

The burden of musculoskeletal disorders in the countries of the Eastern Mediterranean region of the World Health Organization (EMRO): Study period 2000-2017

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Abstract

Background: MSK health is imperative for the active participation of an individual in society and MSK related disorders more direly affects a person's quality of life compared other non-communicable disease while it also negatively effects the health system and economy of a country. The current manuscript analyzed and describes the disease burden of MSK disorders in the EMRO region.

Methods: This was a cross-sectional descriptive-analytical study conducted based on data published by the Global Burden of Disease Database for MSK disorders up to 2017. The study target comprised population from all countries of the EMRO region of World Health Organization. The present study considered, MSK disorders such as (rheumatoid arthritis), (osteoarthritis), (Low back pain), (neck pain), (gout) and (other Musculoskeletal disorders). The DALY index was used to measure total disease burden.

Results: MSK disorders in the world and in the EMRO region was ranked 5th (4% of total disease burden) and 7th (5% of total disease burden) among all diseases in 2017, respectively. Women over 30 years of age in the EMRO region had the highest risk of MSK disorders compared to other regions and in addition, the DALY lost in EMRO region due to MSK disorders was higher in women of all age categories than men. According to the results of this study, Low back pain, Other musculoskeletal disorders and Neck pain had the highest prevalence and burden of disease in the EMRO region and the world. Bahrain, Iran, and Morocco had the highest incidence of MSK DALY score in the EMRO region, and Somalia, Djibouti, and Afghanistan had the lowest incidence of MSK disorders and DALY score, respectively.

Conclusion: With the increase in geriatric population and obesity especially in developing countries, consequently, more people tend to suffer from MSK disorders and it is predicted that this spike will continue in the coming decades. Taking in to account the high prevalence and burden of MSK disorders, forces government and health-policy makers to focus more on preventive cares and rehabilitation.

Background

Musculoskeletal health plays a pivotal role in defining a person's overall productivity such as his capabilities, functionalities and all other aspects of life that involves active participation. MSK related disorders and disease have a more profound effect in reducing the quality of life compared to other non-communicable disease (1). Unfortunately, it leads to an early retirement, reduced income and financial instability in patients (2). A high disease burden of MSK disorders can be witnessed in developing and less developing countries can be related with the increasing geriatric population of these countries(3,4) This issue is predicted to have a magnified effect in the upcoming decades because many developing countries tend to ignore its impact in the present time as they are busy allocating their limited resources in other more competitive fields of research(5). Moreover, we see an unequal distribution of access to these services and facilities stemming from political instability, war, low income and unemployment existing in those countries. According to the National Institute of Occupational Safety and Health, MSK is a disorder that affects the system of human body, especially the bones, spinal discs, tendons, joints, ligaments, cartilage, nerves including blood vessels (6) of which about more than 150 types have been diagnosed that could cause pain and result in impaired function and in the long run may deprive the person of the ability of doing daily basic functions which in turn could significantly deteriorate mental health and accelerate the progression of other chronic disease as well and add to mortality rates (2,7). According to the study based on MSK disease burden between the years 1990 and 2010, the DALYs index of MSK disorders increased by 4.7 percent and its share of contribution to the total disease burden reached 6.8 percent in 2010. Statistics show that the prevalence of MSK has not yet reached its peak and continues to increase owing to the increase in average life expectancy. If this upward trend continues, governments should be prepared to spend quite a great deal on their health care systems (8) Studies also show that musculoskeletal disease includes three of the top 10 indexes in terms of disease burden and disability(9). Muscular skeletal disorders of the muscles is recognized as a growing problem in health care and the second leading cause of disability after mental disorders (8).The report from WHO states that about 10 to 50 percent of the world's population suffer from these disorders (10) and about one in every two American is affected by MSK disorders(2). Given the high prevalence and financial burden inflicted by MSK disorders, governments are deemed to emphasize more on preventive care and rehabilitation (11).

Damian Hoy et al, in their study in 2014 showed that among the 291 diseases studied, back pain had the highest rank in terms of disability index (YLDs) and was ranked sixth in terms of overall disease burden index (DALYs) (4). Another study that evaluated the morbidity of neck pain showed that among the 291 cases reported by the Global Disease Burden in 2010, neck pain based on criteria of years of life lived with disability (YLDs) and (DALYs), had been ranked fourth and twenty one respectively(12).Undoubtedly, MSK disorders impose a heavy financial burden on individuals, health care systems and governments (8). Many studies have depicted the different ways in which MSK disorders negatively impacted the economy, as in by raising costs for governments, as well as lowering income due to deterred efficiency and productivity, early retirement, and absenteeism at work (6, 13, 14) In 2014, 8.3 million working days were wasted in the UK as consequence of MSK disorders, and it was stated that in the EU, more than 40 million workers suffered MSK injuries, which is equivalent to one-seventh of the population (6). Between 1992 and 2010, it was estimated, about 29 to 35 percent of worker absenteeism in U.S as a result of occupational injuries in private factories accounted to MSK disorders (6) The annual economic burden of these disorders in the United States is estimated to be between \$ 45 billion and \$ 54 billion (14). The economic burden inflicted by these disorders on low-income or middle-income countries due to negligence is more conspicuous than in high-income countries (15). Data on funding and budget size for various diseases in the United States indicate that MSK disorders have been assigned the least amount of budget via the National Institutes of Health Research compared to other diseases like cardiovascular disease and cancer (16). The negligence of

these disorders can be attributed to its insignificant role in leading to direct mortality and also due to its irreversible nature. In addition, in some cases, MSK is considered to be part of the natural aging process in the population (15). Precise planning and management can significantly reduce the rate of these disorders and minimize the additional and secondary costs imposed by it (7). In fact, a multidisciplinary approach is imperative to prevent, treat, and address this problem, by means of raising public awareness of risk factors, and in order to assure success, it is necessary to encourage lifestyle changes, welcome more patients, and it is and further improvise this approach with the help of the scientific and medical community (16). Musculoskeletal disorders have not been given much attention, despite its importance in public health, especially in low- and middle-income countries. The epidemiological data from Eastern Mediterranean region (EMR), on musculoskeletal disorders are scattered and disorganized and are not to compare. Most of the existing data in this region come from basic surveys of the community-based program to control rheumatic diseases (15). Many Mediterranean countries, including Egypt, Iran, Kuwait, Lebanon, Pakistan and Tunisia, have introduced community-based programs to control rheumatic diseases over the past two decades. According to a 2017 study by Moradi et al. on the disease burden of MSK disorders in the Mediterranean region between 1990 and 2013, neck pain and low back pain were the top most disorders reported, for example in Iran the prevalence of neck pain and back pain were 23.7% and 14.2%, respectively, and in Kuwait the prevalence of back pain in male and female students was reported to be 20.6% and 39.3%, respectively. Thus, extensive research is deemed as the need of the hour to evaluate the most effective and cost-effective strategy for preventing and managing MSK.

