COMPARATIVE ANALYSIS OF THE INCIDENCE OF DISEASES OF THE MUSCULOSKELETAL SYSTEM IN DIFFERENT REGIONS OF THE REPUBLIC OF KAZAKHSTAN IN THE PERIOD FROM 2011 TO 2020

Received: February 9, 2024
Accepted: March 26, 2024

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Abstract
This study explores the epidemiological landscape of musculoskeletal diseases in Kazakhstan over the past decade, emphasizing the impact on public health and the need for individualized medical approaches. Analyzing a 10-year dataset from 2011 to 2020, sourced from the Ministry of Health, the study reveals a significant increase in overall morbidity, with the highest incidence shifting from the East Kazakhstan region a decade ago to Astana city in 2020. Despite a temporary decline during the initial COVID-19 pandemic, morbidity rose consistently across all southern regions. Detailed regional analyses highlight the Zhambyl region as having the highest incidence in 2020, with distinct patterns observed among different age groups and genders. The findings underscore the importance of targeted strategies to mitigate morbidity and enhance musculoskeletal health, providing a valuable foundation for future public health initiatives.

Keywords: Musculoskeletal diseases, Incidence, Morbidity, Statistical compendium


INTRODUCTION
Musculoskeletal system lesions encompass a spectrum of conditions, including osteoarthritis, rheumatoid arthritis, osteoporosis, and low back pain [1,2]. The development of these diseases is influenced by various direct and indirect factors [3-6]. Musculoskeletal disorders pose a substantial public health challenge, ranking alongside cardiovascular disease, trauma, and mental health disorders and contributing significantly to mortality [7]. Furthermore, they are among the top three causes of disability globally [8]. The impact of musculoskeletal disorders extends beyond health, affecting the overall quality of life and impacting patients’ physical, psychological, and economic well-being [9]. These conditions often impede the fulfilment of professional duties among the able-bodied population, giving rise to social issues [10-14]. Notably, developing countries experience a notable increase in morbidity within this group, primarily attributed to rapid population ageing [15]. In Kazakhstan, musculoskeletal health issues have gained prominence in recent decades. A previous study revealed a 1.4-fold increase in morbidity over ten years (2011 to 2020) [16]. This study aims to investigate the incidence of musculoskeletal diseases across different regions of Kazakhstan, providing a comparative characterization.
to inform future medical support strategies with an emphasis on individualized approaches.

METHODS
To examine the epidemiological characteristics of musculoskeletal diseases in Kazakhstan, a 10-year dataset was analyzed using statistical information from the Ministry of Health of the Republic of Kazakhstan, sourced explicitly from the statistical compendiums focusing on the health of the population and the activities of healthcare organizations. The analysis encompassed a comprehensive review of 10 yearly compilations from 2011 to 2020. Inclusion criteria: information in the "musculoskeletal diseases" category. Exclusion criteria: all categories of diseases that do not belong to the musculoskeletal group. All data within these compilations were processed utilizing the statistical tool of the Republican State Enterprise "Republican Centre for e-Health." Morbidity information specific to various regions of the Republic of Kazakhstan was extracted from these compiled datasets.

RESULTS
Based on the annual statistical compendiums "On the health of the population of the Republic of Kazakhstan and the activities of healthcare organizations" provided by the Ministry of Health, an analysis spanning from 2011 to 2020 revealed a notable increase in the overall morbidity of the population registered in healthcare organizations with musculoskeletal diseases, rising from 682,585 to 987,077 individuals [16].

A decade ago, the East Kazakhstan region had the highest incidence of musculoskeletal diseases at 2,854.1 per 100,000 people. However, by 2020, the city of Astana claimed the top spot with a morbidity rate of 3,616.4 per 100,000 people. Conversely, the lowest incidence in 2011 was observed in the Atyrau region, and in 2020, it was recorded in the West Kazakhstan region, with rates of 546.7 and 687.6 per 100,000 people, respectively.

