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Review

The Frequency of Low Back Pain

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Abstract: The purpose of this review was to study domestic and foreign studies and update knowledge about the frequency of the low back pain (LBP) occurrence among adults. The available full-text English and Russian publications from the following databases were analyzed: PubMed, Springer, Wiley Online Library, Taylor & Francis Online, US National Library of Medicine National Institutes of Health, ScienceDirect and eLIBRARY.RU. The search for publications was carried out by the following keywords and their combinations: low back pain; back pain; discogenic pain; neuropathic pain; lumbodynia; sacralgia; intervertebral discs pathology. The search depth is 5 years (from 2016 to 2021). 2082 publications were analyzed, 132 of them corresponded to the purpose of this study, 21 of them were full-text publications. In total, 21 studies have been analyzed over the past 5 years. In the Russian Federation and abroad. The average LBP frequency ranged from 0.05% in Israel to 83% in Sweden. Such a large spread of indicators may be due to several objective reasons: differences in the design and methods of the study; heterogeneity of samples by age (adolescents, young, adults, middle-aged and elderly); only men taking part in the study; differences in social status (students, military personnel, athletes, working pensioners). In this regard, it impossible to systematize the results of the studies analyzed by us. Our thematic review shows that LBP in modern neurology remains one of the most common pathology, despite the improvement of health care system, preventive and predictive medicine.

Keywords: *low back pain; discogenic pain; intervertebral discs pathology.*

Introduction

According to the World Health Organization (WHO), low back pain (LBP) is defined as pain that is localized between the twelfth pair of ribs and the gluteal folds. In the International Classification of Diseases (ICD-10), LBP is classified under the headings: M54.1 - radiculopathy; M54.3 – sciatica; M54.4 – lumbago with sciatica; M54.5 – low back pain (lumbodynia). LBP is considered one of the most common human diseases [1] that prevails according to the indicator reflecting the number of years of life lost due to persistent health deterioration [2]. LBP is an important global health problem and the most common cause of temporary disability for adults. However, LBP affects people of all ages (from children to the elderly) and it is one of the most common reasons for seeking medical advice. LBP affects working capacity and general well-being, causes disability, and states bear large direct and indirect economic and social losses.

A disease burden study showed that LBP is among the top ten common diseases and injuries that account for the largest number of DALYs (disability-adjusted life year) in the world [1].

The global point prevalence of LBP restricting daily activities is 8-10%, which means that up to 540 million people in the world suffer from it at all times. In general, at any time, about 20% of the world's population may experience LBP and about 35-40% will experience LBP within 1 year. LBP is one of the leading causes of health loss worldwide. In clinical studies, remission in LBP lasting up to 1 year varies from 54 to 90%, but after an acute LBP episode, approximately 1/3 of patients experience a repeat episode and approximately 1/2 of them will seek medical help again. If a person has experienced ≥ 2 LBP episodes, then during the following year he or she is three times more prone to undergo a repeated LBP episode. The LBP cases are very common in the 3rd decade of life, and the prevalence increases until the age of 60-65 years, after that it decreases [3].

LBP persisting from 6 to 12 weeks is considered as subacute, and pain persisting for 12 weeks and more – as chronic. A repeated LBP episode is those cases when LBP occurs after 6 months or more. If an LBP episode repeats after a shorter period of time, then it is regarded as an exacerbation of chronic LBP. In general, medical practice, acute LBP is more common than subacute or chronic. [4]. However, there is a discrepancy between this classification of LBP and other classifications - this is due to the fact that subacute and chronic pain have different duration periods as well as one approved by the Russian Association for the Study of Pain in the clinical recommendations of 2021.

The purpose of this review was to study domestic and foreign studies and update knowledge about the frequency of LBP occurrence among adults.

Materials and methods

The available full-text English and Russian publications from the following databases were analyzed: PubMed, Springer, Wiley Online Library, Taylor & Francis Online, US National Library of Medicine National Institutes of Health, ScienceDirect and eLIBRARY.RU. The search for publications was carried out by the following keywords and their combinations: low back pain; back pain; discogenic pain; neuropathic pain; lumbodynia; sacralgia; intervertebral discs pathology. The search depth is 5 years (from 2016 to 2021). 2082 publications were analyzed, 132 of them corresponded to the purpose of this study, 21 of them were full-text publications. In addition, earlier studies that are of historical interest were analyzed.

Results

Russian Federation

During the analyzed period of time, we found 3 domestic studies that corresponded to the purpose of this review. The age of the patients ranged from 18 to 92 years. The average age of patients with LBP varied from 46.9 [7] up to 52 years old [6].

