

# Disability of the Adult Population of a Large Agro-Industrial Region Caused by Diseases of the Musculoskeletal System: Epidemiological, Medical, and Social Aspects

A Kolyado<sup>1,a\*</sup>, M Ivleva<sup>1,b</sup>, W Kolyado<sup>2,3,c</sup>, A Lazarenko<sup>1,d</sup>, and D Timofeeva<sup>1,e</sup>

<sup>1</sup> Main Bureau of Medical and Social Expertise on the Altai Region of the Ministry of Labour and Social Protection of the Russian Federation, 5 Lenin Ave., Barnaul 656043 Russia

<sup>2</sup> Altai State Medical University of the Ministry of Healthcare of the Russian Federation, 40 Lenin Ave., Barnaul 656038 Russia

<sup>3</sup> Research Institute of Complex Problems of Hygiene and Occupational Diseases, 23 Kutuzov str., Novokuznetsk 654041 Russia

<sup>a\*</sup>akgb22@mail.ru, <sup>b</sup>gbmse22@fbmse.ru, <sup>c</sup>ozizagmu@agmu.ru, <sup>d</sup>vichareva.a.s@gmail.com, <sup>e</sup>dashuta205@mail.ru

\*Corresponding author

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**Abstract:** Diseases of the musculoskeletal system and connective tissue in the Altai region, as well as in the Russian Federation as a whole, occupy the third-ranking place among the diseases causing the formation of primary adult disability for many years. The long-term average incidence of primary disability for this class of diseases in the region was slightly higher than federal indicators. In the structure of the contingent, about half were the people of working age. They were recognized as disabled due to diseases of the musculoskeletal system for the first time. The study of primary disability, taking into account its severity, revealed that among the people recognized as disabled for the first time, the disabled peoples of the third group significantly prevailed. According to the obtained data, disabled people with diseases of the musculoskeletal system experience a high need for measures of professional rehabilitation.

## 1. Introduction

In current conditions, disability and issues of social protection of citizens with disabilities are one of the priority problems of the state. Disability indicators are considered among the primary integral markers characterizing the level of socio-economic development of society, demographic well-being, the state of the environment (ecology), working and living conditions, the effectiveness of the healthcare system, and medical and social rehabilitation [1-3].

About 15% of the world's inhabitants (more than a billion people) have some form of disability. One of the leading causes of disability in Russia and around the world are diseases of the musculoskeletal system and connective tissue [4, 5]. The problem acquires special social significance not only because of the high prevalence of this pathology among the population but also in connection with the significant share in the contingent of sick and disabled people of working age [6].

In recent years, the level of registered primary disability of the adult population of Russia due to diseases of the musculoskeletal system and connective tissue tends to decrease. However, when studying the problem in a regional aspect, quite severe differences in the dynamics of indicators are determined [5].

Despite a fairly large number of scientific publications in this area, comprehensive, multidimensional socio-hygienic studies of adult disability due to diseases of the musculoskeletal system and connective tissue in a vast agricultural region have not yet been carried out. Consequently, this gap in the literature makes this work highly relevant.

## 2. Materials and Methods

The study aims to identify the main trends in the formation of primary disability of the adult population caused by diseases of the musculoskeletal system and connective tissue in a sizeable agro-industrial region. The second goal is to determine the need for disabled people in rehabilitation measures. We rely on the statistical data obtained according to the form of the Federal Statistical Observation No. 7 (social security) “Information on Medical and Social Examination of Persons aged 18 Years and Older” for the period from 2014 to 2018.

## 3. Results

The Altai region is a large agro-industrial region with a large number of rural areas remote from the regional center, low population density, and an extensive network of primary health care. The region has a low level of socio-economic development, a negative demographic situation, aging, and population decline. The incidence in the region due to diseases of the musculoskeletal system and connective tissue (MSSCT) is twice as high as similar Russian indicators.

