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Chronic respiratory diseases and risk factors in 12 regions of the Russian Federation

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Alexander G Chuchalin[1]
Nikolai Khaltaev[2]
Nikolay S Antonov[1]
Dmitry V Galkin[3]
Leonid G Manakov[4]
Paola Antonini[5]
Michael Murphy[5]
Alexander G Solodovnikov[6]
Jean Bousquet[7]
Marcelo HS Pereira[8]
Irina V Demko[9]

[1]Institute of Pulmonology, Federal Medical and Biological Agency, Moscow, Russia; [2]Global Alliance Against Chronic Respiratory Diseases (GARD), Genève, Switzerland; [3]GlaxoSmithKline, Moscow, Russia; [4]Far Eastern Scientific Center of Physiology and Pathology of Respiration RAS (Russian Academy of Sciences), Blagoveshchensk, Russia; [5]Worldwide Clinical Trials, King of Prussia, PA, USA; [6]Worldwide Clinical Trials, Ekaterinburg, Russia; [7]Institut National de la Santé et de la Recherche Médicale, Montpellier, France; [8]Research and Development Chief Medical Office, International Medical, GlaxoSmithKline, London, United Kingdom; [9]Krasnoyarsk State Medical University, Krasnoyarsk, Russia

Correspondence: Alexander G Chuchalin
Institute of Pulmonology, Federal Medical and Biological Agency,
11th Parkovaya, 32, 105077,
Moscow, Russia
Tel +7 495 465 5264
Fax +7 495 465 5264
Email chuchalin@inbox.ru

Background: Estimation suggests that at least 4 million people die, annually, as a result of chronic respiratory disease (CRD). The Global Alliance against Chronic Respiratory Diseases (GARD) was formed following a mandate from the World Health Assembly to address this serious and growing health problem.

Objectives: To investigate the prevalence of CRD in Russian symptomatic patients and to evaluate the frequency of major risk factors for CRD in Russia.

Methods: A cross-sectional, population-based epidemiological study using the GARD questionnaire on adults from 12 regions of the Russian Federation. Common respiratory symptoms and risk factors were recorded. Spirometry was performed in respondents with suspected CRD. Allergic rhinitis (AR) and chronic bronchitis (CB) were defined by the presence of related symptoms according to the Allergic Rhinitis and its Impact on Asthma and the Global Initiative for Obstructive Lung Disease guidelines; asthma was defined based on disease symptoms; chronic obstructive pulmonary disease (COPD) was defined as a post-bronchodilator forced expiratory volume per 1 second/forced vital capacity ratio <0.7 in symptomatic patients, following the Global Initiative for Obstructive Lung Disease guidelines.

Results: The number of questionnaires completed was 7,164 (mean age 43.4 years; 57.2% female). The prevalence of asthma symptoms was 25.7%, AR 18.2%, and CB 8.6%. Based on patient self-reported diagnosis, 6.9% had asthma, 6.5% AR, and 22.2% CB. The prevalence of COPD based on spirometry in patients with respiratory symptoms was estimated as 21.8%.

Conclusion: The prevalence of respiratory diseases and risk factors was high in Russia when compared to available data. For bronchial asthma and AR, the prevalence for related symptoms was higher than self-reported previous diagnosis.

Keywords: chronic respiratory diseases, GARD, Russia, prevalence

Introduction

Chronic respiratory diseases (CRDs) are recognized as being the major cause for premature death in adult populations worldwide. Preventable and treatable CRDs include chronic obstructive pulmonary disease (COPD), asthma, and respiratory allergies.[1]

In general, the prevalence of CRD is increasing everywhere and in particular amongst children and the elderly.[1] The burden of CRD has major adverse effects on the quality of life and disability of affected individuals. It has been predicted that the global burden of CRD will increase considerably in the future, even though many preventable CRDs can be controlled with adequate management in both developed[2] and developing countries,[3,4] as well as among deprived populations.[5,6] However, CRDs remain under-diagnosed and under-treated.[7]

To address this global health problem, the Global Alliance against Chronic Respiratory Diseases (GARD) was formed following a mandate from the World Health Assembly.[8–12] GARD is a voluntary alliance of organizations, institutions, and agencies working towards a common vision to improve global lung health according to local needs. GARD aims to develop a standard way of obtaining relevant data on CRD and risk factors, encourage countries to implement CRD prevention policies and to make recommendations of simple and affordable strategies for CRD management.[7]

The rationale of this study was to investigate the prevalence of COPD in patients with respiratory symptoms, as well as the prevalence of bronchial asthma (BA), allergic rhinitis (AR), and chronic bronchitis (CB) in the overall Russian population. The frequency of major risk factors for CRD was also evaluated in the same study population.