During the initial two years of the COVID-19 pandemic (2019 to 2020), a nationwide and regional decline in incidence was observed in several areas, including Aktobe region, Almaty region, Atyrau region, West Kazakhstan region, Karaganda region, Kyzylorda region, Mangistau region, Pavlodar region, East Kazakhstan region, and the city of Astana. Table 1 provides detailed data on the incidence of the total population per 100,000 (all ages) with first-time diagnoses for the country and its regions.

In the southern region, by 2020, the highest incidence rate was documented in the Zhambyl region at 2831.8 per 100,000 people, followed by Almaty city with an incidence rate of 2736.1 per 100,000 people. Conversely, the Turkestan region reported the lowest incidence rate for the same year at 1089.6 per 100,000 population. Notably, the incidence of the disease showed an upward trend over the ten years in all southern regions and cities. Refer to Table 2 for detailed data on the southern region of Kazakhstan.

In 2020, among the regions and cities of the southern region, the highest morbidity rate in the age group over 18 years was observed in Zhambyl region (3816.9 per 100,000). Almaty city registered the highest morbidity rates in the age groups 15-17 years (3573.1 per 100,000) and 0-14 years (1545.4 per 100,000). Conversely, the lowest morbidity rates in the age groups over 18 years, 15-17 years, and 0-14 years were recorded in the Turkestan region at 1660 per 100,000, 624.8 per 100,000, and 302.7 per 100,000, respectively. Figure 1 presents the incidence among different age groups in the southern region of Kazakhstan for 2020.

The morbidity rate among the female population of the Republic of Kazakhstan increased from 1619.4 to 2336.9 per 100,000 population from 2011 to 2020. When examining all regions of the country, the highest incidence rate among women in 2020 was observed in Astana city, reaching 3211.7 per 100,000 population. Conversely, the lowest incidence rate among women in all regions of the country in 2020 was recorded in West Kazakhstan, amounting to 728.3 per 100,000 population.

In the country's southern region, by 2020, the highest incidence rate among women was documented in the Zhambyl region at 3220.3 per 100,000 people, while the lowest incidence rate was found in the Turkestan region, totalling 1229.9 per 100,000 people. Detailed information on morbidity among the female population of the southern region of Kazakhstan in 2020 is illustrated in Figure 2.

DISCUSSION
A comparative analysis reveals shifts in musculoskeletal disease landscape over the past decade. Ten years ago, the East Kazakhstan region had the highest incidence, with the Atyrau region recording the lowest. However, by 2020, Astana claimed the top spot, while the West Kazakhstan region was at the lower end of the morbidity spectrum. Within the southern region, Zhambyl reported the highest
incidence rate by 2020, with Almaty city ranking second and the lowest rate documented in the Turkestan region. A consistent trend has emerged as morbidity has increased across all southern regions and cities over the last ten years.

In 2020, the southern region displayed distinctive patterns in morbidity based on age groups. Zhambyl region reported the highest incidence rate in the older age group, while Almaty city led in the adolescent and child age groups. Turkestan province consistently recorded the lowest incidence rates across all age groups. Additionally, the comparative analysis spanning from 2011 to 2020 indicates a rise in the morbidity rate among Kazakh women. In 2020, Astana City reported the highest incidence rate among women, while the lowest was documented in West Kazakhstan. Within the southern region, the Zhambyl region registered the highest incidence rate among women, while the Turkestan region recorded the lowest. These findings highlight the evolving dynamics of musculoskeletal diseases across regions, age groups, and genders over the past decade.

Our current study is limited to the comparative characterisation of morbidity within one country. However, the comparative characterisation of morbidity between Kazakhstan and other countries is described in detail in our previous study [16].

CONCLUSION
In summary, the data presented in this article serve as a crucial foundation for formulating and executing measures to reduce morbidity and enhance musculoskeletal health in Kazakhstan and its diverse regions. These findings pave the way for the development of targeted prevention and treatment strategies, with the ultimate goal of enhancing public health and elevating the quality of life for citizens.