Methods

The present study is a cross-sectional, descriptive-analytical study based on the latest available data from the Global Burden Disease (GBD) database (2017) on MSK disorders. We extracted this secondary data from Global Burden Disease (GBD) database site (<http://www.healthdata.org/>) and performed the necessary statistical analysis on it. The study population includes all countries of the Eastern Mediterranean region of the World Health Organization (EMRO) based on information on their disease burden during the period of 2000-2017. The present study, evaluates MSK disorders such as rheumatoid arthritis, osteoarthritis, low back pain, neck pain, gout and other musculoskeletal disorders. Our study uses DALY index to measure total disease burden. DALY is formulated by the sum of years of potential life lost due to premature death (YLL) and the years of productive life lost due to disability (YLD) expressed as follows:

$$DALY = YLLs + YLDs \quad (1)$$

YLLs are calculated by multiplying the number of deaths (N) into the number of life years expected to live based on standard life expectancy (L) denoted as follows:

$$YLL = N \times L \quad (2) \dots$$

Considering the factors of r , k and β changes equation (2) to equation (3)

$$YLLs [r, k, \beta] = \frac{KCe^{rL}}{(r + \beta)^2} \left\{ e^{-(r+\beta)(L+a)} [-(r + \beta)(L + a) - 1] - e^{-(r+\beta)a} [-(r + \beta)a - 1] \right\} + \frac{1 - K}{r} (1 - e^{-rL}) \quad (3)$$

The Disability-Adjusted Life Years (DALY) index acts as the main criteria to measure total disease burden. Accordingly, the DALY level registered in the database of GBD separately on MSK disorders (rheumatoid arthritis, osteoarthritis, back pain, neck pain, gout and other disorders of skeletal muscle) for men and women in different age groups (16 different age groups) for countries in the EMRO zone that consists Qatar, Saudi Arabia, Syria, Tunisia, Yemen, United Arab Emirates, Iran, Bahrain, Afghanistan, Egypt, Somalia, Jordan, Libya, Iraq, Kuwait, Sudan, Lebanon, Morocco, Palestine, Oman, Djibouti was extracted per year for the period between 2000-2017 and were analyzed with the aid of MS EXCEL software and reported with the use of descriptive statistics. The information entered in the GBD database is based on data obtained from research evidence estimated by the countries concerned and some poor may not be recorded in some poor countries that did not have recorded data due to economic and health development. were excluded from the study.

Results

The results show that the total DALY lost in 2000 in EMRO (42,239 DALY per 100,000 population) was lower than in the DALY index for the world (46,280 DALY per 100,000 population) and the total burden of disease in the world and EMRO decreased in 2017 to 32711 and 32916 DALY, respectively per 100,000 population. In the year 2000, HIV / AIDS and sexually transmitted infections (278 DALY per 100,000 population) was recorded as the lowest DALY lost in the EMRO region while substance use disorders (573 per 100,000 population) accounted for most amount of DALY lost in the world during that year. In 2017, neglected tropical diseases and malaria (242 DALY per 100,000 population) had the lowest DALY index and Cardiovascular diseases (4489 DALY per 100,000 population) had the highest DALY index in EMRO region and in the world, Skin and subcutaneous diseases (514 DALY per 100,000 population) accounted for the least DALY index while Cardiovascular diseases (4788 DALY per 100,000 population) had the highest DALY index (table 1 and Figure 1).

Table 1, DALY, percentage of changes in DALY, rank and contribution of various disorders and diseases from the total disease burden for EMRO region and the world separately in 2000 and 2017

disorder name	DALY				RANKE		Percent of total DALYs				DALYs % change	
	Per 100,000 population				2017 EMRO	2017 GLOBAL	2000 EMRO	2017 EMRO	2000 GLOBAL	2017 GLOBAL	2000-2017	
	2000 EMRO	2017 EMRO	2000 GLOBAL	2017 GLOBAL							EMRO	GLOBAL
Neglected tropical diseases and malaria	593	243	1432	815	22	18	0.01	1	3	0.02	-0.59	-0.43
Nutritional deficiencies	1324	793	1378	760	17	19	0.03	2	3	0.02	-0.40	-0.45
Neoplasms	1810	1961	2981	3056	5	2	0.04	6	7	0.09	0.08	0.03
Cardiovascular diseases	4950	4489	4848	4789	2	1	0.11	14	11	0.15	-0.09	-0.01
Chronic respiratory diseases	1018	945	1648	1470	16	8	0.02	3	4	0.04	-0.07	-0.11
Digestive diseases	1145	1079	1187	1116	15	13	0.02	3	3	0.03	-0.06	-0.06
Neurological disorders	1262	1336	1327	1455	10	9	0.03	4	3	0.04	0.06	0.10
Mental disorders	1603	1679	1576	1607	6	6	0.03	5	4	0.05	0.05	0.02
Musculoskeletal disorders	1383	1596	1635	1816	7	5	0.03	5	4	0.06	0.15	0.11
Other non-communicable diseases	3085	2113	2040	1595	3	7	0.07	6	5	0.05	-0.32	-0.22
Skin and subcutaneous diseases	518	514	576	578	20	22	0.01	2	1	0.02	-0.01	0.00
Sense organ diseases	581	594	748	871	19	16	0.01	2	2	0.03	0.02	0.16
Transport injuries	2058	1517	1318	986	9	14	0.04	5	3	0.03	-0.26	-0.25
Unintentional injuries	1858	1271	1881	1387	13	10	0.04	4	4	0.04	-0.32	-0.26
Self-harm and interpersonal violence	867	1556	1250	931	8	15	0.02	5	3	0.03	0.79	-0.26
HIV/AIDS and sexually transmitted infections	279	279	1649	863	21	17	0.01	1	4	0.03	0.00	-0.48
Respiratory infections and tuberculosis	4456	1980	4097	2093	4	4	0.10	6	10	0.06	-0.56	-0.49
Enteric infections	3320	1309	2529	1246	12	12	0.07	4	6	0.04	-0.61	-0.51
Other infectious diseases	3725	1103	2052	747	14	20	0.08	3	5	0.02	-0.70	-0.64
Maternal and neonatal disorders	8784	4550	4393	2586	1	3	0.19	14	10	0.08	-0.48	-0.41
Substance use disorders	550	679	574	584	18	21	0.01	2	1	0.02	0.24	0.02
Diabetes and kidney diseases	1112	1329	1123	1361	11	11	0.02	4	3	0.04	0.20	0.21

