completely, while one-third have a partial improvement (Lépine and Briley, 2011).

Minor depression does not meet the full criteria of depression but also has been found to affect the quality of life, to result in increased health service utilization in an elevated risk of development of depression, as well as an increased suicide risk (Hegerl et al., 2012; Tadić et al., 2010).

Almost two-thirds of all costs are indirect costs of depression (loss of working capacity and premature mortality), which, unlike the high direct costs of somatic diseases, can be modifiable (Gustavsson et al., 2011).

Depression is common in the primary care setting. However, the recognition of depression in primary care settings remains sub-optimal; studies have estimated that depression occurs in 5%–15% of primary care patients, and suggest that only 50% of them are recognized (Kessler et al., 2005a, Bodlund et al., 1999; Wittchen et al., 2002). In this regard, it is notable that in 2012, the State Compensated Medication System data showed that 3,833 patients received reimbursable medicine for treatment of depression. In primary care setting and mental health care services treatment was received by only 8,233 patients with depression, while 54,975 patients – of whom 82% received treatment only from GP – were diagnosed with neurotic disorder, predominantly somatoform autonomic dysfunction (NVD, 2013).

Identifying the prevalence of depression in the general population and primary care would reflect the real situation in this regard and draw the attention of the national bodies towards improving the management of depression, thus contributing to the benefits for the society, reducing the direct and indirect costs.

No population-based studies of the prevalence of depression and associated risk factors have been conducted in Latvia up to now. Therefore, it is not known whether the Latvian data are comparable with that from other countries. Moreover, until recently, there were no valid screening tools for detecting depression in the primary care setting in Latvia. An estimation of the prevalence of depression and possible sociodemographic risk factors in the general population and adaptation and validation of screening tool for depression could contribute to improvement of the recognition and treatment of depression in Latvia.

Aim of the Study

The aim of the study was to determine prevalence of depression in the general population of Latvia and associated sociodemographic and health related factors, to estimate the prevalence of depression in primary care sample in Riga and Riga district and to validate depression screening tool *the Patient Health Questionnaire-9* (PHQ-9).

Tasks of the Study

1. To estimate a point prevalence of depression in the general population of Latvia using the PHQ-9 in Latvian and Russian languages.

2. To analyse the link between the sociodemographic factors, self-reported health status and alcohol usage with depression in the previous two weeks in the general population of Latvia.
3. To assess the 12-month prevalence of depression and minor depression in the general population of Latvia using the depression module of *The Mini International Neuropsychiatric Interview* (M.I.N.I.) 6.0.0. version in Latvian and Russian languages.
4. To evaluate the link between the frequency of use of health care services, basic sociodemographic factors, self-reported medical diseases, absent days at work due to any disease, reported health and smoking status and 12-month depression and minor depression in the general population of Latvia.
5. To estimate a prevalence of depression in a primary care sample in Riga and Riga district.
6. To establish the validity and cutoff score of *the Patient Health Questionnaire-9* (PHQ-9) among primary care patients in Latvia, using the M.I.N.I. as the reference standard.

Hypotheses of the Study

1. The prevalence of depression in the general population and primary care in Latvia is similar or higher compared to the average rates of depression in Europe.
2. Depression is associated with certain sociodemographic and health related determinants.
3. The PHQ-9 is a reliable and valid instrument with optimal cutoff score ≥ 10 and can be used to screen depression among Latvian and Russian speaking adults at the primary care level.

Scientific Novelty of the Study

For the first time in Latvia reliable data on the prevalence of depression in the previous 2 weeks (point prevalence) and the prevalence of depression and "minor depression" in the last 12 months in the general population of Latvia were established. The relation of depression with sociodemographic factors, self-reported health status, alcohol consumption, smoking and somatic diseases, utilization of health care services were analysed. Major strength is that the studies were carried out in a large representative sample of the general population, thus allowing an estimation of depression at a national level and making a comparison with the estimates of depression reported in other countries.

Within the frame of the thesis, the validity of the PHQ-9 was assessed and a cutoff score to identify depression in the sample of patients visiting their GP because of health concerns was established. No previous studies on the validation of any depression screening tool in a sample of primary care attendees in Latvia have been conducted. Therefore, this is the first study to provide evidence on the psychometric properties of the PHQ-9 for measuring depression in a primary care setting in Latvia.

Depression in Latvia is not only underdiagnosed but also most likely confused with neurotic disorders, thus supporting the need to implement depression screening tools in primary care in Latvia. Validation of the PHQ-9 to assess depression in primary care settings in Latvia is an important step towards facilitating the management of depressive patients in primary care in Latvia.

Practical Implication of the Study

The findings outline certain individuals who might be at a higher risk of having depression. The factors associated with major or minor depression could

be used as indicators for health providers to initiate screening for depression. It is also important to monitor individuals with minor depression, taking into account their increased risk of developing major depression.

The methodology that was applied in the validation study of the PHQ-9 was used as the basis of a larger nationwide survey the National Research Program, BIOMEDICINE 2014–2017, which was a cross-sectional study to assess the prevalence of mental disorders in primary care settings in Latvia.

Ethical issues of the study

All procedures complied with the ethical standards on human experimentation (World Medical Association Helsinki Declaration). Ethical permission was granted by the Rīga Stradiņš University Ethics Committee. Informed consent was obtained from all participants after they had received a full explanation of the purpose and nature of the study.

Outline of the Thesis

The thesis consists of 131 pages in Latvian, in compliance with classical structure of a thesis. The work is structured in ten chapters: Introduction; Literature review, Subjects and Methods; Results; Discussion; Conclusions; Publications; Acknowledgements; References and Appendixes. Text of thesis is supplemented by 12 Tables, 6 Figures and 7 Appendixes. Reference list consist of 251 cited references.

2 SUBJECTS AND METHODS

The study was conducted between 2011 and 2014, in three consecutive steps:

In the first phase of the study, the data were obtained from a general population survey on substance use in Latvia in 2011. It consisted of face-to-face interviews of a randomised stratified multistage probability sample. In total, 4493 persons were included, aged between15 and 64.To assess point prevalence of depression, the participants were interviewed using the Patient Health Questionnaire-9. Sociodemographic, subjective health status and alcohol use were assessed using the structured interviews.

Second phase of the study was a part of the Health Behaviour among the Latvian Adult Population survey, conducted in 2012. This survey was based on a nationally-representative, multistage stratified probability sample of 3003 persons. The 12-month prevalence of depression and minor depression was estimated using the M.I.N.I. Self-reported health care utilization, smoking status, absent days at work due to medical condition and somatic illness were also assessed.

In third study phase in 2014, a pilot study was conducted within the framework of the Latvian National Research Programme BIOMEDICINE. The aim to estimate prevalence of depression and the PHQ-9 cutoff score with the best sensitivity, specificity, internal consistency, reliability, and convergent validity in identifying depression in Latvian patient sample in GP setting in Riga and Riga district.

2.1 The point prevalence of depression

The data are from a general population survey on substance use in Latvia in 2011(Snikere et al., 2012). A stratified sample of households was randomly chosen from the Address Register maintained by the State Land Service. The stratification variables were: level of urbanization, development index of the municipality, and region. A total of 56 strata were formed. The person with the nearest birthday was chosen as the respondent within the selected household and was invited to participate in the survey. The questionnaire consisted of a face-to-face interview (questions on sociodemographics, alcohol, tobacco, depression, attitudes towards alcohol and drug policies), and self-completion part (questions about drug use and violence). Specially trained interviewers were involved in data collection. To evaluate how representative the sample was, the survey included a small questionnaire for non-responders comprising several sociodemographic questions (gender, age, education, and ethnicity), smoking habits, alcohol drinking frequency and questions about cannabis use over lifetime and in the previous12 months. The survey instrument was available both in Latvian and Russian languages.

Sociodemographic, self-rated health status, alcohol use measures, and data about depression were evaluated from the structured face-to-face interviews. Age of respondents was classified in 4 categories: 15–24, 25–34, 35–44, and 45–54 years. Marital status was classified in 3 categories: married/cohabiting, divorced/separated/widowed, single. Urbanization was coded in 3 groups: rural, capital, other urban. Ethnicity was classified in 2 groups: Latvian, non-Latvian. Self-rated health status was classified into 3 categories: better than average, average, lower than average. Satisfaction with life was divided into 3 groups: satisfied, somewhat satisfied, not satisfied.

Monthly income for each member of the household during the previous year was classified per capita into one of the four following quartiles: < 91 Latvian Lats (LVL), 91–129 LVL, 130–209 LVL and 210 LVL and above (corresponding to < 129EUR, 129–184 EUR, 185–295 EUR, ≥ 296 EUR).

To assess depression, participants were interviewed using the PHQ-9, which covers the nine symptom based Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for major depression and can also produce dimensional symptom severity ratings. The questionnaire assesses a 2-week period, essentially assessing the current rather than past episodes. Previous studies indicate PHQ-9 has a good sensitivity and specificity to detect major depression (Kroenke et al., 2001).

The PHQ-9 was translated to both Latvian and Russian and back-translated and discussed by 4 health care professionals and checked for accuracy. The presence of depression was defined using the cutoff score of ≥10 in the PHQ-9 as recommended by (Kroenke et al., 2001).