The study by Vyshlov I.A. et al. [5] conducted in Stavropol which included a sample of 1,897 patients aged 18 to 87 years, showed that the prevalence of LBP of the pathology was 30% of the total number of hospitalized patients and increased in the summer months. Pain reflex syndromes prevailed (74%) over compression-root syndromes (26%). The authors found that LBP incidence against the background of vertebrogenic pathology reached 30% of the total number of patients hospitalized in the neurological department. At the same time, all the observed patients experienced the exacerbation of chronic LBP. The average age was 53±34 years. The greatest number of LBP cases was among hospitalized patients in spring and summer. In particular, the LBP frequency in

July was 12%, and in January it decreased to 6%. Among hospitalized patients with LBP were mostly women (71%) and a significant proportion of pensioners (44%). Working patients accounted for 32%. LBP was caused by degenerative-dystrophic changes of the spine in 43% of cases; spinal disc herniation in 22%; intervertebral disc protrusion in 18%; combination of protrusion with spinal discs herniation in 17%. The frequency of occurrence of vertebrogenic LBP among the urban population was higher. The beginning or exacerbation of LBP in summer is probably associated with increasing physical activity. Polyradiculalgia predominates in the structure of reflex LBP. Among compression-root LBP syndromes, the damage of two or more lumbar spinal roots predominated

The study by Vertkin A.L. et al. [6], conducted in 9 federal regions of the Russian Federation (Moscow, Moscow Oblast, Voronezh, Astrakhan, Lipetsk, St. Petersburg, Sochi, Kirov, Kirov Oblast) included 950 patients aged 18 to 80 years (average age 52.6 years). It was shown that among patients with LBP there were more women (66.8%) compared to men (33.2%) but there were no statistically significant differences in age ($p>0.05$). The most frequent localization of back pain was LBP (57.6%-60.6%). According to the analysis of medical documentation, LBP was caused by dorsopathy 72.4% and spinal disc herniation (18.1%). In 5.9% of cases, the cause of LBP was osteoporosis and osteoporotic fractures of the lumbar vertebrae, and in 3.6% – other identified causes of LBP. The average age of the LBP beginning was 35.2 years (minimum – 23 years, maximum – 54 years). LBP average duration was 9.4±5.7 years. It is important that the medical records and medical histories of the patients observed by the authors lacked the necessary examinations for the LBP etiology.

In the study by Galushko E.A. et al. [7], conducted in 12 regions of the Russian Federation, in 10 federal subjects, both urban and rural residents were screened (Voronezh, Irkutsk, Kemerovo, Sverdlovsk, Tula, Ulyanovsk Oblasts, Krasnoyarsk Krai, the Republics of Ingushetia, Tatarstan and Sakha-Yakutia), and in two cities (Ivanovo and St. Petersburg) – only urban residents. The total sample was 4894 people, the average age was 46.9±17.3 years (age ranged from 18 to 90 years). As in the study by Vertkin A.L. et al. [6], 4894 people were observed by rheumatologists, (on average 20% of all patients with joint complaints) with rheumatoid diseases, 8% of patients noted LBP. In 10.2% of cases there were joint complaints not related to rheumatoid diseases, in 5.5% of cases no pathology was observed. The findings of this study are disappointing. According to the authors, in our country, the LBP verification at the outpatient health care level is not carried out in all cases, although it does not require significant economic costs.

European Countries

During the analyzed time period, we have found 8 studies of European countries specialists that correspond to the purpose of this review. The age of the patients ranges from 18 to 90 years. The average age of patients with LBP is from 19.9 to 44 years.

According to Serranheiraa F. et al. [8] research, conducted in Lisbon (Portugal), which included a sample of 735 people, it showed that most of the patients with LBP were women (51.4%), manual workers (52.3%). Among patients with LBP, 21% worked at night, 11.6% worked in shifts. Additionally, the authors analyzed the physical activity of patients associated with work: 38.7% - performed sedentary work; 34.2% - worked in an environment with low and moderate physical activity; 27.1% - had physically heavy work. About 60% of participants experienced one or two episodes of LBP for the preceding year, from 1 to 14 days - in 89.1% of cases. More than six LBP episodes per year were observed in the company, where most of the employees were engaged in heavy physical work. In this study, the authors found no differences between LBP symptoms and the age of workers, but there were statistically significant associations of LBP with physical exertion and

walks ($p<0.05$). This study revealed a statistically significant relationship between the intensity of work-related physical activity, a large number of LBP episodes compared to the previous 12-month period and walks associated with LBP.