The highest number of MSK cases was recorded in women (5840 DALY per 100,000) and men (4689 DALY per 100,000) within the age group of 70-74 years in the EMRO area. Among women, in the six WHO regions, people over the age of 30 in the EMRO region carried the highest risk of DALY lost for MSK disorders, followed by the Region of the Americas and then South-East Asia Region ranking next. Men over the age of 30 in the Western Pacific Region have the lowest DALY index for MSK among the 6 WHO regions (Figure 2 and 3).

In all age groups in EMRO region DALY lost as a result of MSK disorders was higher in the population of women than men. The results also show that the difference in the DALY index between men and women above 10 years of age increased linearly as they got older till the age of 60 and from 60 to 74 the difference in index remained constant but after 74 years onwards the difference of index in the DALY of these two groups decreased (Figure 5).

Out of 6 types of MSK disorders, Low back pain, Neck pain, other musculoskeletal disorders and Osteoarthritis in all age groups in the EMRO region had the highest score. Low back pain also appears to be prevalent in all age groups above 10 years. MSK disorders of all sorts were low in the younger age categories but increased gradually with increase in age. Age groups between 65-79 had the highest DALY value for lower back pain disorder. Furthermore, the age category of 70-74 had highest DALY index for neck pain and other musculoskeletal disorders. (Figure 6).

In EMRO region, the burden of MSK disorders in 2000 and 2017, was reported to be 1383 and 1596 DALY per 100,000 cases respectively. Meanwhile, the global DALY index was 1635 and 1816 per 100,000 people, respectively. The growth rate of MSK disease burden during the period 2000-2017 in the EMRO region and the world was 15% and 11%, respectively. In 2017, these disorders accounted for 6% of the total global disease and was ranked 5th while these disorders contributed for 6.2% of disease burden in EMRO region alone and ranked 7th. The prevalence status for MSK disorders was higher in women compared to men both globally and in the EMRO region during the year 2000 and 2017. Low back pain, other musculoskeletal disorders and neck pain were reported to be the most common disorders among men and women in the EMRO region and the world. The prevalence rate for all 6 types of MSK disorders except gout was higher in women than men throughout different years in EMRO region and the world. Moreover, based on results of the year 2000, the prevalence of MSK disorders in EMRO region (29874 cases per 100,000) was less than that of the world (35962 cases per 100,000 people). In 2017, the prevalence of these disorders increased in both globally and in EMRO zone, but the global prevalence (41023 cases per 100,000 people) was still higher than the EMRO region (35034 cases per 100,000 people). The incidence of musculoskeletal disorders consistently increased globally and in the EMRO region, with the highest incidence being related to low back pain and neck pain disorders (Table 2).

Table 2, disease burden (DALY), incidence and prevalence of musculoskeletal disorders by gender for EMRO region, in 2000 and 2017

				Rheumatoid arthritis	Osteoarthritis	Low back pain	Gout	Other musculoskeletal disorders	Neck pain	Total
DALY per 100.000	2000	EMRO	Female	38.45	67.68	784.80	3.69	338.93	305.74	1383
			Male	14.73	63.98	693.45	12.05	239.73	213.05	
		GLOBAL	Female	53.79	116.59	869.34	6.64	405.54	378.97	1635
			Male	21.42	75.71	707.37	19.76	336.20	281.11	
	2017	EMRO	Female	49.27	91.42	873.38	4.83	391.33	359.66	1596
			Male	17.56	82.06	772.56	15.16	290.80	257.71	
		GLOBAL	Female	66.07	151.41	932.21	8.72	458.79	430.65	1816
			Male	25.49	100.18	768.48	24.85	346.95	319.22	
Prevalence per 100.000	2000	EMRO	Female	236.15	2153.16	7046.94	117.97	3765.28	3108.32	29874.25
			Male	87.35	2012.35	6140.52	385.68	2684.29	2136.24	
		GLOBAL	Female	296.97	3685.24	7757.38	213.58	4357.49	3825.13	35962.97
			Male	104.38	2370.36	6230.52	627.56	3689.08	2805.28	
	2017	EMRO	Female	321.55	2901.49	7813.64	154.20	4353.06	3653.38	35034.22
			Male	109.73	2577.87	6820.89	483.98	3259.99	2584.44	
		GLOBAL	Female	387.90	4794.89	8328.55	282.27	4984.83	4361.72	41023.61
			Male	135.66	3145.26	6780.52	794.75	3827.02	3200.24	
Incidence per 100.000	2000	EMRO	Female	16.32	127.19	3050.39	24.34	0.00	694.95	7387.87
			Male	6.03	120.00	2710.36	78.36	0.00	559.93	
		GLOBAL	Female	18.21	185.79	3280.27	40.72	0.00	839.38	8008.76
			Male	7.06	129.63	2701.97	114.03	0.00	691.70	
	2017	EMRO	Female	21.56	173.71	3357.96	31.11	0.00	805.71	8311.04
			Male	7.46	159.53	2989.96	97.14	0.00	666.90	
		GLOBAL	Female	22.84	228.91	3511.42	52.59	0.00	934.02	8765.17
			Male	8.75	162.25	2926.47	141.76	0.00	776.16	

In the EMRO region, Bahrain (4539 DALY per 100,000 people), Iran (4437 DALY per 100,000 people), and Morocco (4393 DALY per 100,000 people) respectively had the highest incidence of MSK disorders while Somalia (1559 DALY per 100,000 people). Djibouti (2069 DALY per 100,000 people) and Afghanistan (2225 DALY per 100,000 people) had the lowest incidence of MSK disorders. Women in EMRO region (41735 DALY per 100,000) carried a higher DALY value than men (36779 DALY per 100,000 population) for MSK disorders. Findings states, that in all countries in EMRO region, low back pain (41028 DALY per 100,000 people), neck pain (16571 DALY per 100,000 people) and other musculoskeletal disorders (14761 DALY per 100,000 people) were reported to be the most common MSK disorders. Gout (497 DALY per 100,000 people) was the least affecting MSK disorders in the region (Figure 7).