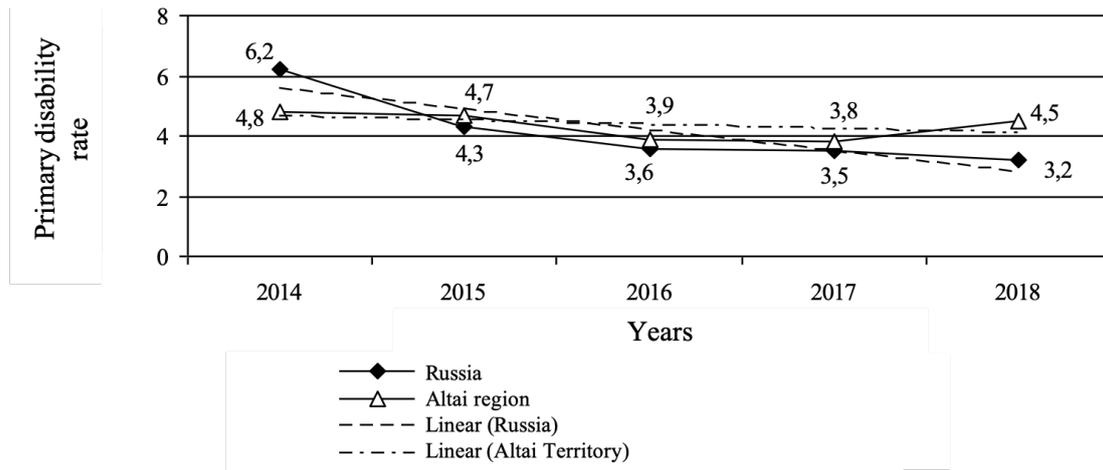
The total number of citizens aged 18 years and older who were first recognized as disabled (FRD) due to diseases of the musculoskeletal system and connective tissue (MSSCT) in the Altai region in 2014-2018 amounted to 4,100 people. During 2014-2017 the number of FRDs tended to decrease with the highest rate of decline in 2016 (13.9%). In 2018, in comparison with the previous year, the number of FRDs increased (the growth rate compared to 2017 was 17.3%). However, the indicator remained lower than in the last year.

Table 1 presents the dynamics of the frequency of cases of primary disability in the adult population of the Altai region due to diseases of the musculoskeletal system and connective tissue per 10,000 of the corresponding population in 2014-2018.

TABLE 1. THE DYNAMICS OF THE LEVEL OF PRIMARY DISABILITY OF CITIZENS AT THE AGE OF 18 AND OLDER AS A RESULT OF DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE IN THE ALTAI REGION IN 2014-2018

Years	Primary Disability Due to MSSCT diseases, <sup>0</sup> / <sub>000</sub>	Growth / Decrease Rate, %	Clarity indicator, %
2014	4.8	-	100.0
2015	4.7	-21	97.9
2016	3.9	-17.0	81.3
2017	3.8	-2.6	79.2
2018	4.5	18.4	93.8
Average annual growth / decrease rate, %	-	-0.8	-

As can be seen from the Table 1, the level of disability due to the analyzed class of diseases in 2014-2018 tended to decrease (with an average annual rate of decline of -0.8%). Nevertheless, practically throughout the entire studied period, this indicator exceeded average Russian values (Fig. 1).



**Fig. 1.** The dynamics of the level of primary disability of the adult population of the Altai region due to diseases of the musculoskeletal system and connective tissue in comparison with similar indicators in the Russian Federation, per 10,000 of the corresponding population.

According to the obtained data, despite the general tendency to reduce the frequency of disability due to diseases of the musculoskeletal system and connective tissue, a significant increase, almost to the initial value, was noted in 2017-2018 (+18,4%).

The study showed that the proportion of working-age citizens (18-55 years-old women and 60 years-old men) in the total number of FRDs due to diseases of the MSSCT ranged from 49.2-52.9%, the share of persons of retirement age (55+ years-old women and 60+ years-old men and older) was 47.1-50.8%□

The level of primary disability of citizens of retirement age, as well as the entire adult population, also tended to decrease (average annual rate of decline – 4.9%) in 2014-2018, while the frequency of disability of the working-age population increased slightly (Table 2).