Missing values of PHQ-9 scale variables were replaced using imputation by chained equations with gender, age, education, marital status, household income per capita and urbanization as predictors.

A *Composite International Diagnostic Interview* (CIDI) was used for assessing alcohol dependence as defined in the DSM-IV (Samet et al., 2007). Three of seven diagnostic criteria needed to be fulfilled to achieve the definition/diagnosis of alcohol dependence. The CIDI alcohol dependence scale was also translated into Latvian and Russian and back-translated into English and checked for accuracy. The PHQ-9 and alcohol dependence scales showed good internal consistency. For PHQ-9, the Cronbach's alpha was 0.86 for the Latvian version and 0.87 for the Russian version. The principal component analysis of alcohol dependence scale identified one factor for alcohol dependence and Cronbach's alpha was 0.90 for the Latvian version and 0.87 for the Russian version.

2.1.1 Statistical analysis

Prevalence estimates were calculated for the total sample, age subgroups, and sociodemographic characteristics. Descriptive statistics, uncorrected Pearson chi-square and logistic regression models were applied to the data. Model 1 was adjusted only by gender and age, Model 2 was adjusted by all simultaneous factors. All results are reported as odds ratios (OR) with 95% confidence interval (CI). Data analyses were carried out with Stata 12 for Windows (StataCorp) taking complex sampling design into account; standard errors were calculated using Taylor series linearization.

2.2 The 12-month prevalence of depression and minor depression

Estimates of depression and minor depression in the previous 12 months was assessed in the Health Behaviour among the Latvian Adult Population survey, conducted in 2012. Most of the measurements included in the survey questionnaire have been in use since 1998 as part of the Finbalt study, and have been pretested in previous surveys (Puska et al., 2003). This survey was based on a nationally-representative, multistage stratified probability sample of 3004 persons between the ages of 15 and 64 years old (Leadholm et al., 2014, Pudule et al., 2013). The stratification variables included population density and nationality; a total of 32 strata were formed. Within those strata, a total of 390 starting addresses were randomly selected from the list of addresses, proportional to the population size in each stratum. Taking each of these addresses as a starting point, an additional seven to eight households in the vicinity were interviewed. The additional households were selected by a random route method (every third household in urban and semi-urban areas and every household in rural areas). In each sampled household, only one respondent was selected for interview, by

using Kish tables and the closest birthday principle (Gaziano, 2005; Kish, 1949). Data was collected by face-to-face interviews in Latvian or Russian (language as preferred by respondent). Each sampled household was visited up to three times if no initial contact with the household or respondent was made. The fieldwork for the study was conducted from April to June 2012, and was carried out by 68 professional interviewers coordinated by five regional fieldwork coordinators and two fieldwork supervisors based in the city of Riga. Before conducting fieldwork, interviewers received training sessions covering survey methodology and the scales used. Data were weighted by gender, age groups, urbanization, region and nationality to account for different levels of non-response among various groups of the population (Pudule et al., 2013).

The survey was conducted in the two most commonly spoken languages in Latvia – Latvian and Russian. In order to measure depression, the participants were interviewed using the depressive episode module of the Mini International Neuropsychiatric Interview (M.I.N.I), Version 6.0.0. The M.I.N.I is a structured screening interview that was validated by convergence with the SCID-P (Structured Clinical Interview for DSM-III-R Patient Version) and the CIDI (Composite International Diagnostic Interview), and by expert professional opinion (Sheehan et al., 1998). The good psychometric characteristics of the M.I.N.I, its ability to be administered rapidly, and its acceptability to patients made it a good choice for the research purposes (Pinninti et al., 2003). The M.I.N.I used in this study has been previously translated for use in Latvian and Russian languages by authorship holders. The M.I.N.I test results were interpreted into three categories: not depressed, major depression, or minor depression (according to DSM-IV-TR).

To check for associations between depression prevalence and sociodemographic characteristics, the gender and age of participants were recorded. Age was recorded as a categorical variable (15–24, 25–34, 35–44, 45–64, and 55–64).

The variable of health care utilization was calculated on the basis of the self-reported question. The healthcare variables were dichotomized (did not use vs. used the service), for others categorized (“did not use”, “1–2 times”, “3–5 times”, “6–9 times”, “10 or more times”).

Self-reported diagnosis of somatic illnesses was assessed by the question “Has a doctor over the past 12 months diagnosed you with any of the following illnesses?" The answers were coded in certain categories: cardiovascular diseases, diabetes, arthritis, back pain, respiratory, gastroenterology, urinary, cancer.

Other health status variables included: self-reported health status (assessed by the question “How would you rate your current health status?”, with the response options “good”, “fairly good”, “average”, “fairly poor”, “poor”. These were recoded into three categories “above average”, “average”, “below average”), smoking status (with responses categorized into “non-smoker”, “quitter/ex-smoker”, “occasional smoker”, or “regular smoker”), receipt of disability pension (assessed by the question “Do you currently receive disability pension?”), and absenteeism (assessed by the question “How many calendar days over the last 12 months did you skip work or did not perform everyday duties because of health issues?” The responses were categorized as “none”, “1–10 days”, or “11+ days”).

2.2.1 Statistical analysis

Data analyses were carried out using the statistical package Stata (version 13). To account for complex survey sampling design, Taylor series linearization methods were used to calculate the standard errors. The Rao-Scott Chi square test was used to test for different distributions of categorical variables between the “not depressed”, “minor depression”, and “major depression” respondent

groups. The Rao-Scott Chi square statistic was chosen over classical Pearson Chi square to account for the complex sampling design (Rao and Scott, 1984). Multinomial logistic regressions were used to calculate odds ratios (OR) for both a crude (Model 3) and adjusted (Model 4) model. Multinomial logistic regression was used because the dependent variable (depression status) had more than two categories. It was also used to examine whether healthcare utilization was similar for individuals with major and minor depression and those not qualifying for a diagnosis of depression. Three categories of depression status (no depression, minor depression, major depression) were used for the dependent variable. Model 3 examined the association between depression status and each of the factor variables, separately controlling for gender and age. The regression analyses performed for Model 4 examined the multivariate associations between depression.

2.3 The point prevalence of depression and the PHQ-9 validation in primary care sample in Riga and Riga district

In 2014, a pilot study was conducted within the framework of the Latvian National Research Programme BIOMEDICINE (2014–2017) to assess the prevalence and detection of mental disorders in primary care settings in Latvia.

During a one-week period, all consecutive patients aged 18 years or older visiting a primary care physician with any health concerns at six primary care facilities in the capital city and in rural areas of Latvia were invited to participate in the study. Patients who visited their GP for administrative reasons were not included in the sample. No further restrictions on patient selection were implemented. The participants signed an informed consent form upon recruitment. All study subjects were invited to complete the paper-pencil form of the PHQ-9 questionnaire in their native language (Latvian or Russian) during the same visit prior to seeing their GP. Before completing the PHQ-9, the patients

received instructions, and a psychiatrist answered any questions or uncertainties they had.

Sociodemographic characteristics were obtained after screening with the PHQ-9. Within 2 weeks of the screening phase, the psychiatrist interviewed the participants using the Latvian and Russian version for Latvia of the structured diagnostic M.I.N.I. 6.0.0; this version was translated and validated by the copyright holders. The M.I.N.I. was used as the reference standard to determine the presence of major depression and was conducted over the telephone.

2.3.1 Statistical analysis

The construct validity of the PHQ-9 was analysed using factor analysis with Varimax rotation. The internal reliability of the PHQ-9 was assessed by Cronbach's alpha coefficient. The criterion validity of the PHQ-9 was assessed by ROC analysis. The criterion validity of the PHQ-9 was analysed in terms of sensitivity, specificity, and positive and negative predictive values for different cutoff scores. The Latvian and Russian version of the M.I.N.I., which is used to diagnose major depressive disorder, was used as the criterion standard. Data analyses were performed in Stata version 14 (Stata Corp). A separate analysis was conducted for the Latvian and Russian languages, and no significant differences were observed. The tables include the whole study sample. Tables with separate analyses for the two languages are included in the Appendix.

3 RESULTS

3.1 Prevalence of depression in the previous two weeks in Latvian general population

The survey response rate was 61%, and it was calculated according to the standards of the American Association of Public Opinion Research (American Association for Public Opinion Research, 2017). There were no statistically significant differences in the basic sociodemographic characteristics between survey respondents and non-respondents.

The final weighted sample included 4493 persons (2173 males, 2320 females). Survey context on substance use caused oversampling of the15–24 year old subgroup, thus causing unequal selection probabilities, which was addressed by data weighting procedures.