Discussion

MSK disorders contribute to highest proportion as the cause for persistent pain in different regions and geographies (17). Pain and disability associated with MSK disorders have a significant impact on individuals, their families, community and health and economic systems (18) to the extent in comparison to other non-communicable diseases, it results in the loss of many precious years of active labor in life (19) and adds to large global burden (9). Economic consequences that follows include rise in health care costs and insurance, reduced labor productivity, work absenteeism. Therefore, considering the importance of this issue, the burden of MSK disorders in the Eastern Mediterranean countries (EMRO) during the period 2000 to 2017 was evaluated using the data from existing studies in the field of total disease burden (GBD). As was stated by the results of this study, the growth rate of MSK disorders during the period 2000-2017 in the EMRO region and the world was 15% and 11%, respectively. The

study findings of Al Hey et mentioned an increase of 61.6% in MSK disorders during the years between 1990 and 2016 followed by an increase of 19.6% during the period between 2006 and 2016(20). In 2017, overall only 6% of MSK disorders contributed to the total global disease burden, ranked 5th; whereas they accounted for 6.2% of the, total disease burden in the EMRO region alone (ranked seventh). The prevalence of this disease is predicted to continue to spike with the increased pattern of sedentary lifestyle, obesity and ageing (21). A 2016 study found that MSK disorders was ranked second for years of life lived with disability (22). On closer look at burden of diseases in the year 2000 revealed HIV/AIDS to carry the least DALY index value in the EMRO region and substance abuse had least DALY index globally meanwhile, cardiovascular disease had the highest DALY score globally as well in the EMRO region. On the other hand, in 2017, the EMRO region reported Neglected tropical diseases and malaria with the least DALY value and Skin and subcutaneous diseases had the least value globally whereas, cardiovascular diseases carried highest DALY score globally and in EMRO region. Unfortunately, health systems at present remain oblivious to the prevalence of MSK disorders since they are more focused on other non-communicable diseases such cancer, diabetes, chronic respiratory and cardiovascular disease (23).

Findings present a surge in difference of prevalence between men and women in EMRO region and in the world and in all age groups, DALY lost to MSK disorders had a higher prevalence rate in women than men. The age group of 70-74 years had the highest DALY score for MSK in EMRO region. Among women in the six WHO areas, the EMRO had the highest incidence of MSK in all age groups over 30 years. The age category above 30 in the EMRO region had the highest DALY score due to MSK disorders. Numerous studies so far, have pointed out the surge in disease burden for MSK disorders with increasing age. (3,24). The female population have higher burden of MSD compared to the males. Also, the difference in DALY index between men and women above 10 years of age increased sequentially with increasing age up to 60 years and from 60 to 74 this difference remained constant but after 74 years of age the difference between the DALY index of these two groups significantly decreased. Likewise, the study by Cross et al, in the year 2014, indicated that the standardized prevalence based on age was higher in women than men and prevalence increased steadily with age (25).

The study led by Hoy at el study in 2014 showed that low back pain was higher in men than women, and in this study, the age group of 65 to 79 years had the highest DALY for low back pain (9).

Out of the 6 types of MSK disorders, Low back pain, Neck pain had the highest DALY in all age groups in the EMRO region and all 6 types of MSK disorders with the exception of Gout was found to be more prevalent in women than men in all age groups both, in EMRO region and the globally. The results of the present study revealed the prevalence of Low back pain in all age groups over 10 years of age, which concurs with results of the study by Briggs at el in 2018 (2).Gout was found to possess the lowest DALY value (497 DALY per 100000 population) among various types of MSK disorders in our study which is in line with the findings of Hoy et al in 2014(9). The age group of 70-74 years had the highest DALY score for neck pain disorders and study by Hoy at el (2014) confirmed that it was higher in women compared to men. The results of Hoy et al (2012) mentioned back pain to be a major problem worldwide, which was more prevalent in among women aged 40-80 years (26).

In fact, according to the results, the prevalence per capita for MSK disorders was lower in 2017 than in 2000 in EMRO region compared to the world. Accordingly, the prevalence of MSK disorders standardized by age was recorded highest in Western Europe followed by Middle East and lowest was recorded in Latin America (4). In the EMRO region, Bahrain, Iran and Morocco had the highest incidence of MSK, respectively, and Somalia, Djibouti and Afghanistan had the lowest incidence of MSK disorders. A study from Egypt found that 16.2% of adults suffered pain from MSK related disorders. (27). It should be noted that Iran, Bahrain and Qatar are middle- high-income countries of EMRO besides, countries such as Iraq and Yemen were not war-zoned at the time of study, and it should be brought to attention that the researches evaluating MSK disorders in countries like Iran has been carried out on large scale unlike other countries of the EMRO zone, adding more evidence to the database which possibly explains the higher incidence of MSK disorders in Iran.

The prevalence of MSK disorders has been given much emphasis in developing countries owing to increase in obesity and early ageing of population(29) MSK disorders imposes heavy diagnostic-therapeutic costs for the individual, the health system, and the community, and the most direct costs being related to physiotherapy, inpatient services, pharmacy, and primary care (30).Hence, preventive measures for these disorders significantly could reduce the disease burden and costs imposed on the individual and society. Therefore, it is recommended to perform extensive practical researches in the field of health maintenance and prevention measures for MSK disorders in order to encourage a healthy lifestyle with the aim of reducing obesity and increase physical activity and make the data accessible for policy-makers.

Conclusion

It is well known that MSK disorders at present, account for a large proportion of disability in the world. More people will suffer from MSK as the population grows and with increase in obesity, and it is expected to keep spiking over the coming decades. The current trend for MSK disease burden, especially in developing countries, is clearly high, and given the high prevalence and high burden of, obviously government programs and health policy makers should pay more heed on preventive care and rehabilitation (11) especially since low-income countries are direly affected and since MSK disorders tend to be more prevalent in middle and low income countries(20). On one hand, the growth of the elderly population in countries around the world, especially developing countries such as Iran, aging in the near future, and on the other hand, to achieve sustainable development goals and promote a fulfilling healthy decade of 2020-2030 for the elderly, innovative and continuous efforts must be made on improving MSK health.