According to a study by Nygaard P.P. et al. [9] conducted in Copenhagen (Denmark), including a sample of 11,738 elderly workers (≥50 years old) as part of the SeniorWorkingLife study (2018), the workers answered questions about physical work requirements, LBP intensity and work restrictions due to LBP. Using logistic regression analysis and potential errors control, the authors modeled the associations between physical work requirements and LBP intensity (interaction) with the limitations of work due to the LBP (result). It showed that a higher intensity of LBP, as well as higher physical work requirements, significantly increased the likelihood of work restrictions due to LBP and these two factors interacted with each other ($p <0.0001$). In the results, stratified by the intensity of LBP, higher physical work requirements gradually increased the likelihood of temporary disability due to LBP. Thus, older Danish workers who performed intensive physical work were more likely to suffer from LBP during everyday work tasks compared to workers with a similar intensity of LBP in "sedentary" professions.

In another Danish Research Grøn S. et al. [14] 2293 people were included. The average age of the participants was 44 years. There were no statistically significant differences by gender (59% were male and 41% female). Patients over the age of 18 who were consulted about LBP with or without nerve root pain of all duration of symptoms were recruited from chiropractic clinics.

The Brunnsviken Brief Quality of life scale (BBQ) was used during the first visit and for 3 and 12 months. Socio-demographic and symptomatic questions were answered at the first visit. The BBQ was applied at all three time points (visits), and linear regression was used to analyze the cross-connection between the initial characteristics of the patient and the BBQ. LBP characteristics and symptoms among the observed patients were associated with the baseline survey of back sensations ($p <0.05$), but most of these associations were weak. The strongest association was with severe disability (4.0 points [95% CI 3.3–4.6]) and a lower level of the quality-of-life scale). The patients' negative beliefs were associated with more severe LBP at baseline and with continued LBP at follow-up.

Vujcic I. and co-authors [10], conducted a study in Belgrade (Serbia), including a sample of 459 medical students, whose average age was 22.46 ± 0.95 years, and two-thirds of 66.0% were women. LBP lifetime incidence was estimated as the proportion of respondents (young Serbs) who had ever suffered from LBP at some point. The 12-month prevalence was related to LBP episodes in the past year. The point prevalence referred to LBP experienced at the time of filling out the questionnaire (up to date).

The authors classified LBP as chronic if it lasted for more than 12 weeks. According to this study, out of 459 participants, 75.8% reported on LBP at some point in their lives, 59.5% in the last 12 months, and 17.2% of them suffered from LBP at the time of their survey. Chronic LBP was observed in 12.4% of students. The lifetime and 12-month prevalence of LBP were significantly higher among young female Serbs than among male Serbs, while the prevalence was the same in both groups. The most frequently mentioned self-perceived subjective triggers with a strong/extremely strong influence on the point and 12-month prevalence of LBP in females and males were the following: bad posture (53.3% vs. 54.9%); low physical activity (53.2% vs. 42.9%); fatigue (46.8% vs. 36.3%). Mental stress during the exam period and sitting at the university as potential triggers for the current LBP was noted by about one third of the study participants (34.2%). Other triggers were: a bad (uncomfortable) mattress; house cleaning; intense sports activities; weather conditions. Thus, the LBP prevalence is high among Serbian medical students, LBP significantly affected their daily functioning and mood. Serbian female students had a significantly higher 12-month and lifetime prevalence of LBP compared to male students.

The study by Karel K. [11], who conducted an analysis of LBP prevalence in Germany, used data from the Disease Analyzer database (IQVIA), which contains prescriptions for medications, clinical diagnoses, as well as basic medical and demographic data obtained directly and anonymously from computer systems used in general medical practice and the practice of neurologies. This database contained the information about 2367,885 people in total, with at least one visit to one of the 1000 offices of general practitioners in Germany from January 2017 to December 2017. Among these patients, 46.7% were men, and 28.0% of them were over 65 years old. LBP was diagnosed in 88,660 patients (prevalence was 3.7%). LBP was diagnosed with a significantly higher frequency in men than in women (4.1% vs. 3.4%), but there was no significant difference in gender between people aged <65 years compared with Germans over the age of ≥ 65 years (3.7% vs. 3.8%). In 30,817 patients (1.3%) LBP was diagnosed for the first time, but no significant differences were observed between women and men (1.3% in both groups) or people aged <65 years versus ≥ 65 years (1.3% in both groups).

