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Evaluation of musculoskeletal complaints, treatment approaches, and patient perceptions in family medicine clinics in a tertiary center in Jordan: a cross-sectional study

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Abstract

Background Musculoskeletal (MSK) conditions, such as back pain and joint disorders, are common globally and significantly burden healthcare systems. Family medicine clinics serve as the first point of care, requiring providers to manage diverse MSK issues and address gender-specific differences, especially in regions with limited resources, like the Middle East. This study evaluates MSK management, gender differences, and patient perceptions in Jordanian family medicine clinics, aiming to improve care strategies and outcomes in similar settings.

Methods This cross-sectional study included 500 adults with musculoskeletal complaints at a Jordanian teaching hospital (January–June 2024). Data were collected via interviews and records, focusing on patient perceptions and health profiles. Ethical approval and informed consent were obtained. Analysis was conducted in SPSS with $p < 0.05$ as the significance threshold.

Results In our study of 500 patients (mean age 46.1 years, 61.5% female), key gender differences emerged. Females had a higher prevalence of low back pain (61.9% vs. 38.1%, $p = 0.024$) and hip pain (100%, $p = 0.008$), as well as greater anxiety about disease progression (62.2% vs. 37.8%, $p = 0.045$) and fear of disability (64.2% vs. 35.8%, $p = 0.048$). Females also reported lower mental health ($p = 0.036$), sleep quality ($p = 0.044$), and overall quality of life ($p = 0.019$). In contrast, males showed higher workload (54.4% vs. 45.6%, $p = 0.020$), more work-related injuries (82.8%, $p < 0.001$), and greater disability ($p = 0.024$) with lower functional status ($p = 0.041$). These findings underscore significant gender-specific needs in MSK care.

Conclusion Our study reveals notable gender-based differences in musculoskeletal complaints and treatment experiences in a Jordanian tertiary setting. Females reported higher rates of low back and hip pain, more frequent

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referrals, and lower quality of life, while males experienced greater occupational strain, work-related injuries, and disability.

Keywords Musculoskeletal disease, Quality of life, Psychosocial factors, Gender disparities, Patient perceptions, Patient satisfaction, Healthcare systems

Background

Orthopedic conditions are among the most common health complaints encountered globally, affecting millions of individuals of various ages and backgrounds [1–3]. Conditions such as back pain, neck pain, and joint disorders, including osteoarthritis and tendonitis, are frequent presentations in medical clinics [4–6]. These musculoskeletal (MSK) complaints often lead to discomfort, reduced mobility, and a decreased quality of life [7]. Due to the high prevalence of these conditions, patients frequently seek medical advice to alleviate symptoms such as pain, stiffness, and functional limitations. Consequently, musculoskeletal disorders represent a significant burden on healthcare systems worldwide, highlighting the importance of effective management strategies [8, 9].

In many cases, family medicine or primary care clinics serve as the initial point of contact for patients with MSK complaints [10]. This can present a significant challenge for primary healthcare providers, as they must be equipped to manage a wide variety of musculoskeletal conditions. The diversity of orthopedic presentations, combined with the complexity of differentiating between acute, chronic, and potentially serious conditions, places substantial pressure on family medicine systems [11, 12]. Primary care physicians are tasked with providing accurate diagnoses, implementing appropriate management plans, and determining when to refer patients to specialists. These challenges underscore the critical role of family medicine in the early diagnosis and management of orthopedic conditions.

Given the high volume of musculoskeletal complaints seen in family medicine clinics, it is essential to evaluate how these conditions are managed and the effectiveness of the treatment approaches employed [13, 14]. Equally important is the assessment of patient perceptions regarding the quality of care they receive. Patient satisfaction and their perception of the quality of care are vital components of healthcare delivery, as they directly influence patient compliance and health outcomes [15, 16]. Understanding the patient experience, particularly in relation to musculoskeletal disorders, can provide valuable insights into the effectiveness of current healthcare practices and highlight areas for improvement.

While global studies highlight the prevalence and impact of MSK disorders, there is limited evidence on how these conditions are managed in primary care, particularly in family medicine clinics. This is especially true in developing regions, such as the Middle East, where healthcare systems face unique challenges, including resource constraints and inconsistent service delivery [17, 18]. Existing research provides valuable insights into MSK management in high-income countries, but it does not account for the socio-economic, cultural, and systemic factors that influence care in resource-limited settings.

Despite these challenges, the extent to which MSK care is optimized in primary care, especially in addressing gender-specific needs and patient perceptions, remains unclear. Furthermore, there is a significant gap in understanding how treatment pathways and patient outcomes are shaped by these factors in developing countries, leaving a critical grey area in the evidence. Addressing these unknowns is essential to bridge the gap between global standards of care and region-specific needs.