**TABLE 2.** THE DYNAMICS OF THE LEVEL OF PRIMARY DISABILITY OF THE ADULT POPULATION OF THE ALTAI REGION DUE TO DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE, DEPENDING ON AGE, 2014-2018

Years	Total		Including			
	Primary disability rate, ‰	Growth / decrease rate, %	working-age population		retirement age population	
			Primary disability rate, ‰	Growth / decrease rate, %	Primary disability rate, ‰	Growth / decrease rate, %
2014	4.8	-	3.4	-	7.9	-
2015	4.7	-2.1	3.3	-2.9	7.5	-5.1
2016	3.9	-17.0	3.0	-9.1	5.7	-24.0
2017	3.8	-2.6	3.0	0.0	5.4	-5.3
2018	4.5	18.4	3.7	23.3	6.2	14.8
Average annual growth / decrease rate, %	-	-0.8	-	2.8	-	-4.9

Despite the above trends, the level of primary disability of citizens of retirement age due to diseases of the MSSCT was significantly higher than the same indicator for the working-age population. In both age groups, a significant increase in disability indicators was recorded in 2017-2018.

Table 3 presents the results of a study on the primary disability of the adult population of the Altai region due to diseases of the musculoskeletal system and connective tissue, depending on the place of residence.

TABLE 3. THE DYNAMICS OF THE LEVEL OF PRIMARY DISABILITY OF THE ADULT POPULATION OF THE ALTAI REGION DUE TO DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE, DEPENDING ON THE PLACE OF RESIDENCE, 2014-2018

Years	Total		Including			
	Primary disability rate, ‰	Growth / decrease rate, %	Urban population		Rural population	
			Primary disability rate, ‰	Growth / decrease rate, %	Primary disability rate, ‰	Growth / decrease rate, %
2014	4.8	-	4.6	-	5.1	-
2015	4.7	-2.1	4.9	6.5	4.4	-13.7
2016	3.9	-17.0	4.2	-14.3	3.5	-20.5
2017	3.8	-2.6	3.8	-9.5	3.8	8.6
2018	4.5	18.4	4.5	18.4	4.6	21.1
Average annual growth / decrease rate, %	-	-0.8	-	0.3	-	-1.1

As can be seen from the above data, the frequency of primary disability of the rural population during the entire studied period was lower or did not have significant differences compared with the same “urban” indicator. The exception is 2014. The level of disability in the countryside was higher than in the cities of the region.

The average long-term intensive indicators of primary disability due to diseases of the MSSCT of residents of urban and rural settlements in 2014-2018 did not differ significantly (4,4‰ and 4,3‰ respectively). The increase in the level of disability in 2017-2018 marked in both urban and rural areas.

Table 4 presents the results of the study on the primary disability of the adult population of the Altai region due to diseases of the musculoskeletal system and connective tissue in the gender aspect.

TABLE 4. THE DYNAMICS OF PRIMARY DISABILITY OF THE ADULT POPULATION OF THE ALTAI REGION DUE TO DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE DEPENDING ON THE SEX, 2014-2018

Years	Total (both sexes)			Including					
				Men			Women		
	Total	Primary disability rate, ‰	Growth / decrease rate, %	Total	Primary disability rate, ‰	Growth / decrease rate, %	Total	Primary disability rate, ‰	Growth / decrease rate, %
2014	923	4.8	-	308	3.6	-	615	5.8	-
2015	887	4.7	-2.1	331	3.9	8.3	556	5.3	-8.9
2016	732	3.9	-17.0	268	3.2	-18.3	464	4.5	-15.9
2017	717	3.8	-2.6	269	3.2	1.4	448	4.3	-2.7
2018	841	4.5	18.4	338	4.1	26.9	503	4.9	13.3
Average annual growth / decrease rate, %	-	-	-0.8	-	-	4.6	-	-	-3.5

It was revealed that throughout the study period, the structure of the primary disability of the adult population due to diseases of the musculoskeletal system and connective tissue was dominated by females (63.1%). The proportion of men in the total number of FRDs equaled to 36.9%.

The level of primary disability of women due to diseases of the musculoskeletal system and connective tissue, compared with the same indicator for the male population, was significantly higher. The increase in disability in 2017-2018, is observed in both gender groups with a higher growth rate of disability among the male population.

