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RESEARCH ASPECTS OF BALNEOLOGICAL TREATMENT OF MUSCULOSKELETAL DISORDERS - REGIONAL DIFFERENCES AND CARE PATHWAYS IN HUNGARY

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Abstract: Musculoskeletal disorders (MSDs) pose a growing public health and economic challenge in Hungary, particularly in light of demographic aging and the rising prevalence of chronic diseases. These disorders significantly impair quality of life and workforce productivity. Hungary's rich balneotherapy resources offer unique opportunities for both prevention and treatment. However, access to spa treatments remains uneven across regions. The aim of this study is to explore the prevalence and regional distribution of musculoskeletal disorders and to assess the utilization of publicly subsidized spa treatments. The research seeks to map care pathways and highlight systemic inequalities in access to musculoskeletal care services. Data from three key sources—the Central Statistical Office (HCSO), the National Health Insurance Fund (NEAK), and spa service providers—were analyzed. The study uses longitudinal (1999–2023) and regional comparative methods to assess GP-reported MSD cases, rheumatology specialist visits, and subsidized balneological treatments. The number of MSD patients has tripled over two decades, reflecting both an aging population and increased disease awareness. GP and specialist records show growing demand, but spa utilization has declined in several regions, with stark territorial disparities. Budapest and the Northern Great Plain region dominate in service usage, likely due to historical infrastructure and service availability. The data indicate a systemic mismatch between need and access, especially in peripheral regions such as Szabolcs-Szatmár-Bereg County. While spas are essential to the treatment of MSDs, limited accessibility hinders equitable care. To reduce regional disparities, targeted health policy measures are needed. These include infrastructure development, expansion of publicly funded treatments, and prevention campaigns promoting physical activity. Improving equitable access to spa treatments may contribute to healthier aging and sustained labor market participation. Future research should investigate the effectiveness of spa treatments by patient group and explore ways to integrate balneotherapy more firmly into national prevention strategies.

Keywords: labour market activity, civilisation diseases, balneotherapy, health tourism, medical tourism

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INTRODUCTION

Since the 20th century, global fertility rates have been declining while life expectancy has increased, resulting in the rapid aging of populations worldwide (Zhang, 2025). In recent years, Europe's demographic situation has been described briefly as a "demographic winter[1]", we see an ageing and declining population in parallel. According to the European Commission (2023), approximately one-fifth of the population is currently aged 65 or older, and this proportion is expected to approach 30% by 2050. WHO (2024) highlights that nations face growing pressure to adapt their health and social care infrastructures to demographic shifts, particularly as aging is often accompanied by worsening health and a rising incidence of disability, which together strain the capacity to sustain quality of life and increase demands on healthcare systems (Stuck & Masud, 2022; Liotta, 2018; Xi, 2025). International data from OECD27 countries in 2021 indicate that Japan, Switzerland, and Korea had the highest average life expectancy at birth, exceeding 80 years. In contrast, countries such as the United States reported values ranging from 75 to 80 years, while the lowest life expectancy—below 75 years—was observed in Latvia, Lithuania, Hungary, and the Slovak Republic (OECD, 2023).

Changes in age structure have a significant impact on society (Bényi et al., 2021) including the labour market, as some sectors, such as health and education, have a significantly higher proportion of older workers (WHO, 2014; Csejk, 2017). Demographic changes in European societies with an ageing trend, including Hungary, have made it particularly important for workers to be in better and more balanced health, so that they can continue to work reliably and to a high standard for as long as possible. In addition to an ageing population, society is increasingly challenged by lifestyle-related civilisation diseases. Not only are these diseases becoming more common (Szakály, 2017), but they are also affecting younger and younger age groups, especially in more developed and middle developed countries (Győrffy, 2019; Szatmári, 2018; Papp, 2017; Rajovic, 2024).

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[1] The term demographic winter describes the process of population decline and ageing.

According to the WHO, nearly 80% of non-communicable diseases are preventable through four key lifestyle changes: healthy diet, regular physical activity, avoiding smoking, and limiting alcohol consumption. There are significant differences in the prevalence of these habits between European countries. According to an OECD study (2023), the proportion of adults who smoke daily was highest in Bulgaria in 2021, at nearly 29%. Hungary ranked fifth with 25%. In the same year, a report by the European Society of Cardiology (2022) showed that in Portugal, Germany, Malta, Italy and Hungary, more than 38% of the population had insufficient physical activity. According to the European Health Interview Survey (2019), Hungary has the highest preventable mortality in the EU after Lithuania and Latvia, while it ranks at the bottom of the avoidable mortality ranking after Romania, Lithuania, Latvia and Bulgaria.