This study hypothesizes that variations in the presentation, management, and patient perceptions of musculoskeletal (MSK) complaints exist within family medicine clinics, influenced by factors such as gender, psychosocial considerations, and healthcare delivery practices. By investigating these variations in a tertiary center in Jordan, a developing Middle Eastern country, we aim to address gaps in the literature and provide insights into the complex interplay of these factors. The findings from this study are intended to inform strategies for improving the quality of MSK care and optimizing patient outcomes in resource-constrained healthcare systems.

Patients and methods

This study was prepared following the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guideline for cross-sectional studies [19].

Study design

We employed a cross-sectional descriptive design using a convenience sampling method. The objective was to evaluate the presentation, management, and perceptions of musculoskeletal (MSK) complaints in family medicine clinics. A comprehensive approach was taken to assess demographic variables, health profiles, comorbidities, visit-specific characteristics, healthcare-related factors, psychological dimensions, and occupational influences. This design provided a snapshot of patient care and the interplay of these factors within the study period.

Setting

The study was conducted in the family medicine clinics of a central teaching hospital in Amman, Jordan. The clinics, comprising approximately 10 units, operate throughout the week and serve a diverse patient population from urban and rural areas. Data were collected over six months, from January 1st, 2024, to June 30th, 2024, ensuring seasonal variability was captured. The research team consisted of family medicine residents trained in standardized data collection methods and supervised by 2–3 family medicine consultants. Data were gathered during routine clinical visits, ensuring real-time documentation of patient complaints and management pathways.

Participants

The study's inclusion criteria targeted adults aged 18 years or older presenting with musculoskeletal (MSK) complaints. These complaints were defined as disorders involving muscles, bones, tendons, ligaments, and connective tissues, typically manifesting as pain, stiffness, or functional impairment. To participate, individuals needed to provide informed consent and agree to interviews and data collection using their authorized medical records. This approach ensured a comprehensive understanding of the participants' MSK conditions while maintaining ethical standards.

Exclusion criteria were implemented to minimize confounding factors and ensure the reliability of the study findings. Patients with non-MSK complaints, cognitive impairments, severe trauma requiring emergency care, recent orthopedic surgeries, or advanced comorbidities such as cancer were excluded. Additionally, pregnant women were not included due to the unique nature of pregnancy-related MSK conditions. Overall, 500 participants were carefully selected, reflecting the diverse spectrum of MSK conditions commonly encountered in primary care settings.

Variables

The study variables were structured to analyze factors influencing outcomes such as patient-reported satisfaction, perceptions of care, and quality of life (QoL). Exposures included demographic factors (age, gender, socioeconomic status), health profiles, and types of musculoskeletal (MSK) complaints. Predictors and confounders, such as medical comorbidities (e.g., hypertension, diabetes), employment status, psychological variables, and work-related factors, were considered to ensure a thorough and unbiased assessment of relationships between exposures and outcomes.

Data collection and measurement

Data collection followed a structured protocol combining personalized patient interviews and reviews of electronic health records to ensure comprehensive and accurate data capture. Trained family medicine residents conducted the interviews using a standardized questionnaire specifically developed for this study.

The questionnaire was designed to capture demographic, clinical, and psychosocial variables, drawing from validated tools and existing literature on musculoskeletal complaints. Content validity was ensured through expert review, and a pilot test with 20 eligible patients refined its clarity and structure. Reliability was assessed with Cronbach's alpha, achieving a value above 0.7, and test-retest reliability showed a strong intraclass correlation coefficient (ICC) for key variables. These steps confirmed the questionnaire's validity and reliability for the study.

The interviews, conducted during routine clinic visits, gathered self-reported information on demographic, psychological, and occupational factors, while electronic health records provided clinical data on comorbidities and treatment approaches. Variables such as pain intensity and functional status were assessed using validated scales (e.g., a 0–10 pain scale). All data were recorded electronically, consolidated into a single dataset, and cross-verified for accuracy. The process adhered strictly to the predefined study timeline to maintain consistency and reliability.

Study size

A sample size of 500 was determined using a power analysis conducted in G*Power software (version 3.1.9.7), ensuring sufficient statistical power to detect meaningful associations between variables. The calculation was based on a 95% confidence level, a 5% margin of error, and an expected effect size of 0.3, derived from prior studies in musculoskeletal health research [20–23].

Bias

Efforts were made to minimize bias throughout the study. To address selection bias, convenience sampling was conducted across various clinic sessions to ensure the inclusion of a representative patient sample. Information bias was mitigated by adhering to a standardized data collection protocol, with trained interviewers ensuring consistency and uniformity in data recording. Additionally, recall bias was minimized by focusing the data collection on recent patient experiences, reducing the likelihood of inaccuracies related to memory.