According to the research by Sundell C.G. et al. [12], conducted in Sweden, including a sample of 2,550 students aged 16-20 years, a standardized Scandinavian questionnaire was used to analyze musculoskeletal symptoms. The authors studied the differences in LBP prevalence depending on the gender of young Swedes, the average prevalence and disability due to LBP. The authors also analyzed the differences in LBP frequency among young Swedish athletes, depending on the hours spent on sports or physical activity. The interesting fact is that women sometimes had LBP more often than man. Those who were engaged in sports reported on LBP to a much greater extent than those who were physically inactive in their free time. Gender and sports in free time were important risk factors for LBP development. During the analyzed period, the women had a higher risk of LBP development for more than 30 days or daily if they experienced LBP episodes earlier. This study proves that LBP is common among young Swedes, especially among women. High athletic activity was a significant risk factor for LBP development, duration of an LBP episode and disability due to LBP.

According to the research by Mattila V.M. et al. [13], conducted in Finland, including a sample of 1,155 people who passed a medical examination for military service and underwent physical training in the period from 1997 to 2007, 778 people completed retraining and physical training courses. The authors studied the relationship between LBP during military service and LBP later in life in addition to the relationship between LBP and physical training. A total of 219 out of 778 Finns (28%) visited a doctor due to some musculoskeletal symptoms during their military service:9.5% - visited a doctor due to unspecified LBP during their service; 5.3%- were temporarily absent during their service due to LBP. In a follow-up, 15.7% of the participants reported on LBP during the last month. LBP during military service was associated with self-assessment in follow-up ($p = 0.004$). Of those participants who were absent during their military service due to LBP, 31.7% reported on LBP during the last month. In the analysis of risk factors, no initial variables of health and physical performance behavior were associated with the initial LBP at follow-up. The main conclusion of this study was that the indefinite LBP among Finnish men during military service predicts LBP development in their later life.

According to the study by Kędra A. et al. [15], in which 1,321 students of the 1st, 2nd and 3rd undergraduate courses in physical education, physiotherapy, pedagogy and tourism, and recreation at 4 universities in Poland took part, an original questionnaire was used. The main part of the questionnaire concerned the following questions: LBP experience during the year (12 months) before the study; the frequency and intensity of LBP; LBP treatment methods (painkillers, seeking medical help, X-ray examination); the circumstances under which LBP or muscle tension occurred; situations in which LBP made it difficult or impossible to perform physical activity or daily activities; ways to cope with

LBP and subjective knowledge of the principles of ergonomics. A 10-point pain scale was used to assess LBP intensity. The questionnaire reliability was assessed before the beginning of the study by introducing it twice with a monthly interval to a group of 20 people. There were no statistically significant differences between the results obtained in the two tests ($p<0.05$). The LBP episodes frequency analysis showed that respondents who experienced LBP rarely (1-2 episodes per year) made up the largest group. The most common was the LBP of mild severity which was reported on by 43.4% of respondents. More than 20% of the respondents struggled from severe pain. A significant percentage of respondents (more than 20%) restricted their physical activity due to LBP, and 4.4% had to give up physical activity at all. Almost 60% of the respondents reported that LBP made it difficult for them to sit for long periods of time, while for almost 50%it was difficult to stand. This study conducted in Eastern Poland showed that LBP is common among young Poles, hinders or restricts their daily activities, including sitting, standing and physical activity.

Middle Eastern Countries

During the analyzed time period, we found 2 studies performed in the Middle East countries that corresponded to the purpose of this review. The age of the patients ranged from 18 to 63 years. The average age of patients with LBP is from 19 to 29 years.

According to the study by Mostafa A. et al. [16], conducted in Saudi Arabia, based on a cross-poll of 259 physiotherapists and occupational therapists in rehabilitation centers, using a modified Scandinavian questionnaire - a previously approved modified questionnaire for the Nordic countries was created during a survey limiting one-time participation in each unique IP address, and distributed to potential participants via social networks [3,4,11,12]. It was structured into sections: demographic characteristics (age, gender, height, weight and concomitant diseases such as diabetes mellitus, hypertension and rheumatoid arthritis); lifestyle information (lifestyle and behavior of rehabilitation specialists, for example, physical exercises such as walking and running for 15 minutes). Various LBP indicators, its consequences and risk factors information were collected. Logistic regression analysis was carried out to identify significant LBP predictors. Medical rehabilitation specialists determined LBP incidence as 73.7% for 1 year of follow-up, 52.5% for LBP that lasted ≥ 1 day, 22.4% for chronic LBP, 23.9% for LBP on sick leaves, and 18.5% of LBP cases with medical treatment. Difficult/impossible types of daily life were reported on in a standing position (45.5%), employment (44.0%), climbing stairs (33.9%), walking (33.0%), sitting (29.3%), sleeping and traveling (29.8%), waking up (23.0%), social life (26.2%), self-service (15.7%). 32.5% of participants had to quit their job because of LBP, the average of 1.38 ±2.96 non-working days during the past year. Half of the patients (50.3%) were treated with physiotherapy, 25.1% received medical care, and 39.3% requested rest days and/or sick leave. Physical stress and <10 years of physical labor experience were significant LBP predictors among Saudi Arabia adult population. The LBP prevalence was high and had a great impact on the daily activities of the Arabs. Physiotherapy was the most popular method for LBP treatment. The authors noted that educational programs are necessary for teaching the correct use of body mechanics, as well as programs for planning sports events to reduce LBP development risk and organizing rest periods in groups at LBP development risk.