According to Szatmári (2018), the health status of a country's population is influenced by many historical, social, cultural and geographical factors, but is fundamentally determined by their lifestyle. Health is a key determinant of quality of life, which is why accessible, high-quality healthcare is of paramount importance at the societal level. A healthy population fosters both individual and collective development (Neira, 2025).

The health status of the Hungarian population is quite poor by international standards (Bényi et al., 2021), and we rank among the worst in Europe for lifestyle-related chronic diseases (HCSO, 2023), so it is of paramount importance to examine and address these problems (Śledzik et al., 2023). According to the results of the 2019 European Population Health Survey, 48% of the Hungarian population has a chronic disease, and the proportion of chronic patients increases with age. Around one fifth of young people (22%), almost half of middle-aged people (48%) and more than three quarters of older people (77%) report a chronic disease (HCSO, 2019). Among the chronic diseases, musculoskeletal disorders deserve special attention, as their prevalence has been increasing in Europe in recent decades (Péntek, 2021).

According to Statista (2023), musculoskeletal disorders have shown an increasing trend for both men and women between 1999 and 2019, per 100 000 inhabitants. The incidence of musculoskeletal disorders has shown a consistent upward trend, with 2019 data indicating rates of 6,509.7 per 100,000 women and 5,122.98 per 100,000 men. Within the European Union, approximately 100 million individuals are affected by musculoskeletal discomfort (Rajovic, 2024). Globally, more than 500 million people suffered from recurrent back pain in 2020, and this figure is expected to rise to 800 million by 2050 (Ferreira, 2023). Juliette's (2021) study presents the prevalence of musculoskeletal disorders in Europe in 2019, by country. Poland (6,736.63), Hungary (6,697.15), Croatia (6,679.48) and the Czech Republic (6,568.42) have higher prevalence rates, while the United Kingdom (5,820.79), France (5,035.25), the Netherlands (4,971.69) and Ireland (4,968.54) are at the bottom of the list. Musculoskeletal disorders[2] are the second highest chronic disease in Hungary, affecting a significant proportion of the population and placing a heavy burden on the health system (Ádány, 2011).

In addition to the healthcare system, the labour market is also affected, as chronic illnesses—especially musculoskeletal pain—negatively impact employees' quality of life and work performance, increasing long-term absenteeism. Specifically, neck and limb pain can diminish the quality of life among office workers, while lower back and hip pain may lead to decreased productivity and increased absenteeism (Gürses, 2025).

In Hungary, among the chronically ill, more than one-and-a-half times as many people were absent from work for health reasons compared to the rest of the surveyed population, and the average duration of absence over 12 months was nearly two-and-a-half times longer. Compared to the average for all chronic patients, 7 percentage points fewer individuals with hypertension and 3 percentage points more with musculoskeletal disorders took sick leave (HCSO, 2019). In order to get a comprehensive picture of the health status of the Hungarian population and the prevalence of lifestyle-related diseases, especially musculoskeletal diseases, it is essential to collect and analyse medical data. GP reports are an important resource for monitoring disease prevalence and trends. This data is not only used for health care planning, but also for developing prevention and treatment strategies. Statistical reports show the evolution of more than 30 chronic diseases in Hungary since 1999. According to a study by Bényi (2021), GP reports show that the total number of illnesses requiring care exceeded 15 million in 2019 among people aged 19 and over.

So, there are nearly 2 chronic diseases per adult person in our country. Musculoskeletal disorders could be effectively prevented (Betlejewski, 2007) at all three levels of prevention, as different levels contribute differently to health maintenance. The key to primary prevention is regular, daily exercise from an early age, maintaining a healthy weight, eating a healthy diet, avoiding smoking, keeping alcohol consumption in moderation and following health and safety regulations (Feith & Falus, 2019; Berkő, 2020). Age-related mandatory screening and targeted occupational health screening are important elements of secondary prevention (Ilyés, 2023). Tertiary prevention involves reducing pain and preventing deformities with physiotherapy and medication (Gősi et al., 2022).