Methods

This was a cross-sectional population-based epidemiological study conducted in 2010–2011 across 12 regions (Figure S1) of the Russian Federation.

The aim of the study was to recruit 250 adult (≥18 years) respondents in each major Russian city. As a general procedure, the administrative districts of each region participating in the study were selected based on a stratified random cluster sampling procedure. This stratification ensured appropriate weighted representation of each district's target population in the study sample. The most current census data from the entire region and from each district were collected from official sources in order to proportionally stipulate the number of participants in each district. In a second stage, streets from each previous selected district were also selected by applying a two-step stratified random cluster sampling procedure with a standard random number generator (Microsoft Excel 2010; Microsoft Corporation, Redmond, WA, USA).[13] In the last stage, each selected street had also been randomly assigned specific households that would be approached to take part in the study. When blocks of apartments were selected, only several apartments were chosen from the block, and then the interviewers' team moved to the next block randomly. To ensure inclusion of respondents who could not be available, rounds were conducted during non-working time.

GARD study received favorable opinion from the National Ethics Committee, Russian Ministry of Health. Prior to initiating a face-to-face interview by a team that consisted of either a nurse or a physician, subjects gave written consent for the use of the anonymized data reported in the questionnaire (Figure S1) and for pulmonary function testing – applicable to respondents with suspected CRD based on self-reported symptoms. Upon availability of hospital records, patient-reported diagnoses were checked.

The presence of BA symptoms was considered if patients experienced an attack of wheezing, or wheezing/whistling that resulted in breathlessness. AR symptoms were adapted from the Allergic Rhinitis and its Impact on Asthma criteria, according to which the presence of running nose with sneezing or nasal obstruction indicates rhinitis and the presence of running nose alone might also indicate rhinitis.[14] CB was defined as the presence of cough and sputum production for at least 3 months in 2 years.[15]

COPD was defined following the Global Initiative for Obstructive Lung Disease definition of post-bronchodilator $FEV_1/FVC < 0.7$. The identification of symptomatic patients included clinical diagnosis of dyspnea, chronic cough or sputum production,[15] as well as those who were active smokers for more than 1 year, or those exposed to biomass or occupational hazards.

These selection criteria were checked by a doctor/pulmonologist using the GARD questionnaire which was developed in the respondent's native language. As the questionnaire was self-completed by respondents and did not cover all of the information necessary to check the above criteria, the doctor/pulmonologist briefly interviewed the respondents regarding their medical history to establish the pulmonary origin of dyspnea and collect details on allergies and current health condition. In addition, all subjects who had an acute respiratory viral infection at the time of the interview were excluded to ensure reliable pulmonary function tests. Spirometry was performed at the investigational center and in accordance with international standards, including bronchodilator challenge.[16] For post-bronchodilator measurements, investigators were recommended to perform spirometry 15 minutes after two–four puffs of salbutamol (200–400 μg) via metered-dose inhaler with spacer.

Statistical analysis

The primary study endpoint was to establish prevalence of COPD, BA, and AR in accordance with the current diagnostics standards in the representative population. Using a two-tailed binomial test with a significance level of 5%, the study was designed to have 80% power to establish prevalence for each disease under study with the significance level not less than 1% on each side. The calculation of the sample size was made using Stata 12 package (sampsi) (StataCorp LP, College Station, TX, USA). The target sample size of 7,164 respondents was determined using the following assumptions:

- Binomial distribution of the prevalence
- The maximum prevalence for each study indication according to literature was 20%

- Maximum acceptable one-sided error for prevalence determination was 5%, which was a 1% one-sided error for a maximum prevalence of 20%
- Two-sided type 1 error of 5%, which was the risk to incorrectly accept the false null hypothesis of non-equivalence of sample prevalence and estimated population prevalence
- An 80% probability to detect non-equivalence of the sample prevalence and the estimated population prevalence in case of true non-equivalence
- A 10% probability that patients did not show up for the functional testing at the investigational site after the completion of the questionnaire.

The comparison of the qualitative parameters in different groups (by age, sex, etc) was carried out using chi-square test, in the case of two groups, where possible, Fisher's exact test was used. Taking into consideration the cross-sectional nature of the study, odds ratio was calculated and 95% confidence intervals (CI) for the odds ratio to estimate the statistical significance of associations between risk factors and diseases. As spirometry was performed only in a sub-set population with symptoms and/or risk factors, this association was not calculated. All results were considered statistically significant at the level of $P<0.05$.