In a total sample women were more prevalent (51.6%, 95%CI 49.8–53.4) than men (48.4%, 95%CI 46.6–50.2). 22.0% (95%CI 20.7–23.3) of respondents were in a group 15–24 years, 20.6% (95%CI 19.1–22.3) of respondents were in a group of 25–34 years, 19.7% (95%CI 18.2–21.2) were in a group of 35–44 years, 21.4% (95%CI 19.9–22.9) in 45–54 years group, and 16.4% (95%CI 15.2–17.6) respondents in oldest age group. People with Latvian ethnicity were more prevalent (67.3%, 95%CI 65.7–68.9) than respondents with other ethnicities (32.7%, 95%CI 31.1–34.3). The highest proportion of respondents had secondary education (59.7%, 95% CI 57.9–61.4%), while education lower than secondary had 18.8% (95% CI 17.5–20.1) of all respondents. 21.6% (95%CI 20.1–23.2) had education higher than secondary. Majority of respondents were employed (61.7%, 95%CI 60.0–63.4), 12.3% (95%CI 11.1–13.6) of respondents were unemployed and 26.0% (95%CI 24.7–27.5) were economically inactive. Among the respondents there were more people who are married or live with

their partner (56.8%, 95%CI 54.9–58.5). 20.6% (95%CI 19.1–22.0) of respondents were divorced or lived separated or were widowed. In the capital lived 29.0% (95%CI 27.9–30.2) of all participants, in other Latvian cities lived 26.4% (95%CI 25.5–27.4) and in rural area – 44.5% (95%CI 43.3–45.8) of all respondents. Majority of participants reported their health status as good (68.3%, 95%CI 66.7–69.9), and 4.9% (95%CI 4.1–5.6) – as poor. Majority of respondents reported improvement in health status during previous 12 months (75.9%, 95%CI 74.4–77.3), and 16.1% (95%CI 14.9–17.4) reported worsening of health.

The point prevalence of depression in the general Latvian population was 6.7% (95%CI 5.6%–7.9%). Depression was more frequent in women (7.8% (95%CI 6.5–9.2) than in men (5.6%, 95%CI 4.4–6.8). Depression was more frequent in the oldest age group (55–64 years), 9.9% (95%CI 7.5–12.5) compared with the youngest age group (15–24 years), 3.8% (95%CI 2.5–5.1); $p = 0.002$). Depression was about twice as frequent (10.6%, 95%CI 8.4–12.8, $p < 0.0001$) among those who were divorced, widowed or separated in comparison with those who are married (5.8%, 95%CI 4.7–7.0) or single (5.5%, 95%CI 3.9–7.1). The point prevalence of depression was higher in urban dwellers (except the capital) (10.8%, 95%CI 8.9–12.7). In a group of education lower than secondary depression in the previous 2 weeks was 9.3% (95% CI 6.7–11.9), but in group of education higher than secondary – 6.9% (95% CI 6.9–8.7). In unemployed group of respondents depression in last 2 weeks was 11.0% (95%CI 7.2–14.8) but among employed respondents – 5.5% (95% CI 4.6–6.4). Depression was more frequent in a group with the lowest income per person (1st quartile, <129 EUR) (8.7%, 95%CI 6.9–10.6), compared with a group with the highest income per person (4th quartile, > 296 EUR) (5.4%, 95%CI 3.9–6.9).

In the poor health status group depression in last 2 weeks was 31.0% (95%CI 24.1–37.9), and 3.4% (95%CI 2.7–4.1) – in the group of good health status. In the group of worsened health within previous 12 months depression

was higher (18.4%, 95%CI 15.2–21.5), compared with a group of no changes in health (4.4%, 95%TI 3.5–5.3).

The point prevalence of depression in a group with alcohol dependence was higher (17.6%, 95%CI 13.9–21.3) compared with a group without alcohol dependence (5.2%, 95%CI 4.4–6.0).

Using Model 1, which was adjusted for gender and age, the odds of having depression were higher in women (OR 1.4, 95%CI 1.1–1.9, $p = 0.018$), in people older than 55 years old (OR 2.7, 95%CI 1.8–4.2, $p < 0.001$), in people who are no longer married (OR 1.6, 95%CI 1.1–2.4, $p = 0.007$), in people with an education level lower than secondary school (OR 2.0, 95%CI 1.2–3.3, $p = 0.006$),and in people living in urban areas (OR 2.6, 95%CI 1.9–3.6, $p < 0.0001$). OR of having depression were higher in respondents who had other than Latvian ethnicity (OR 2.6, 95%CI 1.9–3.4, $p < 0.0001$), unemployed group (OR 2.1, 95%CI 1.4–3.3, $p = 0.001$), and very high in those with alcohol dependence (OR 6.0, 95%CI 4.4–8.7, $p < 0.0001$). Using Model 1, the odds of having depression was 26.8 (95%CI 17.9–40.2, $p < 0.0001$) times higher for those who were dissatisfied with life, compared with people who considered themselves as being "satisfied".

Self-rated health status, both current and during the past year were very strong predictors of having depression. In the case of poor self-rated health status, the odds of having depression were 15.8 (95%CI 10.1–24.8, $p < 0.0001$) times higher comparing with those whose rating was good. The odds of being depressed were 4.7 (95%CI 3.4–6.5, $p < 0.0001$) times higher if self-rated health had worsened during the past year.

Using Model 2, which takes all variables into account, similar tendencies were found. The odds of having depression was 2.3 (95%CI 1.6–3.5, $p < 0.0001$) times higher for women compared with men. In the multivariate model influence of age groups, marital status, education level, income per person, and

employment was weakly correlated with depression and did not reach statistical significance.

The odds of having depression among the urban population of Riga (the capital of Latvia) were 1.4, while in other urban areas of Latvia the odds were 2.7 (95%CI 1.9–3.9, $p < 0.001$) higher.

The odds of having depression were 3.4 (95%CI 2.2–5.2, $p < 0.0001$) times higher for those with alcohol dependence, and these results remain statistically significant in the multivariate model.

Poor subjective health status was associated with a 4.5 folds of being depressed. If self-perceived health status worsened during the previous year, the odds of depression is increased to 2.6 (95%CI 1.8–3.9, $p < 0.0001$), furthermore, these results remained statistically significant as independent factors.

The risk of having depression was 2.8 fold higher in people with non-Latvian ethnicity, and these findings are similar with Model 1.

Table 3.1 presents depression related sociodemographic factors, health status evaluation, self-rated satisfaction with life, alcohol dependence with the results of the logistic regression analyses.

Table. 3.1

Association of sociodemographic factors, alcohol dependence, self-rated health status and satisfaction with life with depression in two weeks. Results of logistic regression

Factor	Model 1*		Model 2**	
	OR (95%CI)	**p**	**OR(95% CI)**	**p**
Gender				
Male	1.0		1.0	
Female	1.4 (1.1–1.9)	0.018	2.3 (1.6–3.5)	<0.0001
Age				
15–24	1.0		1.0	
25–34	1.7 (1.1–2.7)	0.028	1.6 (0.9–2.8)	0.093
35–44	2.0 (1.2–3.4)	0.006	1.2 (0.6–2.4)	0.569
45–54	1.9 (1.2–3.0)	0.003	0.8 (0.4–1.5)	0.416
55–64	2.7 (1.8–4.2)	<0.001	0.8 (0.4–1.6)	0.534

Table 3.1 continuation

Factor	Model 1*		Model 2**	
	OR (95%CI)	**p**	**OR(95% CI)**	**p**
Marital status				
Married/ cohabiting	1.0		1.0	
Divorced/ separated/ widowed	1.6 (1.1– 2.4)	0.007	1.1 (0.7–1.6)	0.761
Single	1.4 (0,9–2.3)	0.124	1.2 (0.7–2.0)	0.448
Urbanization				
Rural	1.0		1.0	
Capital	1.6 (1.1–2.3)	0.025	1.4 (0.9–2.2)	0,090
Helath status				
Good	1.0		1.0	
Average	3.8 (2.6–5.5)	<0.0001	1.8 (1.2–2.7)	0.007
Poor	15.8(10.1–24.8)	<0.0001	4.7 (2.6–4.5)	<0.0001
Change in health				
No change	1.0		1.0	
Improved	1.3 (0.8–1.2)	0.309	1.2 (0.7–2.2)	0.482
Worsened	4.7 (3.4–6.5)	<0.0001	2.6 (1.8–3.9)	<0.0001
Ethnicity				
Latvian	1.0		1.0	
Non-Latvian	2.6 (1.9–3.4)	<0.0001	2.8 (2.0–3.8)	<0.0001
Education				
Higher than secondary	1.0		1,0	
Secondary	0.9 (0.6–1.2)	0.474	0.8 (0.5–1.2)	0.270
Lower than secondary	2.0 (1.2–3.3)	0.006	1.0 (0.6–1.8)	0.913
Alcohol dependence				
No	1.0		1.0	
Yes	6.0 (4.2–8.7)	<0.0001	3.4 (2.2–5.2)	<0.0001

End of the Table 3.1

Factor	Model 1*		Model 2**	
	OR (95%CI)	**p**	**OR(95% CI)**	**p**
Satisfaction with life				
Satisfied	1.0		1.0	
Somewhat satisfied	4.4 (3.2–6.1)	<0.0001	3.3 (2.3–4.8)	<0.0001
Not satisfied	26.8 (17.9–40.2)	<0.0001	18.0 (11.3-28.7)	<0.0001
Income per person				
1st quartile	1.7 (1.2–2.6)	0.007	0.9 (0.6–1.5)	0.788
2nd quartile	1.5 (1.0–2.3)	0.076	1.4 (0.9–2.2)	0.178
3rd quartile	1.0 (0.6–1.5)	0.889	0.8 (0.5–1.3)	0.353
Employment				
Employed	1.0		1.0	
Unemployed	2.1 (1.4–3.3)	0.001	0.7 (0.4–1.2)	0.225
Economically inactive	1.8 (1.2–2.5)	0.001	1.1 (0.8–1.7)	0.551

*Model 1 adjusted by gender and age
**Model 2 adjusted by all factors simultaneously

3.2 The 12-month prevalence of depression and minor depression and healthcare utilization in the general population of Latvia

In Health Behaviour among the Latvian Adult Population survey, 2012, the final weighted sample included 3003 persons (1447 males and 1556 females); the questionnaire of one respondent had to be dropped due to insufficient data quality.