Declarations

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Authors' contributions

JY, AK and MZ: data collection, study design, data analysis, writing and revising the manuscript. MS and FM: data extraction, data analysis, revision of manuscript. H.M and RH: study design, revision of manuscript. The authors read and approved the final manuscript.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are available in the [the Global Burden of Disease study (GBD)] repository, [<https://vizhub.healthdata.org/gbd-compare/>]

Ethics approval and consent to participate

Not applicable in this section.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Figures

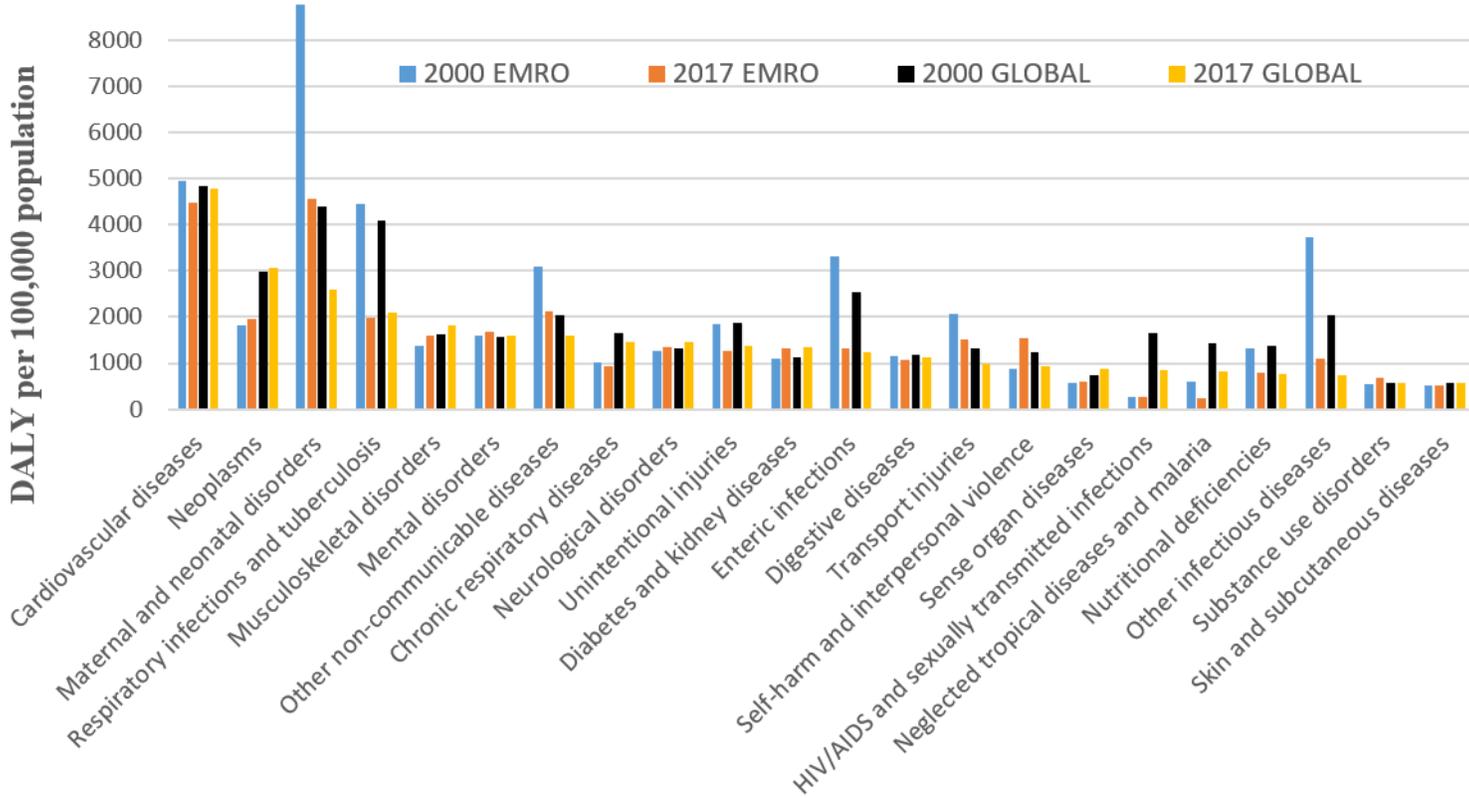


Figure 1 depicts the difference between the DALY lost and the types of disorders between EMRO and the world in 2000 to 2017(We used data from the Global Burden of Disease study (GBD) 2000-2017)