According to a study by Shlomo M. et al. [17], conducted in Israel, the patient records of recruits aged 18-21 years during a 30-month period after their entry into the Israel Defense Forces were examined. The duty status of military personnel in combat units, maintenance units and administrative units was assessed in accordance with their LBP incidence. The end point of the study was determined as significant results of a clinical examination with a neurological deficit that correlates with X-ray data on CT scan or MRI showing spinal discs hernitation, spinal stenosis or spinal roots compression. Female

military personnel were not included in this study because they did not serve in combat units and not many of them served in maintenance units. The respondents were divided into the following categories according to the criteria recorded in the medical profiles book of the Israel Defense Forces: 1 - all subjects who have no evidence of past and/or present LBP; 2 - mild scoliosis or kyphosis, no LBP in patient records ; 3 - LBP in patient records, lack of clinical data, normal results of radiological examination; 4 - LBP is in anamnesis, lack of clinical data, X-ray with slight changes; 5 - LBP is in anamnesis, clinical data with neurological deficiency, CT scan or MRI showing spinal discs hernitations or spinal stenosis or spinal roots compression; 6 – severe LBP with neurological deficiency or severe functional limitation, but with a good prognosis for improvement; 7 - severe LBP with significant neurological deficiency and severe functional limitations. Subjects of categories 6-7 were not called up for military service. The LBP incidence (among 159,295 recruits) was 0.05%. The relative risk (RR) of LBP development was significantly higher among the subjects who were assigned to administrative units (AC) compared to combat units and maintenance unit in all LBP categories. The RR for LBP recurrent episodes in soldiers with LBP in patient record (categories 3 and 4) was 4.1 and 10.7 compared to category 1, respectively. The lower-than-expected overall LBP incidence (0.05%) reflects the fact that severe LBP cases are not common in this age group of the Israeli population. This conclusion is a truer reflection of the LBP incidence compared to other studies, since the endpoint is based on accurate clinical definitions in medical documents, and not on questionnaires, as in most other studies. The RR for LBP development was significantly higher among the subjects who were assigned to AU compared to combat units and maintenance units in all LBP categories. A burdened childhood LBP anamnesis was regarded as a significant risk factor for LBP exacerbations in adulthood. LBP in patient records has been designated as a risk factor for recurrent LBP episode in all types of professions and especially in sedentary ones.

Southeast Asian Nations

During the analyzed time period, we found 1 study performed in Southeast Asian countries that corresponded to the purpose of this review.

According to a study by Takaaki I. et al. [18], conducted in Japan, cross-sectional data obtained in 2013 in 30 Japanese municipalities was used. The survey was conducted between October 2013 and December 2013. Functionally independent elderly Japanese aged 65 years and older (n = 26,037) could participate in the study. Multilevel Poisson regression analysis with a reliable variance estimate was used to study the relationship between Socio-Economic Status (SES) and LBP. The LBP self-assessment in the past year was used as a dependent variable. The level of education, past profession, equivalent household income, wealth and subjective economic situation were SES and were separately analyzed as independent variables adjusted for covariates, including age and gender. The LBP prevalence among the Japanese population was 63.4%. In general, lower SES were more likely to suffer from LBP compared to the highest. Firstly, with regard to the level of education, the prevalence rate (PR) (95% reliable interval (RI)) for the lowest level, the SES was 1.07 (95% RI:1.02–1.12). Secondly, as for the past profession, the PR for blue–collar workers compared to professionals was 1.06 (95% CI:1.01-1.11). Thirdly, with regard to equalized household incomes, the RR for the levels below the average and lowest income levels were 1.08 (95% RI 1.02–1.13) and 1.16 (95% RI 1.10–1.23), respectively. Fourth, with regard to wealth, the RR RI for the lower middle and lowest levels of well-being were 1.11 (95% RI:1.04–1.19) and 1.18 (95% RI:1.11–1.27), respectively. Fifth, with regard to the subjective economic situation, the RR for the lower average and lowest financial conditions were 1.18 (95% RI:1.10–1.26) and 1.32 (95% RI:1.22–1.44), respectively. Significant socio-economic inequality was observed among elderly Japanese with LBP. The authors

proved, it was shown that a low level of SES is an independent risk factor for LBP and affects its development.