Total, 70% of people have used primary care services in the past 12 months, and 51% of people have used specialized care services. There are statistically significant differences in health care utilization in both genders. In the past 12 months 78.9% of women and 60.5% of men used primary care setting and 50% of women and 41.1% of men – specialized care. Statistically significant differences were found in the frequency of healthcare service use in both genders.

27.2% of women healthcare services in the past 12 months had used 3–5 times, compared to 19.3% of men who had used services in the same frequency. The highest proportion of men (27.1%) within past 12 months had used any service 1–2 times. Statistically significant differences in the number of reported somatic disorders in both genders were found. A total, 20.5% of all respondents reported any somatic condition, 7.7% of respondents reported two somatic conditions, and 4.6% reported three and more diagnosed somatic disorders. 17.7% men and 23.1% women had reported about at least one diagnosed somatic condition. Two somatic diseases were reported by 5.7% of men and 9.5% of women, while three and more diagnosed somatic somatic diseases were reported by 3% of men and 6.1% of women. The most frequent reported somatis conditions were vascular diseases (14.4%), spinal diseases (13.4%) and gastroenterological diseases (6.7%). Moreover, in the frequency of reported medical conditions by both genders statistically significant differences were found. Women more often reported about any somatic disorder, compared to men. Cardiovascular diseases were reported by 18.4% of women and 10.1% of men ($p < 0.0001$), back pain were reported by 15.6% of women and 10.9% of men ($p < 0.0001$), 3.9% of women and 1.9% of men ($p = 0.0007$) reported diagnosed diabetes, 4.6% of women and 2.9% of men ($p = 0.009$) reported any of respiratory disorders, and 0.8% of women and 0.2% of men ($p <0.0001$) were diagnosed with any of the oncological diseases. More than half of people (53.8%) rated their health status as god, 10.8% rated health as poor. There were statistically significant gender differences in their health self-assessment. 11.9% of women and 9.6% of men recognized their health status as poor; 38.1% of women and 32.6% of men reported health status as average. Health status as good was reported by 50% of women and 57.9% of men ($p < 0.0001$).

The 12-month prevalences of major depression and minor depression for the whole sample were 7.9% (95% CI 7.0–8.9) and 7.7% (95% CI 6.8–8.7), respectively. Depression and minor depression was not found in 86.5% (95%CI

84.5–88.2) of men and 82.6% (95%CI 80.7–84.3) of women. Depression for both genders was most prevalent in the age group 45–54 years old (11.4%, 95% CI 9.1–14.1), while minor depression was most frequent in the age group 35–44 years old (8.8%, 95% CI 6.7–11.4) (p = 0.0096). Depression for both genders was less prevalent in the age group 15–24 years old (5.2%, 95%CI 3.7–7.4) and minor depression – in the age group 55–64 years (6.8%, 95%CI 5.1–9.0). Gender analysis demonstrated, that 12-month prevalence of depression among men was higher in the age group 45–54 years (9.8%, 95%CI 6.8–13.9) while minor depression was more prevalent in the age group 35–44 years (10.0%, 95%CI 6.8–14.6). In women both depression and minor depression was more frequent in the age group 45–54 years – 12.7% (95%CI 9.7–16.8) and 10.4%, (95%CI 7.6 – 14.0%), respectively. Table 3.2. presents the 12-month prevalence of major and minor depression among both genders and across age groups.

Table 3.2

Prevalence of major depression and minor depression, and associations with gender and age (n=3003)

	No depression % (95%CI)	**Minor depression % (95% CI)**	**Depression % (95% CI)**	**p**
Total	84.4 (83.1–85.7)	7.7 (6.8–8.7)	7.9 (7.0–8.9)	
Gender				
Males	86.5 (84.5–88.2)	6.9 (5.7–8.4)	6.6 (5.4–8.1)	0.0114
Females	82.5 (80.7–84.3)	8.4 (7.1–9.8)	9.1 (7.8–10.5)	

Table 3.2 continuation

	No depression % (95%CI)	Minor depression % (95% CI)	Depression % (95% CI)	p
Age				
15–24	87.5 (84.6–89.9)	7.3 (5.5–9.6)	5.2 (3.7–7.4)	0.0096
25–34	85.3 (82.3–87.9)	7.5 (5.7–10.0)	7.2 (5.3–9.6)	
35–44	83.1 (79.8–86.0)	8.8 (6.7–11.4)	8.1 (6.1–10.7)	
45–54	80.6 (77.4–83.5)	8.0 (6.1–10.3)	11.4 (9.1–14.1)	
55–64	86.1 (83.2–88.6)	6.8 (5.1–9.0)	7.1 (5.4–9.4)	
Males				
15–24	90.1 (86.1–92.9)	5.2 (3.3–8.2)	4.7 (2.8–8.0)	0.0652
25–34	86.2 (81.8–90.0)	7.2 (4.8–10.8)	6.6 (4.3–10.1)	
35–44	83.0 (77.5–87.4)	10.0 (6.8–14.6)	7.0 (4.2–11.3)	
45–54	84.9 (80.2–88.7)	5.3 (3.2–8.6)	9.8 (6.8–13.9)	
55–64	88.7 (84.2–92.0)	7.0 (4.5–10.8)	4.3 (2.5–7.7)	
Females				
15–24	84.9 (80.4–88.6)	9.4 (6.5–13.3)	5.7 (3.6–9.0)	0.047
25–34	84.4 (79.9–88.1)	7.9 (5.3–11.5)	7.7 (5.1–11.4)	
35–44	83.3 (79.1–86.7)	7.5 (5.2–10.7)	9.2 (6.7–12.7)	
45–54	76.9 (72.1–81.0)	10.4 (7.6–14.0)	12.7 (9.7–16.8)	
55–64	84.2 (80.1–87.6)	6.6 (4.5–9.7)	9.2 (6.6–12.5)	

The prevalence of self-reported somatic illnesses among people with major, minor, and no depression was estimated. Somatic conditions were more prevalent in the group with major depression. The most prevalent self-reported diseases were cardiovascular diseases (24.4%), back pain (21.5%), and gastroenterological diseases (14.1%). The most prevalent reported somatic

conditions in the group of minor depression also was cardiovascular diseases (18.1%), back pain (16.3%), and gastroenterological diseases (10.3%). The prevalence of self-reported somatic illnesses among people with major, minor, and no depression is summarised in Table 3.3.

Table 3.3

Prevalence of somatic illnesses among people with no depression, with minor depression, and with major depression (n=3003)

Variables	No depression %	Minor depression %	Depression %	p
Cardiovascular disease	13.1	18.1	24.4	< 0.0001
Diabetes	2.2	6.8	5.7	< 0.0001
Arthritis	1.3	4.6	3.0	0.0003
Back pain	12.3	16.3	21.5	< 0.0001
Respiratory	3.4	4.3	7.5	0.0054
Gastroenterology	5.7	10.3	14 1	< 0.0001
Urinary	2.9	5.5	5.9	0.0063
Cancer	0.3	0.8	2.7	< 0.0001

Table 3.4 displays the results from the multinomial logistic regressions. Model 3 was adjusted for gender and age, and reveals that the OR of having depression was higher among females aged 45–54 years old (OR 2.3, 95%CI 1.5– 3.6, $p \leq 0.001$), in people who had used healthcare services more than six times in the past 12 months (OR 4.1, 95%CI 2.6–6.4, $p \leq 0.001$), among those who received disability pension (OR 2.8, 95%CI 1.8–4.3, $p \leq 0.001$), among those who had three or more somatic conditions (OR 6.5, 95%CI 3.9 – 10 .7, $p \leq 0.001$), among those with more than 11 days absent from work during the past 12 months (OR 2.6, 95%CI 1.9–3.6, $p \leq 0.001$), those who perceived their health status to be average (OR 3.1, 95%CI 2.2–4.5, $p \leq 0.001$) or below average (OR 13.1, 95%CI 8.6–20.0, $p \leq 0.001$), and among those who were occasional (OR 2.7, 95%CI 1.5–4.8, $p \leq 0.001$) and regular smokers (OR 2.1, 95%CI 1.5–2.9, $p \leq 0.001$). The model for the odds ratio of minor depression (as compared to no depression) reveals similar tendencies. However,

differences were also observed. Model 3 did not reveal higher odds for having minor depression among different age groups, and in general, the odds for having minor depression were lower than OR for depression. OR for minor depression were 1.7 folds (95%CI 1.1–2.5, $p \leq 0.01$) higher among those who had used healthcare services during the past 12 months 1–2 times and 1.6 folds (95%CI 1.1–2.4, $p \leq 0.01$) higher among people, who had used healthcare services six or more times. The odds for minor depression were higher in those, who had reported three and more somatic diseases (OR 3.5, 95%CI 2.0–6.2, $p \leq 0.001$), in those who were absent from work for 1–10 days (OR 1.5, 95%CI 1.1–2.1, $p < 0.05$). The odds for having minor depression (OR 2.5, 95%CI 1.6–4.0) were similar with the odds for having depression among people who received disability pension.