Together, the levels ensure comprehensive prevention of musculoskeletal disorders, from prevention of disease onset to early detection and treatment of the problems that develop. If we want to examine how lifestyle elements at the primary prevention level appear in Hungarian society, it is worth drawing on the results of the Hungarian Statistical Office. In particular, I would like to highlight the proportion of people taking regular exercise: HCSO (2019) data show that only 56% of the adult population gets enough leisure-time physical activity of at least 150 minutes per week, as recommended by the WHO, and that the proportion of people who do not get enough exercise increases with aget. Physical activity for recreational purposes declines to almost zero in adulthood (Szatmári, 2018), even though individualised physical activity at any age and in any disease state (except febrile illnesses and bleeding disorders) significantly improves quality of life and extends life expectancy (Tóth, 2021).

[2] Musculoskeletal disorders included joint wear and tear, arthritis, lumbar or spinal problems, cervical spine problems and osteoporosis.

Direction and objective of the research

In conclusion, the deterioration of the health status of the European population, including the Hungarian population, poses significant challenges to society. The wide availability of different therapeutic options, such as physiotherapy, rehabilitation and medical services, is essential for effective treatment and prevention. Tourism activities have a significant impact on a country's economy, environment, community and visitors (Chin, 2025). Hungary is renowned for its spa tourism based on medicinal waters, which is also an integral part of healthcare for musculoskeletal patients. It is a dynamic sector where the image of the destination, the infrastructure and the professionalism of the service providers have a significant impact on the motivation and health tourism intentions of tourists (Satchapappichit, 2025). The importance of health tourism is becoming increasingly important today, especially due to the health problems of an ageing population, as the balneotherapy services of domestic health tourism offer an unique solution to musculoskeletal problems (Hojcska et al., 2024).

Health tourism focuses on patients with chronic diseases, with the main objectives of prevention, cure and rehabilitation. Typically based on natural healing factors and most services are available on prescription (Szabó, 2017; Hojcska, 2017b). In Hungary, research focuses on the role of spas in the treatment of musculoskeletal disorders and the use of spa treatments. The aim is to follow the care pathways of people with musculoskeletal complaints at different levels of the health system, from general practice to specialist rheumatology clinics and spa treatments.

MATERIALS AND METHODS

The research aims to follow the life course of people with musculoskeletal disease at different levels of health care. In this study we work with secondary data, which are reliable, collected from official sources. The most important data sources include statistics from the Hungarian Central Statistical Office (HCSO), which show national data on musculoskeletal disorders in total and in terms of their regional distribution and prevalence, and reports from general practitioners' practices, which provide insights into the number of patients presenting with musculoskeletal complaints.

In addition, I take into account data on attendance at rheumatology clinics from the statistics of the National Health Insurance Fund Management (NEAK), while data on spa treatments are collected from the STADAT tables of the Hungarian Central Statistical Office. In my research, I pay particular attention to tracking the different stages of the patient journey. The first step is to look at the stage from symptom onset to GP visits, using data reported by GPs to see how many people visit a health professional with musculoskeletal complaints. Data from the Information database of the HCSO were used. The database offers a choice of three main statistical themes: population and social statistics; economic statistics; environmental statistics and cross-cutting statistics. Data on musculoskeletal disorders in adult general medical practices can be found under the population and social statistics theme, under the health tab, and under the diseases and accidents sub-page. The next point of analysis is the number of cases seen in the rheumatology department, which shows the demand for specialist care. The data are available from the National Health Insurance Fund Management. Public information on outpatient care is available from separate yearly data tables. The tables include, in addition to the name and code of the outpatient specialty, the number of presentations, the number of interventions and the total score. The research was based on the case series of the profession of Rheumatology and Physiotherapy.

Finally, the third stage of the research is to examine the use of spa treatments. Using data from the KSH STADAT tables entitled Main characteristics of spas, turnover and services provided by spas, we analysed how the use of subsidised treatments has changed in recent years. The analysis was conducted at two main levels: at the national level, which aims to identify general trends and correlations, and at the regional level, which highlights regional differences. Descriptive statistical methods were used in the analysis, which includes a time-series analysis looking at changes in MSDs between 1999 and 2023. We also made regional comparisons, which allowed us to identify differences between different regions in Hungary. The study examines the prevalence of musculoskeletal disorders in an ageing society. It highlights the economic burden of MSDs on the health care system and social security expenditure.

RESULTS

Change in the number of musculoskeletal patients registered with a general practitioner

Diseases are coded according to the International Classification of Diseases, which classifies musculoskeletal diseases as M00-M99. Patients with symptoms of these conditions present first to their general practitioner, and the numbers of cases are recorded every two years on the basis of general practitioner reports.