Australia and New Zealand

During the analyzed time period, we found 1 study performed in the countries of Australia and New Zealand, which corresponded to the purpose of this review.

According to a study by Anne S. and al. [23], conducted in Australia, potential risk factors for LBP development among people aged 17 were identified. The authors also evaluated a wide range of other environmental influences among people of 14 years. The survey data of 1088 participants, including (52.1% female) "without LBP", "LBP with minimal exposure" and "LBP with exposure" at the age of 17 years and a number of indicators from several areas, including spinal pain, physical, psychological, social status and lifestyle, were taken into account for further statistical analysis. Multivariate multinomial logistic regression was used to assess the relationship of potential mechanistic LBP factors at the age of 14 to 17 years. Female gender and LBP at the age of 14 were closely related to LBP at the age of 17. Potential mechanistic factors for LBP outcomes at the age of 17 included exposure to pain (neck/shoulder pain) and physical areas (membership in the standing posture subgroup, back muscle endurance, throwing distance), psychological status (somatic complaints, aggressive behavior), social status (socio-economic indicators) and lifestyle (physical exercises outside of school). The data obtained confirmed the multidimensional nature of adolescent LBP, and that highlights the importance of the problem it poses for epidemiological studies, clinical practice and initiatives for LBP prevention among the younger generation as a whole.

Countries of North and South America

During the analyzed time period, we found 4 studies performed in the countries of North and South America that corresponded to the purpose of this review. The age of the patients ranged from 14 to 65 years. The average age of patients with LBP is 45 years.

According to a study by Jordan E. et al. [19], conducted in Canada, a total of 406,918 patient records were analyzed in the emergency department of the Queen Elizabeth II-QEII, of which 12,914 (or 3.17%) patients had LBP, including "Back Pain" (12,706 records) and "Traumatic back/spine injury" (208 records). The majority of patients (60.8%) received a diagnostic code compatible with LBP, without potential damage to nerve roots (the overall prevalence was 1.93%). Patients who received a diagnostic code corresponding to LBP with a potential nerve roots disorders accounted for 6.7% of all back pain varieties (overall prevalence 0.22%). LBP, belonging to the group of secondary damage factors, accounted for 9.9% of all back pain varieties. The median age of patients was 45 years (PR: 30-60 years), women accounted for 53.4%, and men-46.6% of the total sample. The frequency of Canadians visiting the emergency department with complaints of LBP was 3.17%. The diagnosis of "nonspecific / mechanical LBP without potential damage to nerve roots" was 60.8% of all back pain varieties. The diagnosis of nonspecific/mechanical LBP with potential involvement of nerve roots was 6.7%, and LBP associated with secondary factors accounted for 9.9% of all back pain cases.

In the study by Thiago P. et al. [20], conducted in Brazil, 600 people were interviewed on the following issues: characteristics of participants (i.e. demographic, socioeconomic and labor aspects); level of physical activity (IPAQ); Musculoskeletal symptoms (Scandinavian Questionnaire). Descriptive, two-dimensional and regression Poisson analysis were carried out. The overall LBP incidence was 28.8%, including:39.0% for men; 60.9% for women. The measured associated risk factors for LBP in men were: age from 36 to 59 years (RR = 3.00 [95% RI:1.31–6.88]) and over 60 years (RR= 4.52 [95% RI:2.02–10.12]), smoking (RR = 2.47 [95% CR:1.20–5,11]), fewer years of formal education (0-4 years) (RR

= 6.37 [95% RI:2.15–18.62]) and hypertension (RR = 2.27 [95% RI:1.15–4.50]). For women, additional factors were professional activity, which included weight lifting (RR = 1.80 [95% RI:1.03–3.16]), standing posture, leaning forward (RR = 2.04 [95% RI:1.20–3.44]), sitting posture, leaning forward (RR= 2.17 [95% RI:1.24–3.82]) and computer work three or more days a week (RR = 4.00 [95% RI:1.44–11.11]). Widowed or divorced participants were more likely to report on LBP - men (RR= 3.06 [95% RI:1.40–6.66]) and women (RR = 2.11 [95% RI:1.15–3.88]). Elderly age, low education, hypertension and smoking were additional risk factors for LBP among men. Professional and ergonomic LBP risk factors were the most significant for women. Civil status was associated with LBP among Brazilian male and female.