In Model 4, there were higher odds of having depression for those who had used healthcare services six or more times during the past 12 months (OR 2.0, 95%CI 1.2–3.4, $p \leq 0.01$), who had more than three somatic conditions (OR 2.1, 95%CI 1.2–3.8, $p \leq 0.001$), who perceived their health status as being average (OR 2.5, 95%CI 1.7–3.7, $p \leq 0.001$) or below average (OR 8.3, 95%CI 5.1–13.7, $p \leq 0.001$), and who were occasional (OR 3.0, 95%CI 1.6–5.5, $p \leq 0.001$) or regular (OR 2.2, 95%CI 1.5–3.1, $p \leq 0.001$) smokers. More frequent use of healthcare services, and number of days absent from work in the last 12 months were not related with an increased likelihood of having minor depression. Receiving disability pension (OR 1.9, 95%TI 1.1–3.2, $p < 0.05$) and reporting health status as average (OR 2.0, 95%CI 1.4–2.9, $p \leq 0.001$) or below average (OR 3.0, 95%CI 1.7–5.3, $p \leq 0.001$) was associated with a significantly higher likelihood of having minor depression.

Table. 3.4

Odds ratios for depression and minor depression, according to gender, age and health related variables

	Model 3			Model 4		
Factor	OR Depression vs non-depressed (95% CI*)	OR Minor depression vs non-depressed (95% CI*)	OR Minor depression vs depression (95% CI*)	OR Depression vs non-depressed (95% CI*)	OR Minor depression vs non-depressed (95%CI*)	OR Minor depression vs depression (95% CI*)
Gender						
Male	1.0	1.0	1.0	1.0	1.0	1.0
Female	**1.4[(a)] (1.1–1.9)**	1.3 (1.0–1.7)	0.9 (0.6–1.3)	**1.7[(b)] (1.2–2.4)**	1.4[(d)] (1.0–1.9)	0.8 (0.5–1.3)
Age						
15–24	1.0	1.0	1.0	1.0	1.0	1.0
25–34	1.4 (0.9–2.3)	1.1 (0.7–1.6)	0.8 (0.4–1.4)	1.1 (0.7–1.9)	0.9 (0.6–1,4)	0.8 (0.4–1.5)
35–44	**1.6[(a)] (1.0–2.6)**	1.3 (0.8–1.9)	0.8 (0.4–1.4)	1.0 (0.6–1.8)	0.9 (0.6–1.4)	0.9 (0.5–1.7)
45–54	**2.3[(c)] (1.5–3.6)**	1.2 (0.8–1.8)	**0.5[(a)] (0.3–0.9)**	1.0 (0.6–1.7)	0.7[(d)] (0.4–1.1)	0.7 (0.3–1.3)
55–64	1.3 (0.8–2.2)	0.9 (0.6–1.4)	0.7 (0.4–1.3)	**0.4[(b)] (0.2–0.7)**	**0.4[(b)] (0.3–0.7)**	1.1 (0.5–2.2)
Frequency of healthcare service use in the past 12 months						
Has not	1.0	1.0	1.0	1.0	1.0	1.0
1–2 times	**1.7[(a)] (1.0–2.7)**	**1.7[(b)] (1.1–2.5)**	1.0 (0.5–1.8)	1.6 (1.0–2.5)	1.3 (0.9–2.0)	0.9 (0.5–1.6)
3–5 times	**2.3[(b)] (1.4–3.6)**	1.4 (0.9–2.2)	0.6 (0.3–1.2)	**1.7[(a)] (1.1–2.9)**	1.0 (0.6–1.6)	0.6[(d)] (0.3–1.1)
6 or more times	**4.1[(c)] (2.6–6.4)**	**1.6[(b)] (1.1–2.4)**	**0.4[(b)] (0.2–0.7)**	**2.0[(b)] (1.2–3.4)**	0.8 (0.5–1.4)	**0.4[(a)] (0.2–0.8)**
Number of somatic diagnoses in the past 12 months						
None	1.0	1.0	1.0	1.0	1.0	1.0
One	**2.3[(c)] (1.6–3.2)**	**1.8[(c)] (1.3–2.5)**	0.8 (0.5–1.3)	1.2 (0.8–1.8)	1.4[(d)] (1.0–2.1)	1.2 (0.7–1.9)
Two	**2.5[(c)] (1.5–4.0)**	1.5 (0.9–2.2)	0.6 (0.3–1.2)	1.0 (0.6–1.7)	1.1 (0.6–2.0)	1.1 (0.5–2.4)
Three or more	**6.5[(c)] (3.9–10.7)**	**3.5[(c)] (2.0–6.2)**	0.6 (0.3–1.1)	**2.1[(b)] (1.2–3.8)**	**2.3[(b)] (1.3–4.3)**	1.1 (0.5–2.4)

Table 3.4 continuation

Factor	Model 3			Model 4		
	OR Depression vs non-depressed (95% CI*)	OR Minor depression vs non-depressed (95% CI*)	OR Minor depression vs depression (95% CI*)	OR Depression vs non-depressed (95% CI*)	OR Minor depression vs non-depressed (95%CI*)	OR Minor depression vs depression (95% CI*)
Number of days absent in the past 12 months						
None	1.0	1.0	1.0	1.0	1.0	1.0
1–10 days	0.9 (0.6–1.3)	**1.5[(a)] (1.1–2.1)**	**1.8[(a)] (1.0–3.0)**	0.7 (0.4–1.1)	1.4[(d)] (1.0–2,1)	**2.0[(b)] (1.2–3.5)**
11 + days	**2.6[(c)] (1.9–3.6)**	1.4 (0.9–2.1)	**0.5[(b)] (0.3–0.9)**	1.3 (0.9–1.8)	1.1 (0.7–1.7)	0.9 (0.5–1.5)
Receive disability pension						
No	1.0	1.0	1.0	1.0	1.0	1.0
Yes	**2.8[(c)] (1.8–4.3)**	**2.5[(c)] (1.6–4.0)**	0.9 (0.5–1.6)	1.0 (0.6–1.7)	**1.9[(a)] (1.1–3.2)**	1.8[(d)] (0.9–3.5)
Perceived health						
Above average	1.0	1.0	1.0	1.0	1.0	1.0
Average	**3.1[(c)] (2.2–4.5)**	**2.2[(c)] (1.6–3.1)**	0.7 (0.5–1.1)	**2.5[(c)] (1.7–3,7)**	**2.0[(c)] (1.4–2.9)**	0.8 (0.5–1.3)
Below average	**13.1[(c)] (8.6–20.0)**	**4.0[(c)] (2.5–6.4)**	**0,3[(c)] (0.2–0.5)**	**8.3[(c)] (5.1–13.7)**	**3.0[(c)] (1.7–5.3)**	**0.4[(b)] (0.2–0.7)**
Smoking status						
Non-smoker	1.0	1.0	1.0	1.0	1.0	1.0
Quitter	1.1 (1.6–3.2)	1.3 (0.8–1.9)	1.1 (0.6–2.0)	1.3 (0.8–2.0)	1.3 (0.9–2.0)	1.0 (0.6–1.9)
Occasional smoker	**2.7[(c)] (1,5–4.8)**	1.5 (0.8–2.9)	0.6 (0.3–1.3)	**3.0[(c)] (1.6–5.5)**	1.6 (0.8–3.1)	0.5 (0.2–1.3)
Regular smoker	**2.1[(c)] (1.5–2.9)**	1.3[(d)] (1.0–1.9)	0.7[(d)] (0.4–1.0)	**2.2[(c)] (1.5–3.1)**	1.3 (0.9–1.9)	**0.6[(b)] (0.4–1.0)**

Model 3 results from multinomial logistic regressions expressed as odds ratio with respective 95% confidence intervals controlled for gender and age.

Model 4 results from multinomial logistic regressions expressed as relative risk ratio (RRR) with respective 95% confidence intervals controlled for all factor variables (gender, age, frequency of use of healthcare services, number of self-reported somatic diagnosis in the past 12 months, number of absent days in the past 12 months, receiving disability pension, perceived health, and smoking status). Bolded text indicates a significant difference from the reference group. (a) $p < 0.05$; (b) $p \leq 0.01$; (c) $p \leq 0.001$; (d) $p < 0.1$.

Use of any health care services during the last 12 months was higher among those with major depression, 87.7% (95% CI 82.8–91.3) and minor depression 81.2% (95% CI 75.6–85.7), as compared with use among the non-depressed population 73.1% (95% CI 71.4–74.8).