Results

A total of 7,164 questionnaires were completed. The mean age of respondents was 43.4 years, ranging from 18 to 88 years, and 57.2% were female. Of the respondents, 64.2% were employed at the time of the survey, and 3.4% were migrants from other countries.

Respondents' characteristics are shown in Table 1.

Prevalence of BA, AR, and CB related symptoms

Prevalence of disease related symptoms is shown in Table 2. When respondents were asked if they had ever experienced attacks of wheezing or whistling accompanied with the feeling of breathlessness, 25.7% (95% CI: 24.7–26.7) responded affirmatively. Out of those, 78.7% confirmed they had two or more attacks.

The presence of a running nose along with the presence of at least one of the symptoms of sneezing or nasal congestion was reported among 18.2% (95% CI: 17.3–19.2) of the study population. Of these, 52.9% also had ocular symptoms. The distribution of respondents with respiratory symptoms, by age group, is shown in Figure 1.

Cough and expectoration, occurring in the majority of the week for more than three consecutive months in a year, lasting more than 2 years, compatible with CB, was experienced by 8.6% of all respondents (95% CI: 7.9–9.3). Frequencies of respiratory symptoms are shown in Table 2.

Prevalence of previous diagnosis

Out of all respondents participating in the survey, 6.9% (95% CI: 6.3–7.5) reported a previous diagnosis of BA at

Table 1 Demographic characteristics of sample respondents

Subjects (n)	Male	Female	Total
	3,067 (42.8%) (95% CI: 41.7–44.0)	**4,093 (57.2%) (95% CI: 56.0–58.3)**	**7,164[a] (n, %)**
Age (years)[b]			
Below 20 years	105 (3.4%)	118 (2.9%)	223 (3.0%)
20–29 years	769 (25.1%)	842 (20.6%)	1,611 (22.5%)
30–39 years	576 (18.8%)	713 (17.4%)	1,289 (18.0%)
40–49 years	536 (17.5%)	764 (18.7%)	1,300 (18.2%)
50–59 years	591 (19.3%)	928 (22.7%)	1,519 (21.2%)
60–69 years	325 (10.6%)	484 (11.8%)	809 (11.3%)
70–79 years	139 (4.5%)	212 (5.2%)	351 (4.9%)
80 years and older	25 (0.8%)	31 (0.8%)	56 (0.8%)
Smoking status			
Have ever smoked	2,132 (69.5%) (95% CI: 67.9–71.1)	1,152 (28.1%) (95% CI: 26.8–29.6)	3,284 (45.9%) (95% CI: 44.7–47.0)
Current smokers	1,608 (52.4%) (95% CI: 50.6–54.2)	792 (19.4%) (95% CI: 18.1–20.6)	2,400 (33.5%) (95% CI: 32.4–34.6)
Exposure to workplace dust	956 (31.2%) (95% CI: 29.5–32.8)	630 (15.4%) (95% CI: 14.3–16.5)	1,586 (22.2%) (95% CI: 21.2–23.1)
Exposure to biomass	960 (31.3%) (95% CI: 29.7–33.0)	1,473 (36.0%) (95% CI: 34.5–37.5)	2,433 (34.0%) (95% CI: 32.9–35.1)
Migration from another country	121 (3.9%) (95% CI: 3.3–4.7)	125 (3.1%) (95% CI: 2.5–3.6)	246 (3.4%) (95% CI: 3.0–3.9)
Employment status			
Employed	2,039 (66.5%) (95% CI: 64.8–68.2)	2,562 (62.6%) (95% CI: 61.1–64.1)	4,601 (64.3%) (95% CI: 63.1–65.3)
Unemployed	1,027 (33.5%) (95% CI: 31.8–35.2)	1,530 (37.4%) (95% CI: 35.9–38.9)	2,557 (35.7%) (95% CI: 34.6–36.8)

Notes: [a]Four respondents did not indicate their sex; [b]six respondents did not indicate their age.
Abbreviation: CI, confidence interval.