As a first step, registered patients aged 19 years and older[3] registered with general practitioners for major musculoskeletal diseases {Seropositive and other rheumatoid arthritis (M05, M06); Juvenile arthritis (M08); Gout (M10); Deforming spinal deformities (M40-M43); Spondylopathies (M45-M49); Bone density and bone structure disorders (Osteoporosis) (M80-M85)}. When examining the data, several aspects should be taken into account, such as the dynamics of the change in the number of patients, growth trends, and the number of patients as a proportion of the population. The results (Table 1) show how the total number of musculoskeletal patients registered with a general practitioner has changed over the years at national level. In 1999, the number of patients was 1032304, which increased to 3205738 by 2023, a significant increase of more than three times. The growth rate is not uniform: the highest increases occurred in 2007 (+22.52%) and 2009 (+37.48%), while the last years have seen stagnation or decline.

[3] It is important to note that a person can only be included once in a report for a given disease, but more than one disease can be registered for a person.

Table 1. Change in the number of musculoskeletal patients registered with a general practitioner from 1999 to 2023 (Source: Based on Hungarian Central Statistical Office. (n.d.). Informative database, own editing)

	Total number of patients	Growth (persons)	Growth %	Population (persons)	Number of patients per population
1999	1 032 304			10 253 000	10.07%
2001	1 084 518	52 214	5.06%	10 200 298	10.63%
2003	1 095 218	10 700	0.99%	10 142 362	10.80%
2005	1 141 453	46 235	4.22%	10 097 549	11.30%
2007	1 398 507	257 054	22.52%	10 066 158	13.89%
2009	1 922 712	524 205	37.48%	10 030 975	19.17%
2011	2 261 288	338 576	17.61%	9 985 722	22.65%
2013	2 577 766	316 478	14.00%	9 895 250	26.05%
2015	2 952 411	374 645	14.53%	9 815 858	30.08%
2017	3 135 196	182 785	6.19%	9 739 857	32.19%
2019	3 236 056	100 860	3.22%	9 700 272	33.36%
2021	3 230 707	-5 349	-0.17%	9 651 461	33.47%
2023	3 205 738	-24 969	-0.77%	9 599 744	33.39%

Figure 1 clearly shows a significant increase in the number of patients over the period analysed. In particular, the growth dynamics accelerated between 2007 and 2015, which may reflect increased demand for medical care. Growth then slowed down, with a slight decline in the last few years. The R^2 value is 0.936, indicating that the trend line fits the data well and that the time factor strongly explains the increase.

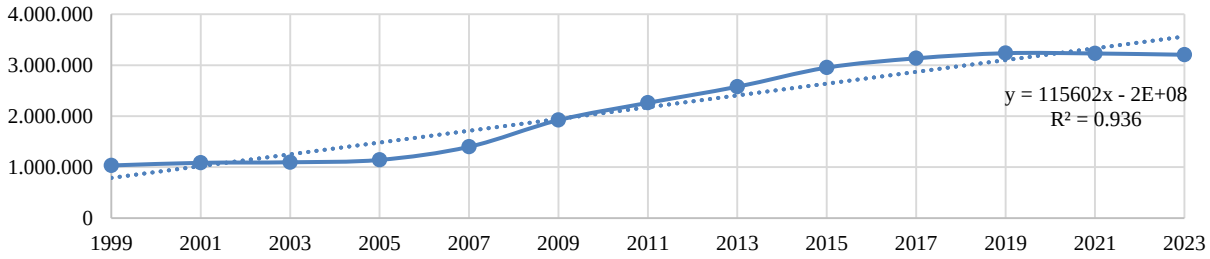

Figure 1. Change in patient numbers from 1999 to 2023 (Source: own editing)

Analysis of the data by region (Table 2) shows that all regions show an increase in the number of people with musculoskeletal disorders between 1999 and 2023. Regional differences can be observed. In Budapest there has been a significant increase, especially after 2007. In 1999, 204 651 persons were affected, while in 2023, 494 554 persons will be affected. This is more than double the increase. The regions of Western Transdanubia, Central Transdanubia, Southern Transdanubia and Northern Hungary show relatively smaller increases compared to other regions. The largest increase was in the Northern Great Plain region, where the number of patients rose from 156710 in 1999 to 60599 in 2023. The rate of growth seems to be slowing down in recent years in several regions between 2019 and 2023.