3.3 The point prevalence of depression and PHQ-9 validation in primary care sample in Riga and Riga district

In the frame of the National Research Programme, in total, 367 patients were invited to complete the PHQ-9, 43 of whom refused to participate in the survey (n = 20 males; n = 23 females). Those who refused did not significantly differ in main socio-demographic characteristics from the rest of the group. A total of 324 patients were screened with the PHQ-9, 272 of whom agreed to participate in the M.I.N.I. The main characteristics of the screened and interviewed patients are displayed in Table 3.5.

Table 3.5

Characteristics of the primary care sample

	PHQ-9		**PHQ-9 without M.I.N.I.**		**PHQ-9 with M.I.N.I.**		**p**
	n	%	n	%	n	%	
Total	**324**		**52**		**272**		
Gender							
Male	109	33.6	16	30.8	93	34.2	0.61
Female	215	66.4	36	69.2	179	65.8	
Mean age	50.0 (SD 18.2)		52.1 (SD 19.4)		49.6 (SD 18.0)		
Age groups							
18–39	106	32.7	16	30.8	90	33.1	0.89
40–64	141	43.5	21	40.4	120	44.1	
65+	75	23.1	13	25.0	62	22.8	
n/a	2	0.6	2	3.8	0	0.0	

Table 3.5 continuation

Ethnicity							
Latvian	197	60.8	20	44.2	174	64.0	<0.0001
Non-Latvian	114	35.2	23	38.5	94	34.6	
n/a	13	4.0	9	17.3	4	1.5	
Education							
Below secondary	48	14.8	6	11.5	42	15.4	0.5
secondary	176	54.3	32	61.5	144	52.9	
Above secondary	100	30.9	14	26.9	86	31.6	
PHQ-9 score							
0–4	140	43.2	30	57.7	110	40.4	0.07
5–9	118	36.4	13	25.0	105	38.6	
10–15	41	12.7	8	15.4	33	12.1	
15–19	17	5.2	1	1.9	16	5.9	
20+	8	2.5	0	0.0	8	2.9	

No statistically significant differences as assessed by chi-square and t-test for age were observed in most sociodemographic characteristics among those agreeing to take part in the M.I.N.I. interview; however, a higher proportion of those not interviewed by the M.I.N.I. scored less than 5 points on the PHQ-9 (69.2% and 50.7% of those not interviewed and interviewed with the M.I.N.I., respectively). According to the M.I.N.I., 22.4% (95% CI17.9–28.4) of patients (n = 61) had experienced a lifetime depression episode, and 13.6% (95% CI 10.3–18.3) of patients (n = 37) had current depression. If patients who were not willing to provide their ethnicity status were included in the analysis, there was a statistically significant difference observed for ethnicity ($p < 0.0001$); however, if patients who did not provide their ethnicity were excluded from the analyses, these significant differences disappeared ($p = 0.169$).

The reliability analysis showed that the items of the PHQ-9 were highly consistent (Cronbach's alpha 0.83). Table 3.6 shows the bivariate correlations between the nine items of the PHQ-9, with coefficients ranging from 0.53 to 0.77.

The item total correlations were high for most items (0.62–0.77) with the exception of item #5 and item #9, which had the lowest inter-item correlations.

Table 3.6

PHQ-9 item level values and item-total correlations

PHQ-9	Mean	SD	Item-test correlation	α if item deleted
1. Little interest or pleasure in doing things	0.79	0.87	0.73	0.80
2. Feeling down, depressed, or hopeless	0.87	0.87	0.77	0.79
3. Trouble falling or staying asleep, or sleeping too much	1.28	1.04	0.63	0.82
4. Feeling tired or having little energy	1.15	0.89	0.65	0.81
5. Poor appetite or overeating	0.65	0.83	0.58	0.82
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0.58	0.83	0.66	0.81
7. Trouble concentrating on things, such as reading a newspaper or watching television	0.47	0.77	0.66	0.81
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0.40	0.75	0.62	0.81
9. Thoughts that you would be better off dead or of hurting yourself in some way	0.19	0.53	0.53	0.82

The performance of the PHQ-9 was compared against the diagnosis of major depression as determined by the M.I.N.I., a reliable standard. The sensitivity, specificity, and likelihood ratio are presented in Table 3.7 At a cutoff score of 10 or above, the sensitivity of the PHQ-9 was 0.86 and the specificity was 0.89.

Table 3.7

Sensitivity, specificity, and likelihood ratios at various cut-off points of the PHQ-9

PHQ-9 score	Sensitivity %	Specificity %	Classified %	LR+	LR-
≥ 6	97.30	58.30	63.60	2.33	0.05
≥ 7	97.30	67.23	71.32	2.97	0.04
≥ 8	97.30	74.89	77.94	3.88	0.04
≥ 9	91.89	83.83	84.93	5.68	0.10
≥ 10	86.49	89.36	88.97	8.13	0.15
≥ 11	67.57	92.77	89.34	9.34	0.35
≥ 12	64.86	95.74	91.54	15.24	0.37
≥ 13	62.16	96.60	91.91	18.26	0.39
≥ 14	56.76	97.87	92.28	26.68	0.44

*LR+ – likelihood ratio for a positive result
**LR− – likelihood ratio for a negative result

In total, 86.5% (95% CI71.1–94.3) of people diagnosed with major depression by the M.I.N.I. had a PHQ-9 score 10 or more. The positive likelihood ratio was 8.13 at this cutoff score. In a screening with the PHQ-9 40.4% (n = 110) of the primary care patients who had screening and a diagnostic interview with the M.I.N.I. had a total score 0–4, and no one of them was diagnosed with major depression. PHQ-9 score of 5–9 had 38.6% (n = 105) patients of whom 13.5% (n=5) were diagnosed with the major depression according the M.I.N.I. The PHQ-9 total score of 10–14 had 33 patients, and 13 of them had depression according the M.I.N.I. A total score of the PHQ-9 15–19 points had 16 patients, and 32.4% (n = 12) of them had major depression by the interview. The PHQ-9 score ≥ 20 had 8 patients, and 7 of them had major depression by the M.I.N.I.

ROC curve analysis (Figure 1) supported the criterion validity of the PHQ-9 in successfully differentiating between patients with and without major depression (AUC = 0.94).

4 DISCUSSION

Depression ranks among noticeable spread of psychic disorders across the Europe; one out of 20 adults have experienced an episode of depression at least few weeks in any year. During the last five years the prevalence of depression within last 12 months in the European countries have not changed significantly, yet there is still a lack of data about the prevalence of depression from Eastern Europe and the Baltic States where residents have lower income per capita, bigger social problems, as well as incomplete health care system (Paykel et al., 2005).

More than a half of unique depression patients in Latvia have received medical help from a psychiatrist in 2010, but more than one third has addressed a family doctor and only a small portion have sought aid from other specialists. One of explanations on why the depression is mainly diagnosed by psychiatrists could be related to a fact that depression is not sufficiently identified and diagnosed at the level of the primary care. It must be noted that one can see a huge difference in the offered help to patients with neurotic, stress-related and somatoform disorders (F4, SSK-10), where more than 60% of patients have received help from family doctors, more than 30% from other doctors and 5% from psychiatrists (Pulmanis et al., 2011). Such distribution ratio could mean that, possibly, neurotic disorders in "non-psychiatrist services" are not differentiated properly from depression. One of reports where the analysed data sets from the National Health Cervice have been reflected for unique patients of year 2009 at family doctors' lead to a conclusion that diagnoses of depression have been established to merely 0.17% of Latvian residents. To mention for a comparison — depression patients in the Register of Psychiatry in year of 2010 constitute 0.39% of total population. Data found in the literature on self-reported depression in a survey on Health Behaviour among Latvian Adult Population,

carried out in 2010, and estimated the point prevalence of depression in the general population survey on substance use in Latvia in 2011, and the 12-month prevalence of depression in a survey on Health Behaviour among Latvian Adult Population in 2012, showed that the cases reported by very respondents, and the prevalence rates of depression estimated in the population surveys, is 10 times more frequent than the cases established in the national healthcare. Such a notable distinction can indicate that a large part of depression cases in Latvia are being treated either in the private structures or are not identified sufficiently due to stigmatisation or are considered as other psychiatric disorders, such as somatoform disorders, by mistake.

Statistical year-book provides an information only about those persons who visit state funded healthcare structures to receive help, therefore in order to establish the true prevalence rates of depression a research of the national level was needed. It would give a possibility not only to find out the scope of the problem, but also facilitate implementing further measures aimed at reducing depression burden. Two nation-wide studies were carried out in Latvia from 2011 to 2013; within the framework of these studies the prevalence of depression in the last 2 weeks or point prevalence and the prevalence of depression and "minor depression" was estimated during the last 12 months.

4.1 The point prevalence of depression in the general population of Latvia and associated factors

It was found out in the general population survey on substance use in Latvia in 2011, that the point prevalence of depression constituted 6.7%. In a similar study in Germany, where also PHQ-9 scale was used and depression was detected with the cutoff score ≥ 10, the prevalence of depression during last 2 weeks was 5.6% (Kocalevent et al., 2013). The prevalence of depression was also higher than in the Estonian Health Survey in 2006 where the last 2 weeks

prevalence of depression, assessed by the depressive episode module of the Mini International Neuropsychiatric Interview (M.I.N.I.), was 5.6% (Kleinberg et al., 2010). Both depression measuring tools detect depression according to DSM-IV diagnostic criteria, but it is possible that PHQ-9 is more efficient at discovering mild and averagely mild depression cases than other measuring tools (Fischer et al., 2011).