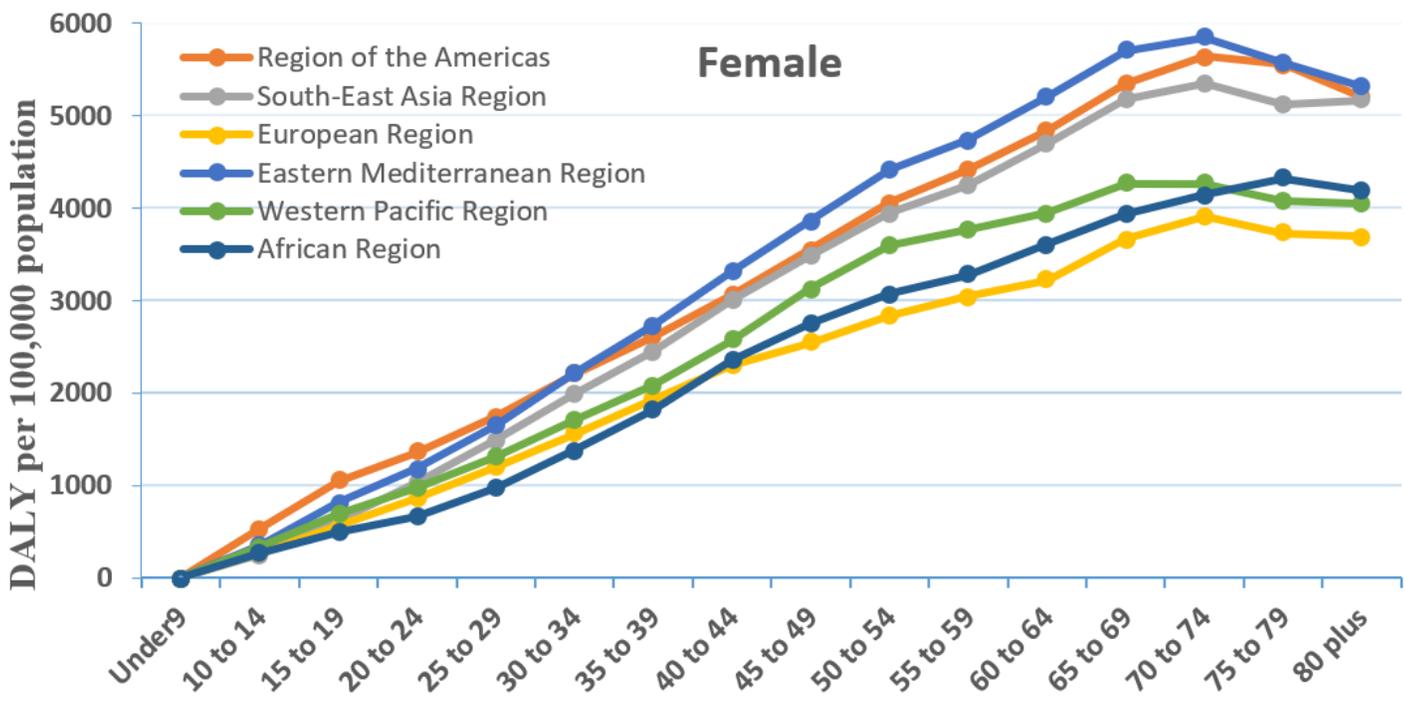


Figure 2 shows the MSK disorder for the six WHO regions for women distinguished by age group

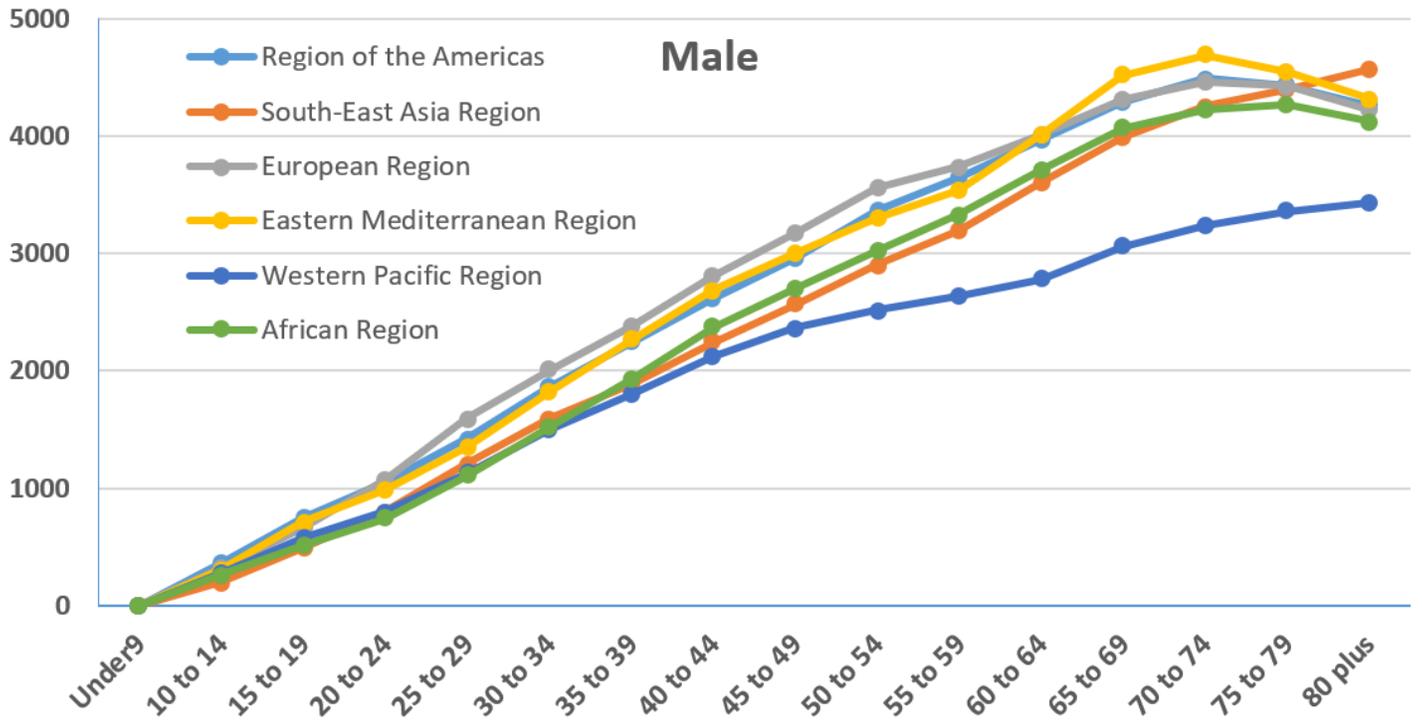


Figure 3

shows the MSK disorder for the six WHO regions for men distinguished by age group