Table 2 Prevalence of respiratory symptoms in the total sample

	Frequency of positive answer (n=7,164)
Asthma	
Attack of wheezing or whistling with breathlessness	25.7% (95% CI: 24.7–26.7)
Allergic rhinitis	
Running nose alone	19.2% (95% CI: 18.3–20.1)
Running nose with sneezing or nasal obstruction	18.2% (95% CI: 17.3–19.2)
Ocular symptoms in respondents with running nose with sneezing or nasal obstruction	52.9% (95% CI: 50.4–55.3)
Chronic bronchitis	
Cough and sputum production most of the days of the week ≥3 consecutive months ≥2 years	8.6% (95% CI: 7.9–9.3)

Abbreviation: CI, confidence interval.

some point in their life. Previous AR diagnosis was also reported by 6.5% of respondents (95% CI: 5.9–7.1). The highest percentage was found among those respondents who had a previous diagnosis of CB (22.2%; 95% CI: 21.2%–23.2%).

Of patients with proven COPD based on spirometry results, 51.4% (95% CI: 45.0–57.7) and 6.8% (95% CI: 4.0–10.6) had also self-reported previous CB and emphysema diagnosis, respectively. When analyzing the pool of respondents with symptoms compatible with CB, only 23.5% (95% CI: 21.5–25.7) reported to have a previous diagnosis. Out of those, 25.9% (95% CI: 20.6–31.8) had positive COPD diagnosis after spirometry. Distribution of respondents with COPD within spirometry population, by age group, is shown in Figure 2.

Prevalence of COPD based on spirometry

Spirometry data was recorded in 16% (251) of the total study sample in patients with suspected CRD. This information was based on both historical and newly performed spirometry data collected as part of the study.

A post-bronchodilator test was performed in 94.4% of these subjects. Subjects with a post-bronchodilator test had a significantly reduced vital capacity and FEV_1 when compared to the total population who had spirometry, and also had a significantly higher age ($P<0.001$).

The prevalence of COPD in patients with respiratory symptoms, or risk factors, was 21.8% (95% CI: 19.5%–24.5%). By extrapolation, the prevalence of symptomatic COPD in the total study population was 15.3%.

Risk factors

The prevalence of smoking was quite high, with 45.7% of the total population responding that they had a smoking history,

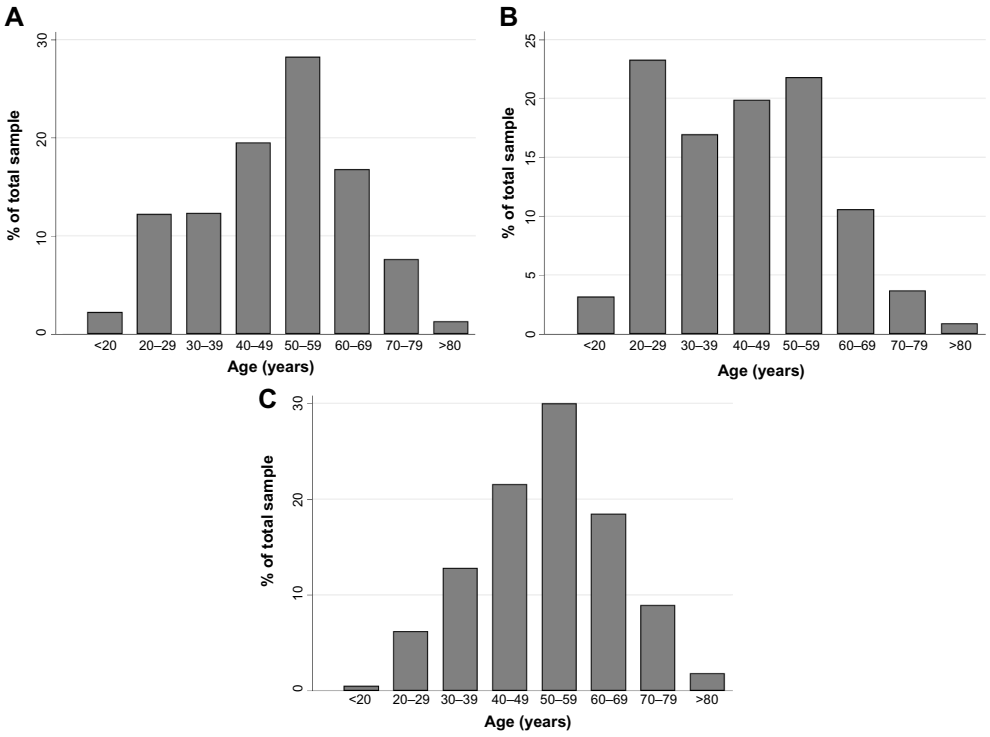

Figure 1 The distribution of respondents with respiratory symptoms for bronchial asthma, allergic rhinitis, and chronic bronchitis.
Notes: (**A**) Asthma. (**B**) Allergic rhinitis. (**C**) Chronic bronchitis.