Using Model 1, i.e. adjusting for gender and age, the prevalence of depressive symptoms was higher in females. However, the gender difference was not as high as expected and did not reach the characteristic women to man ratio 2:1 (Weissman et al., 1984). It is important to bear in mind that in this survey it was not possible to distinguish between major depression and bipolar depression or depression due to a general medical condition, where gender differences are not pronounced (Fountoulakis, 2015). Moreover, Olsen et al. (2004) indicated that the gender difference in depression is primarily a result of a gender difference in the less pronounced depressive states, indicating that the female predominance is less pronounced in the more severe depression states. Using Model2 where all factors were taken into account, the odds of having depression were twice as higher in females than males, which is expected and consistent with other findings (Angst et al., 2002; Weissman et al., 1984). Gender-specific differences in the literature are justified by the additional responsibilities for the women who also fill the roles of homemaker and childcare provider in addition to being employed (Pascall and Manning, 2000; Van de Velde et al., 2010).

There is no consensus about the association between depression and age. In the model adjusted for gender and age, the relationship between age and odds of being depressed is 2.7 times higher in the group older than 54 years old, while in the multivariate model influence of age groups was not consistent and did not reach statistical significance. These results are consistent with findings which show increasing prevalence of depression with age (Kleinberg et al., 2010; Kolchakova and Akabaliev, 2003).

Using Model 2, sociodemographic characteristics such as marital status, urbanization, employment status, income per person, and education level were associated with depression but they lost their significance when other factors were considered simultaneously. The association between marital status and depression in the survey was in people who were no longer married but not in people who were single. These results are consistent with the findings where loss of marital ties are directly associated with depression where as being single is not (Kamiya et al., 2013; Kessler et al., 2005a). The family status in this study was not a statistically significant depression-related factor.

Unemployment, low income, low level of education and social class have been shown to be associated with negative mental health outcomes including depression (Lorant et al., 2003; Weich and Lewis, 1998). Moreover, mental health problems reduce participation in the labour force and resulting in a sustained lack of income. In the Baltic States, depression is a severe problem in the unemployed population, and its prevalence is highest in the long term unemployed (Stankunas et al., 2006). In 2011 in Latvia, the unemployment rate was 15.4% (Central Statistical Bureau of Latvia, 2017). In this survey, unemployment was found to be a risk factor of having depression, but the statistical significance is lost when all other variables are taken into the account.

Also the income level per capita per month did not show a convincing relation to an increased OR of depression during the last 2 weeks. Therefore this study does not reveal low income relation to a higher probability of depression widely mentioned in the world literature.

The prevalence of depression is significantly higher in people with a physical illness, furthermore physical disorders are a risk factor for the subsequent development of depression (Goldberg, 2010; Moussavi et al., 2007; Patten, 2001). That can explain why in our survey poor subjective health status was associated with a 4.5 times likehood of being depressed. If self-perceived health status worsened during the previous year, the likehood of depression is

increased 2.6 fold, furthermore, these results remained statistically significant as in dependent factors. The odds of being depressed were very high if self-rated satisfaction with life was low. Life dissatisfaction is strongly associated with poor subjective health status, poor social situation, personality problems and symptoms of depression (Rissanen et al., 2013a; Rissanen et al., 2011; Rissanen et al., 2013b). Discontent with life is one of the factors of earlier mortality, suicidal behaviour and somatic and psychiatric illnesses (Koivumaa-Honkanen et al., 2001; Koivumaa-Honkanen et al., 2004). This study confirmed that discontent with life is a considerable factor associated with the depression (OR 18.0).

The OR of depression for respondents residing in Riga was 1.4 times higher than those living in rural regions. The probability of depression for persons who lived in other cities and towns was 2.7 times higher in comparison to the residents of rural regions. Such differences were reported also in other studies (McKenzie et al., 2013; Wang, 2004). Higher prevalence and higher odds for it in Latvian cities and towns, except for the capital, could be explained with a wider unemployment and lower salaries in comparison to Riga (Central Statistical Bureau of Latvia, 2015).

In a study conducted in 2011 it was established that prospects to have depression was 3 times higher to those who were diagnosed with alcohol dependency according to CIDI, and these results remain significant in multivariate model. In 2010 Latvia had one of the highest indicators in entire Europe regarding the consumption of registered and unregistered alcohol per capita (Rehm et al., 2012), besides the habits of using the alcohol in Latvia is one of the most harmful in comparison to other countries of the world (Rehm et al., 2012). Excessive use of alcohol or addiction may trigger depression and vice versa — when a person starts consuming alcohol for the purpose of self-treatment.

4.2 The 12-month prevalence of depression and minor depression in the general population of Latvia and associated factors

In order to compare data of the spread of depression in Latvia with data from other countries, a similar research methodology is essential, besides the studies mostly detect depression during the last 12 months. A survey of Health Behaviour among Latvian Adult Population carried out in 2012, was the first study done in Latvia trying to identify the prevalence of depression and "minor depression" during the last 12 months, and also establishing a relation between depression and "minor depression" and a frequency of visits to health care services, somatic illnesses, number of days absent from the work due to health issues as well as self-concept of health and smoking status.

The prevalence of depression during last 12 months in the general population constituted 7.9% and these estimates are higher in comparison with average indicators of the prevalence of depression in Europe or 6.9% (Wittchen et al., 2011). Comparing Latvia to 21 counties recently researched regarding the prevalence of depression, it has one the highest prevalence of depression at global scale (Thornicroft et al., 2016). It was determined that an outlook of both depression and "minor depression" was considerably higher to those respondents who reported at least three chronic somatic illnesses, as well as those who visit different healthcare services more frequently.

The present study did not show any gender difference in the prevalence of major or minor depression. This finding is contrary with the evidence that depressive disorders are twice more common among women than among men. By using logistic regressions and adjusting all factors simultaneously, it was established that in a research, conducted in 2011, the women had twice as high odds to get depression than men, while a study, conducted in 2012, did not show such relation. Such differences in studies could possibly happen, because in a

study conducted in 2011 PHQ-9 was used as a screening tool to detect depression but in a study conducted in 2012 a diagnostic tool was used instead.

The total prevalence of minor depression was 7.7%. The literature suggests that the prevalence of minor depression, as defined by DSM IV criteria, is between 2.6% and 4.5% (Hermens et al., 2004). Depressive symptoms are also associated with functional disability, medical comorbidity and poor subjective health status (Pickett et al., 2014).

The prevalence of major and minor depression varied with age in both men and women, but no consistent age-related pattern was found. The observation of decreased prevalence in the oldest age group for both disorders is consistent with findings from developed countries (Kessler et al., 2010; Strine et al., 2008).

Previous studies suggest that depression is a considerable cause of work place absenteeism and diminished productivity (Hendriks et al., 2015; Suzuki et al., 2015). In our study, receiving disability pension was associated with an almost 2.0-fold risk of having minor depression. Model 1 revealed that being absent from work for 11 or more days during the past 12 months was associated with a 2.6-fold risk of having major depression. Shorter periods of absence from work were associated with a 1.5-fold risk of having minor depression.

The survey of Health Behaviour among Latvian Adult Population, 2012 also discovered the association between the smoking status and depression during the last 12 months. Smoking of tobacco increases depression risk (John et al., 2004) and depression encourages taking up the smoking habit, besides depression makes it harder to quit smoking and more frequently people suffering from depression has several unsuccessful episodes of quitting (Hughes, 2007). When analysing Model 4, the OR of depression during the last 12 months was 2 times higher for regular smokers and 3 times higher for occasional smokers, if compared to non-smokers. The study did not find a relation between the “minor depression” and smoking status.

4.2.1 Relation between depression and minor depression with somatic illnesses and healthcare utilization

Model 4 revealed that having three or more somatic disorders was associated with an increased risk of both major and minor depression (2.0-fold and 2.3-fold, respectively). It is reported that a comorbid state of depression worsens health as compared to depression alone (Moussavi et al., 2007). The study shows, that somatic conditions are more prevalent in people with major depression and minor depression compared to non-depressed population. Although there are numerous studies that have examined depression in people with somatic disorders, many of them suffer from important limitations in terms of generalizability. Our study was conducted in a randomly sampled general population. However, it has to be taken into account that the presence of medical conditions was self-reported.

Patients suffering with mental disorders are usually characterized as high utilizers of health services, moreover Hämäläinen et al., (2004) found that health services are used more frequently by people with more severe, prolonged and subjectively more disabling depressive episodes.

In the survey of Health Behaviour among Latvian Adult Population 2012, reporting six or more visits to any healthcare service in the past 12 months was associated with a 2.0-fold increased risk of having major depression. However, having minor depression was not associated with higher healthcare utilization. This finding is in contrary with studies that report that depressive symptoms are associated with the same or a greater level of service utilization and impairment as clinical depression is (Johnson et al., 1992). It is noteworthy that in the current study, we the reason for visits to healthcare specialists was not assessed.