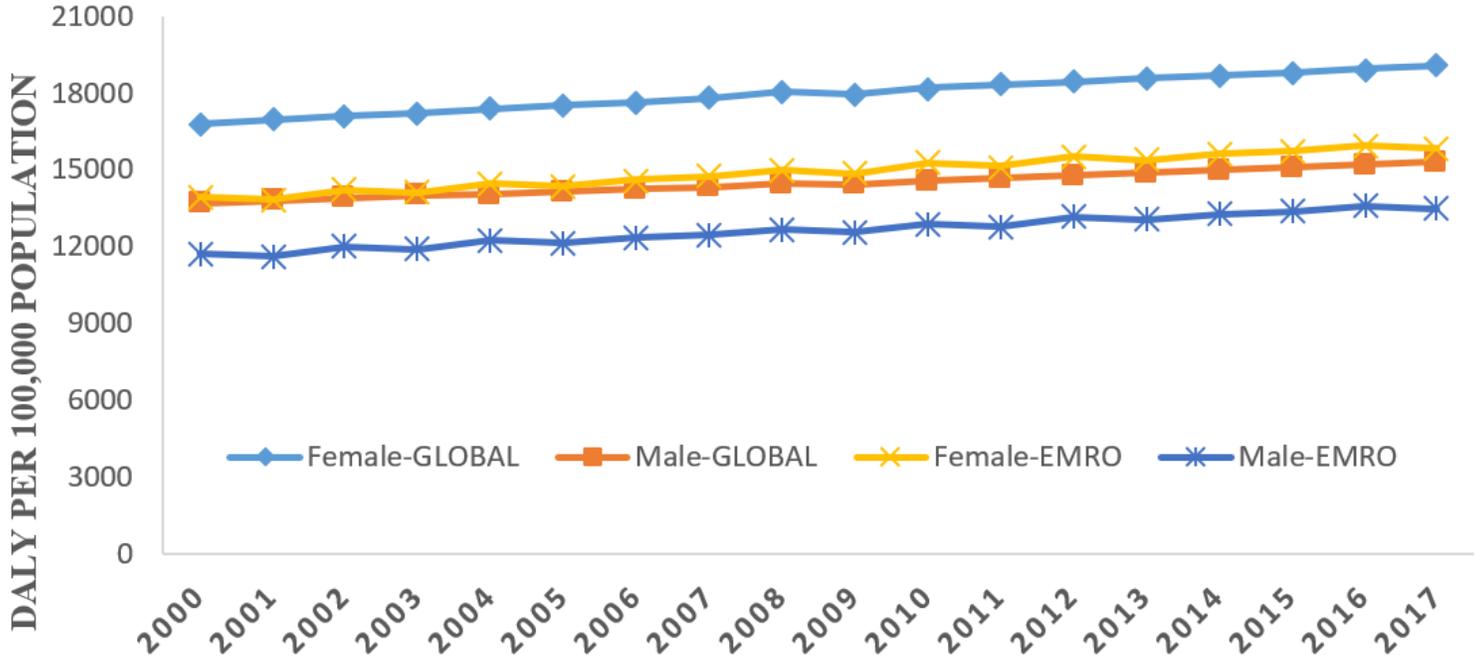


Figure 4

Prevalence of musculoskeletal disorders based on gender during the period 2000-2017

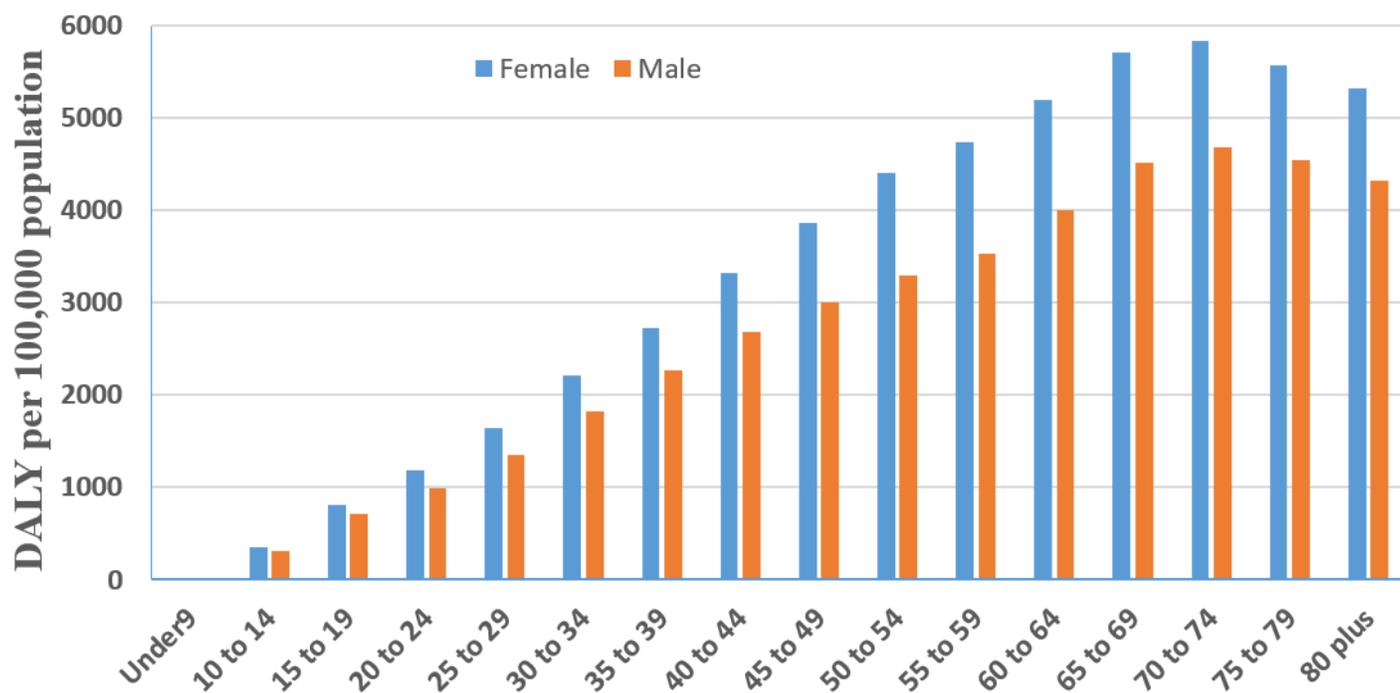


Figure 5
DALY of musculoskeletal disorders differentiated by gender and age group for EMRO region in 2017