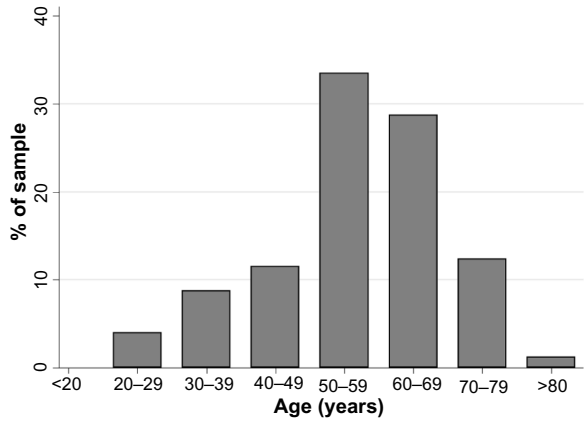

Figure 2 Distribution of respondents with COPD based on GOLD guidelines, by age group.
Abbreviations: COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Obstructive Lung Disease.

of which 73.1% were current smokers. Smoking history was measured if patients have consumed at least 200 packs in their life-time. Regarding workplace dust, 22.2% of the total population responded that they had been exposed to workplace dust for more than a year. For indoor use of an open fire for heating or cooking, 34.0% of the total population responded that they used one. The association between these selected risk factors and respiratory symptoms is shown in Table 3.

Discussion

The GARD study was the first cross-sectional population-based epidemiological study among a representative sample, using a standardized methodology and validated questionnaire, to evaluate the prevalence of respiratory diseases in several regions of the Russian Federation.

Partial use of data collected from previously completed GARD questionnaires from 2009–2010 was approved by the study steering committee. The GARD questionnaire has been used in several studies and has been shown to be an accurate and reliable diagnostic tool.[17,18]

Table 3 Association between risk factors and chronic respiratory diseases

	Symptom odds ratio (95% CI); *P*-value		
	Occupational hazard	**Smoking**	**Biomass exposure**
Bronchial asthma	1.979 (1.737–2.254) <0.0001	1.116 (0.992–1.255) 0.0633	1.431 (1.268–1.614) <0.0001
Chronic bronchitis	2.584 (2.168–3.080) <0.0001	2.617 (2.189–3.129) <0.0001	1.677 (1.415–1.988) <0.0001
Allergic rhinitis	1.327 (1.167–1.509) <0.0001	0.760 (0.671–0.860) <0.0001	0.979 (0.871–1.10) 0.7161

Abbreviation: CI, confidence interval.

The prevalence of respiratory symptoms in the population sampled was found to be high. The percentage of patients with asthma related symptoms was 25.7%, AR 18.2% and CB 8.6%.

Based on spirometry-confirmed diagnosis, 21.8% of respondents with respiratory symptoms had COPD, and, by extrapolations, 15.3% of the overall population suffered from the disease.

CRDs are recognized as a major public health problem with an increasing morbidity and mortality. With such a high burden on the health care system, emphasis on better diagnosis and management of these diseases must be achieved, and reliable epidemiological data on the prevalence and severity of diseases, such as COPD and its exacerbations, are crucial to guide health care policy.[19]

In the Russian Federation, it has been estimated from earlier epidemiological studies that the prevalence of CRD ranges from 17% to 21%. This includes the prevalence of asthma which ranges from 6%–8% for adults and up to 12% for children, and for COPD between 6%–7%, and other miscellaneous disease of 2%.[20]

COPD is the fourth cause of death worldwide.[21] An estimation from the World Health Organization suggests that COPD will be the third cause of death by 2030.[22] The association between COPD and CB may lead to a more severe COPD prognostic, which encompasses a poorer lung function, exacerbation, a worse quality of life and, consequently, a higher economic burden.[23] We used the Global Initiative for Obstructive Lung Disease strategy definition of COPD in symptomatic subjects, which represents a simplified case definition for epidemiological purposes, rather than a definitive clinical diagnosis; this may have resulted in patients with COPD not being diagnosed. The limitation of our study is that a large proportion of patients with COPD are asymptomatic; the study may have underestimated the prevalence of COPD as the spirometry was conducted only in symptomatic patients.[24]