AUTHOR CONTRIBUTIONS
All co-authors have contributed substantially to the concept, case description, searches of relevant articles, and revisions. They approved the final version of the manuscript and take full responsibility for all aspects of the work.

CONFLICTS OF INTEREST
None

FUNDING
None

References


Table 1. Incidence of the Total Population in the Republic of Kazakhstan per 100,000 (All Ages) with First-Time Diagnoses by Regions.

<table>
<thead>
<tr>
<th>Diseases of the musculoskeletal system</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
<td>2011</td>
</tr>
<tr>
<td>Republic of Kazakhstan</td>
<td>1616.0</td>
</tr>
<tr>
<td>Akmola region</td>
<td>2059.1</td>
</tr>
<tr>
<td>Aktobe region</td>
<td>1392.9</td>
</tr>
<tr>
<td>Almaty region</td>
<td>1135.9</td>
</tr>
<tr>
<td>Atyrau region</td>
<td>546.7</td>
</tr>
<tr>
<td>West Kazakhstan region</td>
<td>890.6</td>
</tr>
<tr>
<td>Zhambyl region</td>
<td>1537.1</td>
</tr>
<tr>
<td>Karaganda region</td>
<td>1791.9</td>
</tr>
<tr>
<td>Kostanay region</td>
<td>1797.2</td>
</tr>
<tr>
<td>Kyzylorda region</td>
<td>1124.0</td>
</tr>
<tr>
<td>Mangistau region</td>
<td>1771.6</td>
</tr>
<tr>
<td>Pavlodar region</td>
<td>2323.2</td>
</tr>
<tr>
<td>North Kazakhstan region</td>
<td>2179.4</td>
</tr>
<tr>
<td>Turkestan region</td>
<td>-</td>
</tr>
<tr>
<td>East Kazakhstan region</td>
<td>2854.1</td>
</tr>
<tr>
<td>Astana (Nur-Sultan)</td>
<td>2258.8</td>
</tr>
<tr>
<td>Almaty</td>
<td>2189.0</td>
</tr>
<tr>
<td>Shymkent</td>
<td>-</td>
</tr>
<tr>
<td>South Kazakhstan region (up to 2016 inclusive)</td>
<td>788.8</td>
</tr>
</tbody>
</table>

Note: The designation "South Kazakhstan region," encompassing Shymkent and Turkestan, was applicable until 2016 inclusive. Subsequently, from 2017 onward, statistics are reported individually for the Turkestan region and Shymkent city.
Table 2. Data on the southern region of the Republic of Kazakhstan

<table>
<thead>
<tr>
<th>Region</th>
<th>2011</th>
<th>2016</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almaty region</td>
<td>1135.9</td>
<td>2003.6</td>
<td>2076.1</td>
<td>2075.9</td>
<td>1511.8</td>
</tr>
<tr>
<td>Zhambyl region</td>
<td>1537.1</td>
<td>2073.0</td>
<td>2364.1</td>
<td>2524.9</td>
<td>2831.8</td>
</tr>
<tr>
<td>Kyrgyzorda region</td>
<td>1124.0</td>
<td>1542.3</td>
<td>2215.3</td>
<td>2178.3</td>
<td>1971.7</td>
</tr>
<tr>
<td>Turkestan region</td>
<td>-</td>
<td>-</td>
<td>809.1</td>
<td>793.7</td>
<td>1089.6</td>
</tr>
<tr>
<td>Almaty</td>
<td>2189.0</td>
<td>2478.5</td>
<td>2793.7</td>
<td>2563.3</td>
<td>2736.1</td>
</tr>
<tr>
<td>Shymkent</td>
<td>-</td>
<td>-</td>
<td>2642.0</td>
<td>2605.6</td>
<td>2630.4</td>
</tr>
<tr>
<td>South Kazakhstan region (up to 2016 inclusive)</td>
<td>788.8</td>
<td>1345.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: The designation “South Kazakhstan region,” encompassing Shymkent and Turkestan, was applicable until 2016 inclusive. Subsequently, from 2017 onward, statistics are reported individually for the Turkestan region and Shymkent city.