Another study was conducted by Thiago P. et al. [21], which included 1628 public schools students in the city of Bauru (Pennsylvania, Brazil).The following data were collected: demographic and socio-economic aspects; electronic devices usage; habitual level of physical activity (Baecke); mental health (SDQ); LBP (Scandinavian Questionnaire). Descriptive methods of statistical analysis, as well as two-dimensional and multidimensional logistic regression were used. The overall LBP incidence was 46.7% [95% RI: 44.27-49.11]; among men 42.0% [95% RI: 36.63-43.41], among women: 58.0% [95% RI: 49.73-56.5]. The LBP risk factors were: female (RR = 1.70); daily watching of a TV for more than 3 hours (RR = 1.17); use of a portable computer (RR = 1.40); use of a cell phone in a supine position (RR = 1.23); use of a cell phone in a semi-reclined position (RR = 1.49); daily use of a cell phone for more than 3 hours (RR = 1.36), daily tablet usage (RR = 1.67); daily use of a tablet for more than 3 hours (RR = 1.46) and clinically important mental health problems (RR= 2.62). Thus, the authors have concluded a high LBP incidence among high school students and a striking connection with the female sex, electronic devices and mental health problems.

In the study by Ho-A-Tham N. et al. [22] conducted in Suriname, 2,902 respondents were interviewed during the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) Suriname. 2902 respondents were interviewed. A total of 541 out of 2902 people reported on current acute or chronic LBP. LBP was more common among urban (20.2%) residents than among rural (13.7%), especially among women and the elderly (over 55 years old). In rural areas (median according to the questionnaire of sensations in the back is 18.00 [P25:P75=14.00:22.00] points) there were significantly more negative beliefs than the urban population (median according to the questionnaire of back sensations is 25.00 [P25:P75=19.00:31.00 points], $p<0.001$. Maroons showed more negative beliefs than Creoles ($p = 0.040$), Hindustanis ($p<0.001$), Javanese ($p<0.001$) and representatives of mixed ethnicity ($p<0.001$) groups. At least 75% of the population of Suriname with LBP sought help, especially from Western doctors. Seeking treatment and a higher risk of developing persistent disabling LBP were significantly associated with the severity of the condition ($p<0.001$). The factors influencing seeking for treatment were age ≥45 years ($p<0.001$), indigenous ethnicity ($p<0.05$) and functional disability ($p<0.001$). LBP is a common health problem in the Surinamese urban population, especially among the elderly and women. The majority of people suffering from LBP visited Western practitioners and had more negative beliefs compared to other ethnic communities in this country.

The results of the review are presented in Table 1.

Table 1. The frequency of low back pain (LBP) in Russia and abroad

Region, city	**The study characteristics (duration)**	**The sample characteristics**	**LBP frequency occurrence**	**Author, year**
		Russian Federation		
Stavropol	Epidemiological Longitudinal Prospective (2014)	1897 people: W – 71%, M – 29%. Age: 18 – 92 years. Mean age: n/a.	80 %	Vyshlova I.A. et al., 2016
9 federal subjects of the Russian Federation: Moscow, Moscow Oblast, Voronezh, Astrakhan, Lipetsk, St. Petersburg, Sochi, Kirov, Kirov Oblast	Epidemiological Cross-sectional Prospective (2015)	950 people: M – 33.2 %, W – 66.8%. Age: 18 – 80 years. Mean age: 52 years.	60,6 %	Vertkin A.L. et al., 2016
12 federal subjects of the Russian Federation: Voronezh, Irkutsk, Kemerovo, Sverdlovsk, Tula, Ulyanovsk Oblasts, Krasnoyarsk Krai, Republic of Ingushetia, Republic of Tatarstan, Republic of Sakha, Ivanovo and St. Petersburg	Epidemiological Cross-sectional Prospective (2011)	4894 people: W – 58 %, M – 42%. Age 18 - 90 years. Mean age: 46.9 years.	8 %	Galushko E.A. et al., 2018
		Europe		
Portugal, Spain	Epidemiological Longitudinal Prospective (2020)	735 people: W – 51.3 %, M – 48.7%. Age: n/a. Mean age: 43 years.	69 %	Serranheira F. et al., 2020