The problem of COPD under-diagnosis is well known. Only about one-third of all cases with COPD are recognized by the health care professional,[25–27] and the proportion of undiagnosed cases decreases with increasing disease severity.[28] The prevalence of COPD has often been reported in the range of 6%–10% of the total adult population.[29] However, for the PLATINO study,[18] the crude prevalence of COPD was estimated to be up to 19.7% in population ≥40 years in

Montevideo, especially in elderly men. Other studies have also reported prevalence of up to 20%, dependent on the definition used.[24,30,31] In the BOLD (Burden of Obstructive Lung Disease) Study, prevalence of non-flow obstruction was observed in up to 80% with variation of COPD prevalence from 0.9% to 15.5% among cities, depending on the disease stage.[32]

As the main objective of the GARD study was to assess COPD prevalence in symptomatic patients, the estimation of crude prevalence of 15.3% should be analyzed carefully, even though our results are compatible with what has been seen in different populations.

The assumption of this prevalence was based on the fact that symptomatic patients who have not undergone spirometry (due to the exclusion criteria being matched or refusals/further contact failure after the first assessment by questionnaire) would also have the same frequency of cases observed in those patients with similar clinical characteristics who underwent spirometry. For the remaining asymptomatic population who did not meet clinical diagnosis criteria, our assumption was that the result of spirometry would be ≥ 0.7.

COPD itself is a predictor of mortality as it has been shown that this is significantly higher amongst subjects with COPD compared to subjects without COPD ($P<0.001$).[33] This study reinforces the need for the provision of adequate standard care management in order to improve the quality of life of patients and to decrease exacerbations and hospitalizations.[34–36] Our results suggest that prevalence of COPD in Russia is higher than previously suggested, which also results in a greater health issue.

The prevalence of CB in COPD patients varies substantially.[23,37] In the GARD study, more than half of the patients with COPD also had CB. In a recent European study,[38] CB prevalence varies from 0.7% to 9.7%, going up to 20.1%–56.9% among current smoker respondents, as smoking is one of the major risk factors for developing CB, which can also be seem from our study results. Our findings suggested that prevalence based on CB symptoms is 8.6%, which is consistent with the findings in European populations.

The prevalence of BA may vary considerably in different countries, from 4% to 18% of populations.[39] Even though BA is much more present in developed countries, its prevalence in less industrialized regions is growing.[40] Our findings suggest that in Russia, the prevalence of BA related-symptoms is higher than originally estimated.[20] Asthma is one of the most common chronic diseases in the world and it is estimated to be accountable for about one in every 250 deaths worldwide.[41] A study performed by Brogger et al suggested a 3-fold increase in the prevalence of self-reported diagnosis in 26 years, which could be due to a better standard of care and an easier access to physicians.[42]

As for other CRDs, AR is also experiencing an increase of epidemic proportion,[43] which leads to an intensification in the socioeconomic burden of the disease across the world. Prevalence of AR has been reported as high as 21% in Europe.[44] Asthma and rhinitis have been reported to have similarities related to their epidemiological and patho-physiological background.[45] If untreated, rhinitis may have considerable economic and quality of life implications.[46,47]

A high proportion of the Russian population is exposed to risk factors which could drive specific public health initiatives. In this study, the odds ratios between BA, CB, and AR and occupational hazard, smoking, and biomass exposure were estimated as an attempt to collect information on the major risk factors for those CRDs. The present study did not intend to assess risk factor related to COPD, nor the difference pattern between genders and cities. The prevalence of major risk factors including smoking, occupational hazards, and biomass exposure was high.

The major effects of smoking on CRDs have been extensively recorded over more than 40 years.[48] The associations found in this study were generally consistent with findings from other epidemiological studies where the GARD questionnaire has been used.[17,18] It should be noted, however, that this study design (cross-sectional) was not performed to evaluate causality between risk factors and respiratory disease already established in other studies. Among all three risk factors, the occurrence of an occupational hazard demonstrated a statistically significant association with all respiratory symptoms ($P<0.0001$). Biomass exposure occurrence had a positive association with CB and BA, which was also statistically significant ($P<0.0001$). The negative association between smoking and AR should be analyzed carefully. Some risk factors may be obscured due to changes in smoke habits due to the occurrence of respiratory symptoms. Also, for those respondents with a history of respiratory symptoms, there is a possibility of reluctance to start smoking. All of these factors may create a bias in the risk factors association analysis due to the cross-sectional design study type.