Figure 1. Morbidity across Various Age Groups in the Southern Region of Kazakhstan for 2020
(per 100,000 population)
2011-2020 ЖЫЛДАР АРАЛЫҒЫНА ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ӘРТУРЛІ ӨНІРЛЕРІНДЕ ТІРЕК-ҚИМЫЛ АППАРАТЫ АУРУЛАРЫНЫҢ СЫРҚАТТАНУШЫЛЫҒЫН САЛЫСТЫРМАЛЫ ТАЛДАУ

Түйиндеме
Бұл еңбек сөзі: оңжылыққа Қазақстандағы тіреқ-қимыл аппараты ауруларының әпдіемиологиялық қорінісін зерттейді, олардың қалықтық денсаулығына асері мен жеқелендірілген медициналық тәсілдерді қажеттілігін атап өтеді. Денсаулық сақтау министрлігінің алынған 2011 жылыдан 2020 жылға дейінгі 10 жылдық дерекеттері жинағына талдан, зерттеу жалпы сырқаттанушылықтың айтарлықтай есқенін көрсетеді, бұл ретте сырқаттанушылықтың ең жоғары дәнгейі он жыл бұрын Шыңғыз Қазақстан облысынан 2020 жылы Астана қаласына қоюылған. Бастақы COVID-19 пандемиясы кезінде ауру барлық өңүстік аймақтарда дайікеті түрде есебіз. Егей-тегішті мәнірлі талдау бойынша Жамбыл облысының 2020 жылы сырқаттанушылық дәнгейі ең жоғары есқенін қөрсетіп, ар түрлі жас топтары мен жыныстар арасында ар түрлі әндылықтар байқалады. Натыжелер болашақ қоғамдық денсаулық сақтау бастамалары үшін құнды нығздық қамтамасыз етіп, тіреқ-қимыл аппаратының аурушының аздайту әдет-практикасы және дәнсаулығын жақсарту бойынша мақсаттық стратегиялардың маңызылығын көрсетеді.

Түйінді сәлдер: Тіреқ-қимыл аппаратының аурулары, сырқаттанушылық, аурушынық, статистикалық жаңақ.


https://doi.org/10.47316/cajmhe.2024.5.1.04

СРАВНИТЕЛЬНЫЙ АНАЛИЗ ЗАБОЛЕВАЕМОСТИ ЗАБОЛЕВАНИЙ Опорно-двигательного аппарата В РАЗНЫХ РЕГИОНАХ РЕСПУБЛИКИ КАЗАХСТАН В ПЕРИОД С 2011 ПО 2020 ГГ.
Резюме
В этом исследовании изучается эпидемиологическая картина заболеваний опорно-двигательного аппарата в Казахстане за последние десятилетие, подчеркиваются их влияние на здоровье населения и необходимость индивидуализированных медицинских подходов. Анализируя 10-летний набор данных с 2011 по 2020 год, полученный от Министерства здравоохранения, исследование показывает значительный рост общей заболеваемости, при этом самый высокий уровень заболеваемости сместился из Восточно-Казахстанской области десять лет назад в город Астана в 2020 году. Во время первоначальной пандемии COVID-19 заболеваемость последовательно росла во всех южных регионах. Подробный региональный анализ показывает, что Жамбылская область имеет самый высокий уровень заболеваемости в 2020 году, причем различные закономерности наблюдаются среди разных возрастных групп и полов. Результаты подчеркивают важность целенаправленных стратегий по снижению заболеваемости и улучшению здоровья опорно-двигательного аппарата, обеспечивая ценную основу для будущих инициатив общественного здравоохранения.

Ключевые слова: Заболевания опорно-двигательного аппарата, заболеваемость, заболеваемость, статистический сборник.

https://doi.org/10.47316/cajmhe.2024.5.1.04