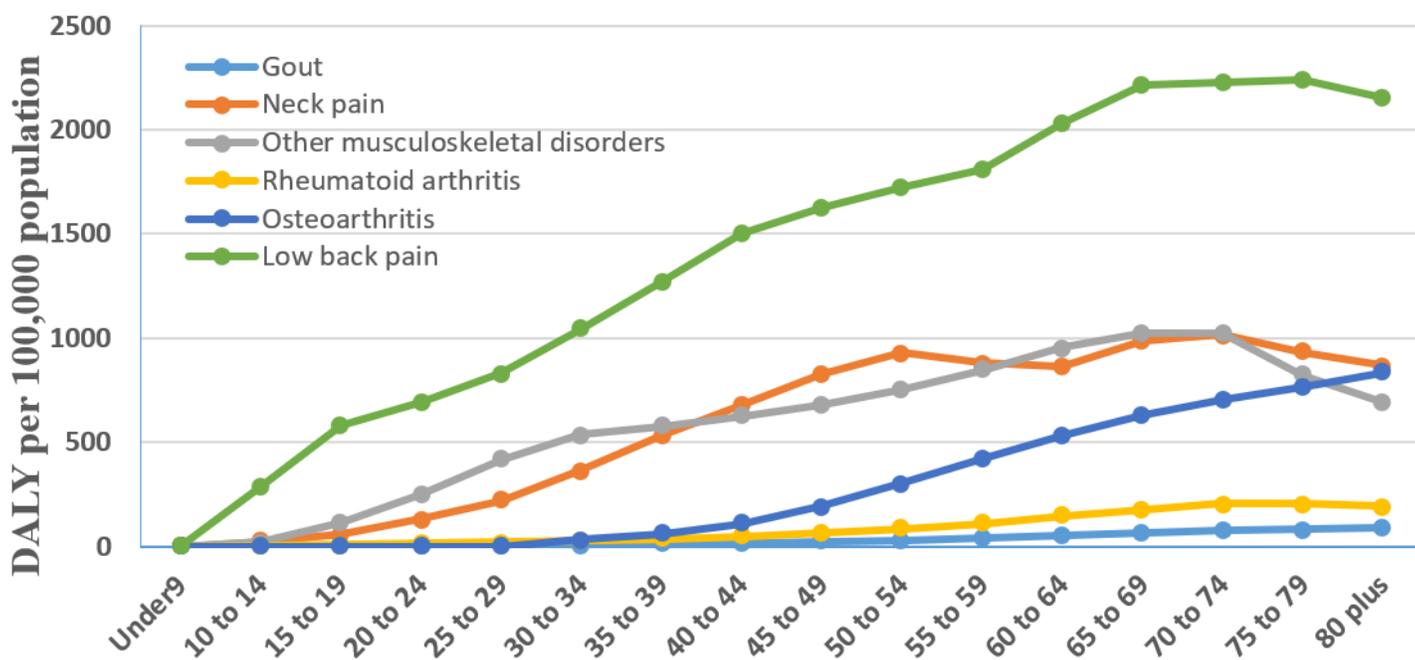


Figure 6
DALY Trend for 2017, based on age and type of musculoskeletal disorders

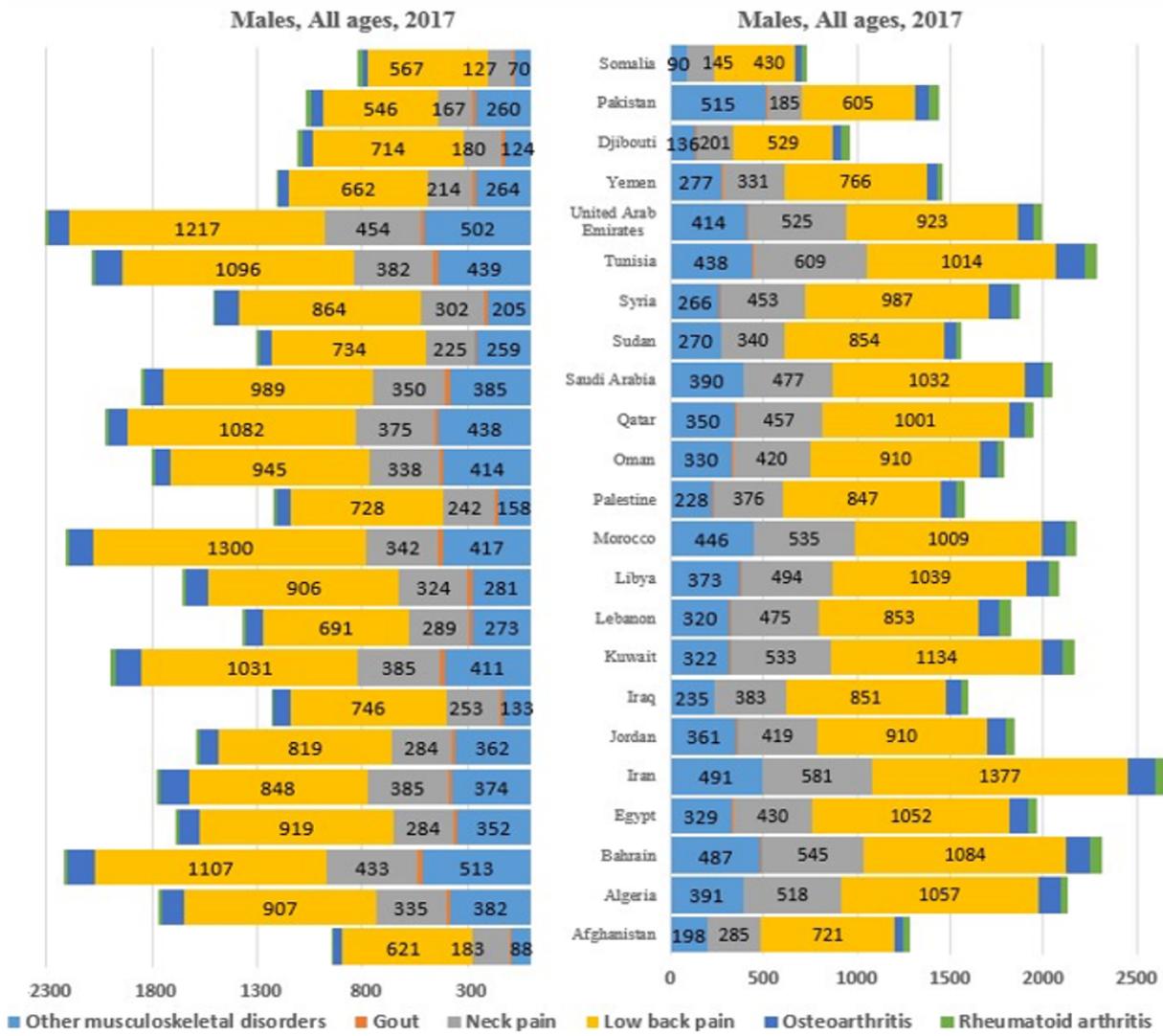


Figure 7
DALY (per 100,000 people) for musculoskeletal disorders distinguished by gender and countries of EMRO region