This study has substantial strengths. To the best of our knowledge, it is the first comprehensive prevalence study conducted in Russia for CRD. Using probabilistic sampling strategy, the study was able to capture the prevalence of

symptomatic CRD and the major risk factors in the Russian Federation. There are also potential limitations of the study, which included only symptomatic patients and did not represent the total number of COPD patients. Moreover not all self-reported symptomatic patients underwent spirometry due to the reasons previously explained.

Furthermore, as for any questionnaire based study, the study outcomes are based on the willingness of the respondents to report their diseases. Furthermore, by also having the prevalence of self-reported symptoms we are minimizing the subjectivity of self-report diagnosis due to the different diagnosis criteria that may be used by physicians. There is also a potential bias of non/incomplete-responders, as we did not adjust for subjects who did not complete all of the questions during the visit. In addition, no adjustments for age or sex have been made. Our sample includes 57% females which could have an impact on prevalence as there may be important sex differences on the perception of dyspnea, health status, and physical activity limitation.[49]

Conclusion

The prevalence of respiratory symptoms in the Russian Federation was found to be high. For asthma, the overall asthmatic symptoms were present in 25.7% of respondents. AR symptoms were presented in 18.2% and CB in 8.6%.

The estimated prevalence of 21.8% for COPD in symptomatic patients and 15.3% in the overall population may still be an underestimate as this was only estimated by spirometry from symptomatic patients. COPD can be present in asymptomatic patients which also may reflect a misrepresentation of prevalence present in this study. There was a considerable discrepancy between self-reported diagnosis and disease based-symptoms for AR and BA, which may suggest that respondents were under-diagnosed. The discrepancy between self-reported symptoms and previous diagnosis highlights the fact that CDR may not be recognized, or may have a late diagnosis which might lead to economic and health impacts. This data will be used to monitor the course and health care utilization of these diseases and to evaluate the impact of future educational programs on assessing and treating patients with CRDs.

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Author contributions

All listed authors meet the criteria for authorship set forth by the International Committee for Medical Journal Editors. Conception and design: AGC, IVD, DVG, NSA, NK and LGM. Analysis and interpretation: AGS. All authors were responsible for drafting and editing the manuscript. All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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Supplementary material

Figure S1 Burden of major respiratory diseases: chronic respiratory diseases core questionnaire.

These questions pertain mainly to your chest. Please answer yes or no if possible. If you are in doubt about whether your answer is yes or no, please answer no.

COUGH

1A. Do you usually have a cough? (Count a cough with first smoke or on first going out-of-doors. Exclude clearing of throat.) [If no, skip to Question 2A.] — 1. No_____ 2. Yes_____

1B. Do you usually cough as much as 4 to 6 times a day, 4 or more days out of the week? — 1. No_____ 2. Yes_____

IF YES TO ANY OF ABOVE (1A, 1B), ANSWER 1C and 1D

1C. Do you usually cough like this on most days for 3 consecutive months or more during the year? — 1. No_____ 2. Yes_____

1D. For how many years have you had this cough? _____years

PHLEGM

2A. Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out-of-doors. Exclude phlegm from the nose. Count swallowed phlegm.) [If no, skip to 3A.] — 1. No_____ 2. Yes_____

2B. Do you usually bring up phlegm like this as much as twice a day, 4 or more days out of the week? — 1. No_____ 2. Yes_____

IF YES TO ANY OF THE ABOVE (2A, 2B), ANSWER 2C AND 2D

2C. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? — 1. No_____ 2. Yes_____

2D. For how many years have you had trouble with phlegm? _____years

WHEEZING

3A. Have you ever had an attack of wheezing that has made you feel short of breath? — 1. No_____ 2. Yes_____

IF YES TO 3A, ANSWER 3B, 3C, AND 3D

3B. How old were you when you had your first such attack? _____Age in years

3C. Have you had 2 or more such episodes? — 1. No_____ 2. Yes_____

3D. Have you ever required medicine or treatment for the(se) attack(s)? — 1. No_____ 2. Yes_____

BREATHLESSNESS

4. If disabled from walking by any condition other than heart or lung disease, please describe and then proceed to 6A.
   Nature of condition(s): _____

5A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? 1. No_____ 2. Yes_____

IF YES TO 5A, ANSWER 5B, 5C, 5D, 5E

5B. Do you have to walk slower than people of your age on the level because of breathlessness?	1. No_____ 2. Yes_____
5C. Do you ever have to stop for breath when walking at your own pace on the level?	1. No_____ 2. Yes_____
5D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?	1. No_____ 2. Yes_____
5E. Are you too breathless to leave the house or breathless on dressing or undressing?	1. No_____ 2. Yes_____

We are going to ask you some questions on medical problems that you may have now or may have had in the past.