A study of primary disability due to diseases of the musculoskeletal system and connective tissue, taking into account its severity, revealed that the structure of the FRDs contingent was significantly dominated by

third-group invalids (80,6%). The total share of disabled people of the first and second groups was less than 20% (3.5% and 15.9%, respectively). In the structure of disability of persons of retirement age, the proportion of "heavy" groups (first and second) was slightly higher (23.4%). In contrast, among FRDs of working age, the proportion of disabled people of the second group was 14.9%, and cases of establishing the disabilities of the first group were single.

In accordance with the requirements of the current legislation, an individual rehabilitation or habilitation program (IRHP) is developed for all citizens recognized as disabled.

According to the data obtained, all citizens, recognized as disabled for the first time due to diseases of the musculoskeletal system and connective tissue, needed medical and social rehabilitation.

A large share in the structure of the studied contingent of working-age citizens with moderate functional impairments caused a high need for people with disabilities in professional rehabilitation measures, which amounted to 62.8 per 100 people (who were first recognized as disabled). Among people of working age, 99.3 per 100 FRDs needed professional rehabilitation measures.

The need for technical rehabilitation equipment (TRE) amounted to 77.4 per 100 FRDs. Most often, citizens who were first recognized as disabled due to diseases of the musculoskeletal system and connective tissue needed to provide TRE, aimed at compensating for restrictions on independent movement, in particular, additional support equipment (64.3 per 100 FRDs), prostheses and orthoses (12.9 per 100 FRDs), wheelchairs (5.8 per 100 FRDs) and orthopedic shoes (2.1 per 100 FRDs).

In order to compensate for the limited ability to self-service due to a pronounced violation of movement, the need for chairs with sanitary equipment was determined in 3.9% of cases of the total number of FRDs due to diseases of the musculoskeletal system and connective tissue. The need of FRDs for decubitus mattresses was 1.3 per 100 FRDs, for absorbent underwear – 0.8 per 100 FRDs.

#### **4. Discussion**

According to the obtained data, MSSCT (musculoskeletal system and connective tissue) diseases in the Altai region, as well as in the Russian Federation as a whole, despite a slight decrease in indicators, occupy the third-ranking place for many years among the diseases causing the formation of primary adult disability. The average long-term frequency of primary disability in this class of diseases in the region was  $4,3^{0/000}$  and was practically higher than federal indicators throughout the entire study period.

In the structure of the contingent of FRDs due to MSSCT diseases, 49.2-52.9% were people of working age, and in the dynamics over the study period, the share of this age group tended to increase. The analysis of intensive indicators of disability due to the studied pathology revealed that the highest frequency of primary disability was observed among the population of retirement age ( $5,4-7,9^{0/000}$ ). Over the past five years, a trend towards a decrease in these indicators has been noted. The disability level of citizens of working age during this period, on the contrary, has slightly increased ( $3,0-3,7^{0/000}$ ).

Significant differences in the prevalence and dynamics of primary disability due to MSSCT diseases among urban and rural populations were not registered.

According to the results of the analysis of disability in the gender aspect, it was found that the level of primary disability of women due to MSSCT diseases is 1.4 times higher compared to the same indicator for the male population.

A study of primary disability, taking into account its severity, revealed that the main share in the total number of FRDs due to MSSCT diseases was made up of people with disabilities of the third group (more than 80%).

The study revealed a high need for citizens, recognized as disabled for the first time due to diseases of the MSSCT, for professional rehabilitation (62.8 per 100 FRDs), which is due to the large share in the structure of the studied contingent of people of working age with moderate functional impairments. The need for technical rehabilitation means (mainly to compensate for restrictions on independent movement) amounted to 77.4 per 100 FRDs. All people with disabilities due to diseases of the MSSCT needed medical and social rehabilitation.

## 5. Conclusion

Diseases of the musculoskeletal system and connective tissue are significant medical and social problems due to their high prevalence and a substantial share in the structure of the causes of adult disability. Given the high frequency of disability of the population for this pathology, as well as the structural features of the contingent of people with disabilities due to diseases of the musculoskeletal system, one of the most important aspects is the development and implementation of the system comprehensive rehabilitation, primarily aimed at restoring the professional status and disability of the disabled.

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