Denmark	Epidemiological Cross-sectional Prospective (2019)	11738 people: M – 53.4 %, W – 46.6%. Age: 18 - 90 years. Mean age: n/a.	52,5 %	Nygaard P.P.et al., 2020
Serbia	Epidemiological Cross-sectional Retrospective (2017)	459 people: M – 34 %, W – 66%. Age: n/a. Mean age: 22.5 years.	75,8 %	Vujcic I., 2018
Germany	Epidemiological Longitudinal Prospective (2018)	2367885 people: M – 46.7 %, W – 53.3%. Age: n/a. Mean age: n/a.	3,7 %	Kostev K., 2019
Sweden	Epidemiological Cross-sectional Retrospective (2019)	2550 people: M – 41.9%, W – 47.7%. Age: 16-20 years. Mean age: n/a	83 %	Sundell C.G. et al., 2019
Finland	Epidemiological Longitudinal Prospective (1997-2007)	778 people: M – 100%. Age: 18-90 years. Mean age: 19.9 years.	15,7 %	Mattila V.M. et al., 2017
Denmark	Epidemiological Longitudinal Prospective (2018)	2293 people: M – 59%, W – 41%. Age: 18-87 years. Mean age: 44 years.	83 %	Grøn S. et al., 2019
Poland	Epidemiological Cross-sectional Retrospective (2015)	1321 people: M – n/a, W –n/a. Age: ≥ 18 years. Mean age: n/a.	61,8 %	Kędra A. et al., 2016

Saudi Arabia	Epidemiological Longitudinal Prospective (July-August 2019)	259 people: M – 42 %, W – 58%. Age: 21-63 years. Mean age: 29 years.	73,7 %	Abolfotouh M. et al., 2021
Israel	Epidemiological Longitudinal Retrospective (1995 - 2004)	159295 people: M – 100%, W – 0%. Age: 18-21 years. Mean age: 19.06 years.	0,05 %	Lugo J.P. et al., 2016
		Southeast Asia		
Japan	Epidemiological Longitudinal Prospective (2013)	26037 people: M – 52%, W – 48%. Age: 65 - 85 years. Mean age: n/a.	59,1 %	Ikeda T. et al., 2019
		America		
Canada	Epidemiological Longitudinal Retrospective (2009 - 2015)	406918 people: M – 46.6%, W – 53.4%. Age: ≥ 16 years. Mean age: 45 years.	2,4 %	Hayden J.A. et al., 2019
Brazil	Epidemiological Cross-sectional Retrospective (2019)	600 people: M – 39.1%, W – 60.9%. Age: 36 – 59 years. Mean age: n/a	28,8%	Bento T.P.F. et al., 2020
Brazil	Epidemiological Longitudinal Retrospective (March – July 2017)	1628 people: M – 42%, W – 58%. Age: 14 – 18 years. Mean age: n/a.	46,7%	Bento T.P.F. et al., 2020
Suriname	Epidemiological Longitudinal Prospective (2016 – 2017)	2902 people: M – 31.4%, W – 68.6%. Age: 15-65 years. Mean age: n/a.	18,6 %	Ho-A-Tham N. et al., 2021
		Australia and New Zealand		
Western Australia	Epidemiological Longitudinal Prospective (1989-1992)	1088 people: W – 52.1%. M – 47.9%. Age: 14-17 years. Mean age: n/a.	16,8 %	Smith A. et al., 2017

Note: n/a – not available

Discussion

In total, 21 studies have been analyzed over the past 5 years. In the Russian Federation and abroad. The average LBP frequency ranged from 0.05% in Israel to 83% in Sweden. Such a large spread of indicators may be due to several objective reasons: differences in the design and methods of the study; heterogeneity of samples by age (adolescents, young, adults, middle-aged and elderly); only men taking part in the study; differences in social status (students, military personnel, athletes, working pensioners). In this regard, it impossible to systematize the results of the studies analyzed by us. However, what captures attention is that the age of patients affected the LBP incidence, since in studies involving participants of different age groups, the indicators were quite high. For example, among adolescents aged 14-17 years, the LBP incidence was 16.8%, and among the elderly 52%. It is also interesting that the gender of patients (as an unmodified LBP risk factor) has different meanings in different countries and ethnic groups. For example, LBP was more common in female patients in Russia, Serbia and Poland, and in Saudi Arabia, Denmark, Israel -in male patients. Although, in most countries of the world, the different incidence rates of LBP, depending on the gender of patients, did not reach statistical significance. Heavy physical labor, along with the work in a forced sitting or standing position, intense sports loads affected the frequency of LBP occurrence, among both urban and rural residents. Civil status also influenced the frequency of LBP occurrence. For example, single people, especially the elderly, were more likely to suffer from LBP.

Conclusion

Our thematic review shows that LBP in modern neurology remains one of the most common pathology, despite the improvement of health care system, preventive and predictive medicine.

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