Table 2. Change in the number of musculoskeletal patients registered with a general practitioner from 1999 to 2023 by region (Source: Based on Hungarian Central Statistical Office. (n.d.). Informative database. own editing)

	Budapest	Pest	Central Transdanubia	Western Transdanubia	South Transdanubia	North Hungary	Northern Great Plain	Southern Great Plain
1999	204 651	101 851	96 009	89 663	99 474	124 096	156 710	159 850
2001	202 072	106 071	101 542	93 310	112 785	129 624	168 608	170 506
2003	191 130	110 914	105 734	95 294	122 016	128 784	170 447	170 899
2005	202 015	121 512	109 325	104 729	127 447	131 491	170 153	174 781
2007	237 238	155 472	132 337	136 931	161 764	146 190	209 492	219 083
2009	310 976	205 799	177 164	188 929	214 050	190 344	303 156	332 294
2011	324 429	242 923	204 667	225 151	261 277	258 216	371 857	372 768
2013	418 982	282 707	218 325	237 639	278 558	270 216	447 087	424 252
2015	460 569	337 336	246 904	264 803	311 734	297 840	551 482	481 743
2017	487 294	362 191	258 890	283 766	322 592	307 124	598 593	514 746
2019	503 874	390 354	265 552	302 169	326 723	318 581	620 281	508 522
2021	493 289	393 767	266 749	303 492	323 950	317 225	626 204	506 031
2023	494 554	391 366	266 454	307 607	323 600	316 329	605 599	500 229

Change in the number of outpatient specialist rheumatology attendances

Outpatient statistics available on the website of the National Health Insurance Fund of Hungary show the number of outpatient visits to rheumatology specialties from 1999 to 2023. Appearance rates in the outpatient statistics published by National Health Insurance Fund of Hungary indicate the total number of visits to a given specialty in a given period. A patient may visit the same specialty clinic more than once, so the case numbers show the total number of presentations

rather than the number of individual patients. Table 3 shows the data retrieved every two years from 1999 to 2023. At the beginning of the period under review, from 1999 to 2005, the number of outpatient rheumatology cases and the population-based rate of outpatient cases showed a steady increase. In 2007, there was a significant drop of 23% in the number of cases, followed by a steady decline from 2011 to 2019. The population has also declined, but the decline in the number of cases per population has been even faster. The year 2021 saw an outlier low of only 1.44 million cases, a 30% decrease compared to the previous two years. By 2023, the number of cases had increased slightly to 1.7 million, a 17% increase compared to 2021.

Table 3. Outpatient statistics in rheumatology (Source: Based on National Health Insurance Fund of Hungary, own editing)

	Total number of patients	Growth (persons)	Growth %	Population (persons)	Number of patients per population
1999	2 793 511			10 253 000	27.25%
2001	3 140 058	346 547	12.41%	10 200 298	30.78%
2003	3 251 983	111 925	3.56%	10 142 362	32.06%
2005	3 384 719	132 736	4.08%	10 097 549	33.52%
2007	2 592 224	-792 495	-23.41%	10 066 158	25.75%
2009	2 721 269	129 045	4.98%	10 030 975	27.13%
2011	2 607 232	-114 037	-4.19%	9 985 722	26.11%
2013	2 475 530	-131 702	-5.05%	9 895 250	25.02%
2015	2 394 966	-80 564	-3.25%	9 815 858	24.40%
2017	2 197 894	-197 072	-8.23%	9 739 857	22.57%
2019	2 068 361	-129 533	-5.89%	9 700 272	21.32%
2021	1 444 590	-623 771	-30.16%	9 651 461	14.97%
2023	1 699 196	254 606	17.62%	9 599 744	17.70%

Interpreting the data observed in Figure 2 is important for several reasons. The value R^2=0.799 suggests that the trend line fits the data relatively well, but does not fully explain the change. This suggests that the decline is not just a trend over time, but that other factors, such as structural changes in the care system, socio-economic effects or changes in patient behaviour, may have contributed. The low point in 2021 may have been caused by the COVID-19 epidemic, which led to restrictions on health services and reduced patient access to care.