4.3 Advantages and limitations of depression prevalence in the general population of Latvia studies

An advantage of the general population survey on substance use in Latvia in 2011, and the survey on Health Behaviour among Latvian Adult Population 2012, was the large and representative population of respondents, thus allowing an estimation of depression at a national level with relatively small margins of error. Another important strength is that only specially trained interviewers were involved in data collection. Interviews were performed face-to-face; the presence of the interviewer makes it easier for respondent to ask for clarification on the questions, and for the interviewer to ask for clarification on the answers.

The results in this report must be considered in the context of some limitations. Due to the cross-sectional nature of the studies, it was impossible to draw conclusions about causality. Lack of information on course or previous episodes of depression is another limitation. In the general population survey on substance use in Latvia in 2011, somewhat high non-response rate is similar or even slightly higher to those observed in recent studies (Fryers et al., 2003; Kessler et al., 2007, EMCDDA, 2013). In this study it was not possible to determine the nosologic version of depression and also to find out etiologic factors of depression.

In the survey of Health Behaviour among Latvian Adult Population 2012, the diagnostic interview covered only depression, and excluded investigation of other psychiatric disorders. The fact that non responders might have different characteristics from responders is also one considerable limitation. Finally, recall bias may have influenced some measures, such as professionally-diagnosed somatic conditions in the past 12 months and health service utilization.

4.4 Prevalence of depression in primary care sample

Within the framework of the National Research Programme BIOMEDICINE in 2014 was found, that the point relevance of depression in the sample of patients attending primary care setting is similar to the prevalence rates in the primary care in Lithuania. Lithuanian colleagues in their study have used a diagnostic interview the M.I.N.I. in a sample 998 patients in the primary care settings in four Lithuanian cities. A Lithuanian study found out that an current depression is the second most frequent mental disorder and it affects 15% of p (Bunevicius et al., 2014). One of the largest studies on the prevalence of depression in the primary care was a cooperation project of WHO, which included 15 countries and more than 26,000 patients in total. The point prevalence of depression constituted 10.4% (Ustun, 1994).

Data from the National Health Service show that in 2013 more than 4,423 unique patients suffering from any of mood disorder diagnosis (F3, ICD-10) have been treated by family doctors, while more than 50,000 unique patients were diagnosed with neurotic and stress related and somatoform disorders (F4, ICD-10), somatoform autonomic dysfunction being the most frequent one (F4, ICD-10) (Pulmanis, 2014b). This fact leads to think that probably depression in Latvia is not sufficiently identified and diagnosed at the primary care level.

It must be noted that a study carried out within the framework of the doctoral thesis was pilot project, followed by a much wider study within the National Research Programme BIOMEIDICNE project, aimed at detecting the prevalence of mental disorders in a large primary care sample size that covered all Latvian regions (Rancans et al. 2016).

4.5 Validation of the PHQ-9 in a primary care sample in Latvia

No previous studies on the validation of any depression screening tool in a sample of primary care attendees in Latvia have been conducted. Therefore, this is the first study to provide evidence on the psychometric properties of the PHQ-9 for measuring depression in a primary care setting in Latvia.

It was found that a threshold of ≥10 on the PHQ-9 was the optimal cutoff score for detecting major depression in primary care patients. A cutoff score of 10 produced psychometric properties comparable to the findings of systematic reviews and meta-analyses of the PHQ-9 (Wittkampf et al., 2009). At this threshold, the study demonstrated an optimal combination of sensitivity and specificity in diagnosing depression. Our diagnostic accuracy rates are close to those reported in a meta-analysis by Gilbody et al. (2007), who showed a pooled sensitivity of 80.0% and a specificity of 92.0%. A recent metaanalysis conducted by Manea et al. (2012) found that the PHQ-9 had acceptable diagnostic properties for detecting major depression using cutoff scores between 8 and 11. In their pooled analysis, the authors reported that the specificity estimates summarized across 11 published studies ranged from 73% (95% CI 63–82) to 96% (95% CI 94–97) for cutoff scores between 7 and 15. The sensitivity and specificity reported in our study are consistent with those of a study conducted by Manea et al. (2012).

Regarding the PHQ-9 items, we found that feeling down, depressed or hopeless and feeling little interest or pleasure had the highest item-test correlations, while the ninth item regarding suicidal thoughts had the lowest. It is possible that the poor performance of these items is specific to a primary care population. This finding also could be explained by cultural factors such as stigma, which affects the endorsement of certain depressive symptoms. A similar finding was reported by Gelaye et al. (2013). The internal reliability of the

PHQ-9 in our study was good and similar to those of other studies ((Kroenke et al., 2001).

One of the limitation of this study is small sample size as well as the fact that the acquired results cannot be attributed to the nationwide primary care level in Latvia. Further and wider studies are necessary to determine changes in the sensitivity and specificity of PHQ-9. It would be useful to conduct studies including all regions of Latvia. This study included both cities/towns and regions, and also the validity of PHQ-9 was determined on the basis of the diagnostic interview with M.I.N.I. where the depression is determined both according to ICD-10 and SDM-IV criteria therefore it could facilitate improvement of depression diagnostics at the level of primary care in Latvia.

CONCLUSIONS

1. The point prevalence of depression in the general Latvian population was 6.7%.
2. The odds of having depression in the last two weeks were higher in females (OR = 2.3), in urban dwellers (though not in the capital city, Riga) (OR = 2.7), in persons with poor subjective health status (OR = 4.7), and in persons with worsened health in last 12 months (OR = 2.6), having a dissatisfaction with life (OR = 18.0) and alcohol dependence (OR = 3.4).
3. The 12-month prevalence of depression in the general Latvian population (7.9%) is higher than in other European countries in average (6.9%).
4. Depression in the last 12 month for both genders was most prevalent in the age group 45 –54 years old (11.4%, 95% CI 9.1–14.1).
5. The odds of having depression in the last 12 months were higher in people in people who had used healthcare services more than six times in the past 12 months (OR = 2.0), among those who had three or more somatic conditions (OR = 2.3), among those who were occasional (OR = 3.0) and regular smokers (OR = 2.2), and among those who perceived their health status to be average (OR = 2.5) or below average (OR = 8.3).
6. The prevalence of self-reported somatic illnesses was more prevalent in the group with depression and minor depression compared to those without depression.
7. The odds of having minor depression were increased for those who had at least three somatic disorders (OR = 2.3), those who received disability pension (OR = 1.9), and those who perceived their health status to be below average (OR = 3.0).

8. In primary care 13.6% of patients had current depression, and 22.4% of patients had A cutoff score of 10 was established for the PHQ-9 (sensitivity 86.49%, specificity 89.36%), correctly experienced a lifetime depression episode.
9. At a cutoff score of 10 or above, the sensitivity of the PHQ-9 in the Latvian and Russian languages was 0.86 and the specificity was 0.89.

Practical implications

The insights obtained within the doctoral thesis show possible ways of improving depression diagnostics at the level of primary care in Latvia.

Taking into consideration the recommendations of WHO, a diagnostics of mild/average depression and its treatment under the supervision of a family doctor and appropriate facilitating mechanisms should be introduced.

For the first time in Latvia's history reliable data on the prevalence of depression during the last 2 weeks and 12 months in the Latvian population and also in the sample of primary care patients were obtained. Depression-related sociodemographic factors were determined in the general Latvian population and Latvian and Russian version of depression screening tool the PHQ-9 was validated.

The pilot study of the family doctor practices revealed that PHQ-9 scale for detecting depression can be used in a routine work. This scale is further used in a much wider study of the National Research Programme BIOMEIDICNE project. By embracing all regions of Latvia the PHO-9 scale was used in practices of already 24 family doctors and it was used for depression screening to 1,604 patients who visited their family doctor due to medical reasons. Therefore a necessity to establish the diagnostic parameters of PHQ-9 in a wider, representative cluster of patients visiting family doctor's practice in all regions

of Latvia aimed at more precise definition of total score of PHQ-9 as the diagnostic parameter of depression.

Within the framework of both studies on the prevalence of depression and related factors the population with a higher risk to get depression and which would benefit from depression screening was determined. Within the framework of the National Research Programme an algorithm of depression diagnostics and treatment applicable to family doctors was determined; it defined a target population of the depression screening, as well as included PHQ-9 scale, its interpretation and necessary tactic of the family doctor, including treatment were explained. After establishment of the algorithm of depression diagnostics and treatment at family doctors a specific training course was introduced, and 10 "Depression School" training seminaries took place in Latvia from October to December 2016; 210 doctors were educated about the prevalence of depression in Latvia, screening population, they were introduced to PHQ-9 scale, its use and interpretation as well as were trained in treating depression. It is necessary to organise educative events for family doctors on diagnostics and treatment of depression also in future.

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PUBLICATIONS

Scientific publications related to the topic of the doctoral theses

1. Rancans, E., Vrublevska, J., Snikere, S., Koroleva, I., Trapencieris, M., 2014. Point prevalence of depression and associated sociodemographic correlates in the general population of Latvia. *Journal of Affective Disorders.* 156, 104–110. (SNIP 1,362)
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