EMPHYSEMA

6A. Has a doctor ever told you that you had emphysema? 1. No_____ 2. Yes_____

ASTHMA

7A. Has a doctor ever told you that you have asthma? 1. No_____ 2. Yes_____

IF YES TO 7A, ANSWER 7B, 7C, 7D

7B. Do you still have it?	1. No_____ 2. Yes_____
7C. At what age did it start?	_____Age in years
7D. If you no longer have it, at what age did it stop?	_____Age in years

TB

8A. Has a doctor ever told you that you had TB? 1. No_____ 2. Yes_____

IF YES TO 8A, ANSWER 8B, 8C, 8D

8B. Do you still have it?	1. No_____ 2. Yes_____
8C. At what age did it start?	_____Age in years
8D. If you no longer have it, at what age did it stop?	_____Age in years

PNEUMONIA

9A. Has a doctor ever told you that you had pneumonia? 1. No_____ 2. Yes_____

IF YES TO 9A, ANSWER 9B, 9C, 9D

9B. Do you still have it?	1. No_____ 2. Yes_____
9C. At what age did it start?	_____Age in years
9D. If you no longer have it, at what age did it stop?	_____Age in years

ALLERGIC RHINITIS

10A. Has a doctor ever told you that you had allergic rhinitis? 1. No_____ 2. Yes_____

IF YES TO 10A, ANSWER 10B, 10C, 10D

10B. Do you still have it?	1. No_____ 2. Yes_____
10C. At what age did it start?	_____Age in years
10D. If you no longer have it, at what age did it stop?	_____Age in years

OTHER RESPIRATORY DISEASE(S)

11A. Has a doctor ever told you that you had another respiratory disease? 1. No_____ 2. Yes_____

*Please specify*_____

IF YES TO 11A, ANSWER 11B, 11C, 11D

11B. Do you still have it?	1. No_____ 2. Yes_____
11C. At what age did it start?	_____Age in years
11D. If you no longer have it, at what age did it stop?	_____Age in years

12. Are you taking medicine for active tuberculosis? 1. No_____ 2. Yes_____

13. Have you ever had chest surgery in which a part of your lung was removed? 1. No_____ 2. Yes_____

HEART TROUBLES AND ATTACKS

14A. Has a doctor ever told you that you had heart trouble? 1. No_____ 2. Yes_____

IF YES to 14A, answer 14B

14B. Have you had treatment for heart trouble in the past 10 years?	1. No_____ 2. Yes_____

15. Have you ever been told by a doctor that you have had a heart attack (myocardial infarction, coronary occlusion, coronary thrombosis)? 1. No_____ 2. Yes_____

OCCUPATION

16. Have you ever worked for a year or more in any dusty job? 1. No_____ 2. Yes_____

TOBACCO SMOKING

Cigarettes

17A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz of tobacco in a lifetime or less than 1 cigarette a day for 1 year). 1. No_____ 2. Yes_____

IF YES TO 17A, ANSWER 17B, 17C, 17D, 17E, 17F

17B. Do you now smoke cigarettes (as of 1 month ago)?	1. No_____ 2. Yes_____
17C. How old were you when you first started regular cigarette smoking?	_____Age in years

17D. If you have stopped smoking cigarettes completely, how old were you when you stopped?	or	_____Age stopped, in years _____still smoking
17E. How many cigarettes do you smoke per day now?		____cigarettes/day
17F. On the average of the entire time you smoked, how many cigarettes did you smoke per day?		____cigarettes/day

INDOOR HEATING AND COOKING

18A. Do you ***cook*** using an open fire? 1. No_____ 2. Yes_____

IF YES TO QUESTION 18A, ANSWER 18B, 18C

18B. What kind of stove/fuel do you use mostly for cooking?	
18B.1. coal or coke	1. No_____ 2. Yes_____
18B.2. wood	1. No_____ 2. Yes_____
18B.3. animal dung	1. No_____ 2. Yes_____
18B.4. other_____	1. No_____ 2. Yes_____
18C. On average how long have you spent cooking with your stove each day over the last four weeks?	MINUTES_____

MIGRATION

19. Have you migrated from another country? 1. No_____ 2. Yes_____

IF YES TO QUESTION 19, specify the country_____

SOCIAL

21. Your present job_____ 1. No_____ 2. Yes_____

Specify the country_____