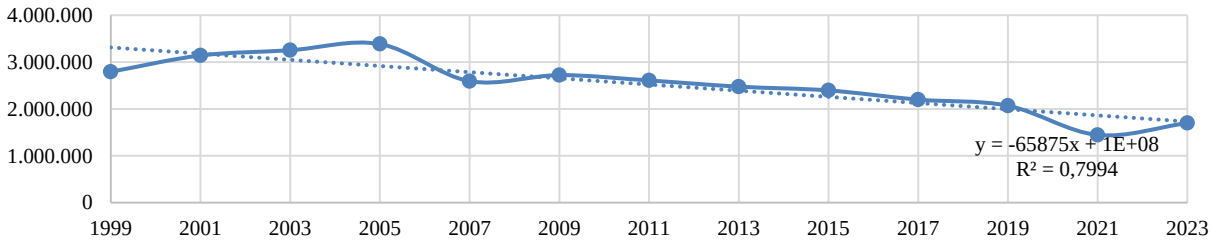

Figure 2. Change in the number of outpatient rheumatology consultations from 1999 to 2023
(Source: Based on National Health Insurance Fund of Hungary, own editing)

The data for the period analysed (Table 4) clearly show significant variations in the number of patients attending specialist rheumatology care in different regions of Hungary. The study shows that Budapest and the Northern Great Plain Region stand out in terms of patient numbers. Budapest always has the highest number of patients, which may be linked to the capital's population concentration and better access to health services. The Northern Great Plain region also shows consistently high rates, which may reflect the higher health needs of the population living there or the specificities of the care system. The data also show that the COVID-19 epidemic has had a severe impact on the care system in all regions, and although the situation is improving, the 2023 figures are not yet at pre-pandemic levels.

Table 4. Rheumatology outpatient statistics by region (Source: Vased on National Health Insurance Fund of Hungary, own editing)

	Budapest	Pest	Central Transdanubia	Western Transdanubia	South Transdanubia	North Hungary	Northern Great Plain	Southern Great Plain
1999	804 196	206 378	211 918	162 232	326 267	179 344	415 152	328 938
2001	996 677	228 394	213 760	168 479	369 108	171 834	442 217	340 592
2003	986 133	242 969	248 908	182 406	356 076	210 786	448 466	353 326
2005	974 047	264 827	269 508	233 957	390 098	234 107	436 098	392 067
2007	848 446	209 089	177 127	164 523	287 361	196 143	401 042	308 493
2009	868 847	225 302	213 424	184 281	316 642	173 167	435 249	304 357
2011	879 522	216 951	224 564	175 248	262 592	188 364	402 627	257 364
2013	837 584	224 029	232 171	183 781	216 614	201 053	333 809	250 922
2015	802 137	221 753	226 758	173 509	199 776	197 354	339 569	234 110
2017	679 121	191 362	215 810	164 996	189 603	200 003	334 769	222 230
2019	634 932	166 794	212 477	168 624	180 905	164 271	335 567	204 791
2021	486 411	102 710	157 743	116 529	123 238	101 033	223 760	133 166
2023	554 409	116 130	173 551	135 028	161 895	120 628	265 549	172 006

Change in the number of people receiving subsidised spa treatment

Spas and subsidised spa treatments play an important role in Hungary's health and tourism system. The analysis is based on the data published by the National Statistical Office (Table 5), which show changes in the number of spas, their turnover and the number of treatments subsidised by the National Health Insurance Fund of Hungary.

Table 5. Spa turnover, thousands of persons (Source: Based on HCSO, own editing)

	2011	2013	2015	2017	2019	2021	2023
Number of spas in Hungary	105	122	132	103	115	106	100
Number of persons in baths, thousands	32 023	38 394	40 241	41 363	42 051	22 413	33 762
Of which: National Health Insurance Fund of Hungary supported	2 309	2 454	2 371	2 186	2 119	973	1 262
Bath, where medical examination is available	85	105	115	103	102	86	72
Baths where medical treatment is available	108	137	146	137	141	121	114

Over the last decade, spa attendance has shown significant changes, especially in terms of persons assisted by National Health Insurance Fund of Hungary and total passenger traffic. The analysis of the period 2011-2019 (Figure 3) shows a positive picture of the evolution of the baths' turnover: during this period, the number of visitors has been increasing steadily. This growth is partly due to the modernisation of spas, the expansion of their services and the popularity of spa culture. Over the same period, the number of persons assisted by the National Health Insurance Fund of Hungary showed minor fluctuations, but overall showed a downward trend as a proportion of total passenger transport**.** This may suggest that spas are increasingly being used for tourism purposes, rather than exclusively for subsidised medical treatment.

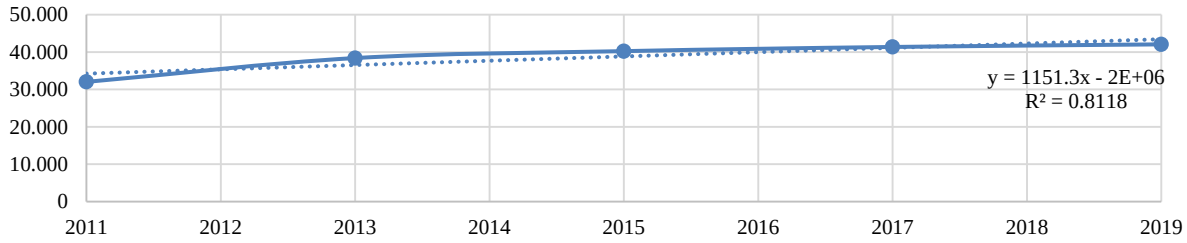

Figure 3. Baths in Hungary (2011-2019), thousands of visitors (Source: Based on HCSO, own editing)

In the following (Table 6), we examine the regional and temporal variation of National Health Insurance Fund of Hungary subsidised passenger flows of spas in Hungary, based on data collected every two years between 2011 and 2023. The analysis of the evolution of subsidised passenger transport provides an important picture of regional differences.

Table 6. Subsidised passenger flows of baths by region (Source: based on HCSO own editing)

	Budapest	Pest	Central Transdanubia	Western Transdanubia	South Transdanubia	North Hungary	Northern Great Plain	Southern Great Plain	Total
2011	520 000	24 000	50 000	575 000	110 000	162 000	438 000	432 000	2 311 000
2013	764 000	26 000	50 000	569 000	92 000	75 000	467 000	412 000	2 455 000
2015	446 000	5 000	125 000	539 000	224 000	77 000	522 000	434 000	2 372 000
2017	407 000	6 000	115 000	436 000	217 000	68 000	511 000	426 000	2 186 000
2019	358 000	28 000	99 000	490 000	200 000	56 000	513 000	375 000	2 119 000
2021	115 000	4 000	50 000	207 000	112 000	33 000	326 000	125 000	972 000
2023	198 000	45 000	62 000	245 000	136 000	30 000	317 000	230 000	1 263 000

Table 7. Musculoskeletal and rheumatological data in the Northern Great Plain Region, 2023
(Source: Based on biennial GP and National Health Insurance Fund of Hungary reports, own editing)

Data for 2023	Szabolcs-Szatmár-Bereg county	Jász-Nagykun-Szolnok county	Hajdú-Bihar county
Musculoskeletal disease data based on biennial general practitioner reports	247391	141326	216882
Published in rheumatology and physiotherapy	59 270	103 885	102 394
	23.96%	73.51%	47.21%

During the period under review, subsidised passenger transport fluctuated significantly. Budapest's prominent role is clearly visible from the data. In 2011, the capital recorded a subsidised passenger transport of 520,000 persons, which increased to 764,000 in 2013. However, this peak did not prove to be sustainable and after 2015, the number of passengers decreased steadily, reaching only 115,000 in 2021.

The Northern Great Plain has shown steadily higher figures between 2011 and 2019. In 2021, however, the Northern Great Plain also suffered a significant decline, with a drop to 326 000 visitors. The figures for 2023 (317 000 visitors) indicate that the region is only slowly recovering from the difficulties caused by the epidemic.

However, the number of patients registered by general practitioners and attending rheumatology and physiotherapy in the Northern Great Plain Region (Table 7) highlights the differences within the region. The question arises: what explains why in Szabolcs-Szatmár-Bereg county, where most patients are, only 23.96% of patients receive treatment?

DISCUSSION

The aim of this study is to follow the life course of people with musculoskeletal disorders at different levels of health care in Hungary. The research seeks to identify the specificities of patients' care pathways, from GP visits to specialist rheumatology care to spa treatments. At the same time, it explores regional differences in the care system that affect patients' access to the treatments they need. Ultimately, the research aims to contribute to reducing these gaps and to the implementation of a national strategy for the treatment and prevention of musculoskeletal disorders. Statistical studies clearly show that the prevalence of musculoskeletal disorders has increased significantly in recent years.

GP records show that the number of musculoskeletal patients nationally more than tripled between 1990 and 2023. The present research provides a detailed regional analysis within Hungary, revealing regional disparities and highlighting the role of Budapest and the Northern Great Plain in the provision of medical treatment.

This regional distribution is consistent with the findings of Hojcska (2019) that the geographical distribution of spas has a significant impact on access to care. The issue of territorial disparities has recently become a particularly topical and multidimensional problem. Láczay (2020) points out that people living in peripheral regions are increasingly feeling the threat of marginalisation. These problems are exacerbated by ethnic conflicts, border migration, a steady deterioration of the social situation, unemployment and the breakdown of educational institutions, which together create extremely difficult living conditions. Health inequalities are a major challenge in themselves.

Although medical advances have led to breakthroughs in the prevention and treatment of many diseases, disparities between different geographical areas and social groups remain significant. A minority of health inequalities are genetic or biological, but a larger proportion are the result of social and economic inequalities, as Uzzoli (2019) points out.

Territorial disparities in Hungary are not only evident in the health sector, but also in many other social and economic areas, such as unemployment and access to education. In the less developed regions of the country, uneven economic development and infrastructure deficiencies significantly limit the opportunities of those living there.

According to Fedor & Láczay (2021), generations may grow up in the border areas of the Northern Great Plain without the basic skills needed for employment due to underdevelopment. This can lead to persistent poverty, lack of social mobility and economic inactivity. Together, these contribute to a poorer quality of life, making it more difficult to lead a healthy lifestyle. Regional disparities in the prevalence of musculoskeletal disorders and related health care are a major challenge not only in Hungary but also at international level. The aim of the European Alliance of Associations for Rheumatology (EULAR) is to collect data and investigate the impact of rheumatic and musculoskeletal diseases on individuals, society and the health economy in EULAR member countries. Its strategy for 2024-2028 is guided by a vision of a world in which all rheumatic and musculoskeletal diseases are detected, diagnosed and ultimately cured or prevented (EULAR Strategy 2024 – 2028). According to the Global Burden of Disease Study (2019), an extensive assessment was conducted on 369 diseases and injuries across 204 countries spanning the years 1990 to 2019.

The results indicate that conditions such as low back pain and neck pain are major factors contributing to disability-adjusted life years (DALYs), emphasizing their relevance to global public health. The development of health care systems, economic situation and geographical location influence access to care. For example, the availability and popularity of balneotherapy treatments varies between countries and regions (Hojcska, 2024). Due to their high prevalence and shared risk factors, musculoskeletal disorders often co-occur with other chronic diseases (Rajovic, 2024).

Low back pain is a leading global cause of disability (Wu, 2020; Hoy, 2014; Chen, 2021), and its burden—both in terms of disability and cost—is expected to rise (Hartvigsen, 2018). Rajovic (2024) highlights the need for prevention through physical activity, healthy nutrition, and improved functional capacity, supported by targeted public health interventions.

CONCLUSIONS

The change in the number of musculoskeletal patients registered with a general practitioner shows that the prevalence of musculoskeletal disorders has increased significantly over the last two decades, especially between 2007 and 2015. Although there has been a slight decline in the number of spa treatments in recent years, the number of patients as a proportion of the population remains high, which may be a consequence of an ageing population and lifestyle factors, but further research is needed to investigate the age distribution of patients, particularly for prevention purposes. This raises the importance of prevention and timely treatment, on the one hand, and the strategic development of the range of services and the care system, on the other. The number of specialist rheumatology attendances is on a downward trend, especially during the COVID-19 epidemic. The data suggest that there is a need to improve the availability of specialist services and to motivate patients to actively participate.

The number of people using spas has also shown a fluctuating trend in recent years. The decrease in the number of subsidised treatments may indicate that not all patients are accessing this treatment option. It would be important to improve regional access to spa treatments. Further analysis is needed to increase the number of subsidised treatments and to bring their availability closer to eligible people. However, this requires not only the development of balneological products, but also the development of health tourism service products. The data show significant regional disparities due to differences in the availability of health services. The high figures for Budapest and the Northern Great Plain reflect

concentrated provision, as they have a long tradition of spas, while other regions show lower concentrations. Targeted new types of development are needed to reduce regional disparities.

Limitations

One of the main limitations of the study is that the data come from different sources (HCSO, National Health Insurance Fund of Hungary) and their methodologies may differ. Differences between GP (number of patients) and specialist care statistics (number of presentations) affect the accurate interpretation of the results. In addition, the number of musculoskeletal patients registered with a general practitioner includes only patients aged 19 years and over, while the population-based caseload is calculated for the total population. This methodological peculiarity may bias the results, as the population studied is actually smaller than the total population to which the data were compared.

A further challenge is the lack of reliable data on medical and health tourism in Hungary, as noted by the Hungarian Tourism Development Strategy. The absence of systematic data collection, limited scientific output from spas and universities, and the lack of coordinated research hinder both marketing and service development. Additionally, balneological research lacks institutional support in Hungary (Hungarian Tourist Agency, 2021).

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