Ethical considerations

In conducting this study, all ethical considerations were carefully addressed to ensure the protection and privacy

of the participants. Approval was obtained from the institutional review board (IRB) of the teaching hospital where the research was conducted, IRB approval No. (10/2024/25/22).

Informed consent was obtained from all participants prior to their inclusion in the study, ensuring that they fully understood the purpose of the research. Patient confidentiality was strictly maintained by anonymizing all data, and access to medical records was restricted to authorized personnel directly involved in the study. Furthermore, the study was conducted in accordance with the principles outlined in the Declaration of Helsinki, ensuring that all participants were treated with respect and dignity throughout the research process.

Statistical analysis

For statistical analysis, descriptive statistics were used to summarize demographic characteristics and clinical outcomes. Categorical variables were analyzed using Chi-square tests, while continuous variables were compared using t-tests or Mann-Whitney U tests, depending on the data distribution. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to explore associations between variables. All analyses were conducted using the Statistical Package for Social Sciences (SPSS version 23) and Microsoft Excel, with a p-value of less than 0.05 considered statistically significant. Data were compiled into a single electronic file for analysis to ensure consistency and accuracy throughout the study.

Dependent variables in this study included patient satisfaction, pain scores, functional status, and quality of life metrics. Independent variables comprised demographic factors (e.g., age, gender, socioeconomic status), clinical factors (e.g., MSK complaint type, comorbidities, and treatment pathways), and psychosocial factors (e.g., coping strategies, anxiety levels, and fear of disability). Variables were categorized based on their role in influencing outcomes, allowing for a structured approach to statistical analysis. Descriptive statistics summarized these variables, and inferential tests examined associations between independent variables and outcomes. This framework ensured a comprehensive understanding of the factors impacting musculoskeletal health and patient experiences.

The study methodology is illustrated in Fig. 1.

Results

Demographic and medical characteristics

The questionnaire was completed by a total of 500 patients, with a mean age of 46.11 ± 15.32 years. Of these, 305 patients (61.0%) were female. In terms of education, 332 respondents (66.3%) were university graduates. The majority of participants resided in urban areas (376, 75.2%), were married (342, 68.7%), and reported an average economic status (421, 84.4%).

Regarding medical history, hypertension (HTN) was present in 126 patients (25.2%), diabetes mellitus (DM) in 109 patients (21.8%), and cardiovascular disease (CVD) in 53 patients (10.6%). Additionally, 147 patients (29.4%) were smokers. Table 1 provides a detailed summary of the demographic and medical characteristics of the participants.

Musculoskeletal pain, treatment pathways, and patient experience in family clinics

The most frequently reported musculoskeletal complaints were low back pain (23.8%), knee pain (23.4%), and foot and ankle pain (16.9%). The median pain score was 7 (IQR 2) on a scale of 10, with females showing significantly higher odds of presenting with hip pain (OR = 1.650, $p = 0.008$) and a higher prevalence of low back pain compared to males (61.9% vs. 38.1%, OR = 1.12, $p = 0.024$). Pain scores also differed significantly between genders, with females reporting higher scores ($p < 0.001$). Most patients (98.4%) received analgesics as initial management, with no significant gender difference. Only 18.1% were referred to orthopedic specialists, while 57.3% reported receiving counseling on musculoskeletal health, and just 41.5% underwent diagnostic tests during their visits, highlighting gaps in assessment.

Patients expressed high satisfaction with their clinic visits, with a median satisfaction score of 8 (IQR 3) and counseling adequacy rated similarly at 8 (IQR 2). However, disability and functional status showed gender-specific differences: males reported higher disability scores (median 8, IQR 4) compared to females (median 4, IQR 4), while females demonstrated better functional status in daily activities (median 8, IQR 3 vs. males at 6, IQR 2). These findings underscore overall positive patient experiences alongside gender-related variations in pain, disability, and functional capabilities, summarized in Tables 2 and 3.

Patient perceptions and confidence in family medicine healthcare

Gender differences in healthcare access and perceptions revealed notable trends. Most participants reported easy access to healthcare facilities, with females slightly more likely to report difficulties, though this was not statistically significant ($p = 0.087$). Health insurance coverage was predominantly partial for both genders, with no significant differences in type. Males reported greater access to social support (OR = 1.309, $p = 0.039$), while fear of disability or loss of independence was more common among females (OR = 0.992, $p = 0.048$), highlighting distinct psychosocial concerns. Males also expressed significantly higher confidence in the healthcare system's capacity to

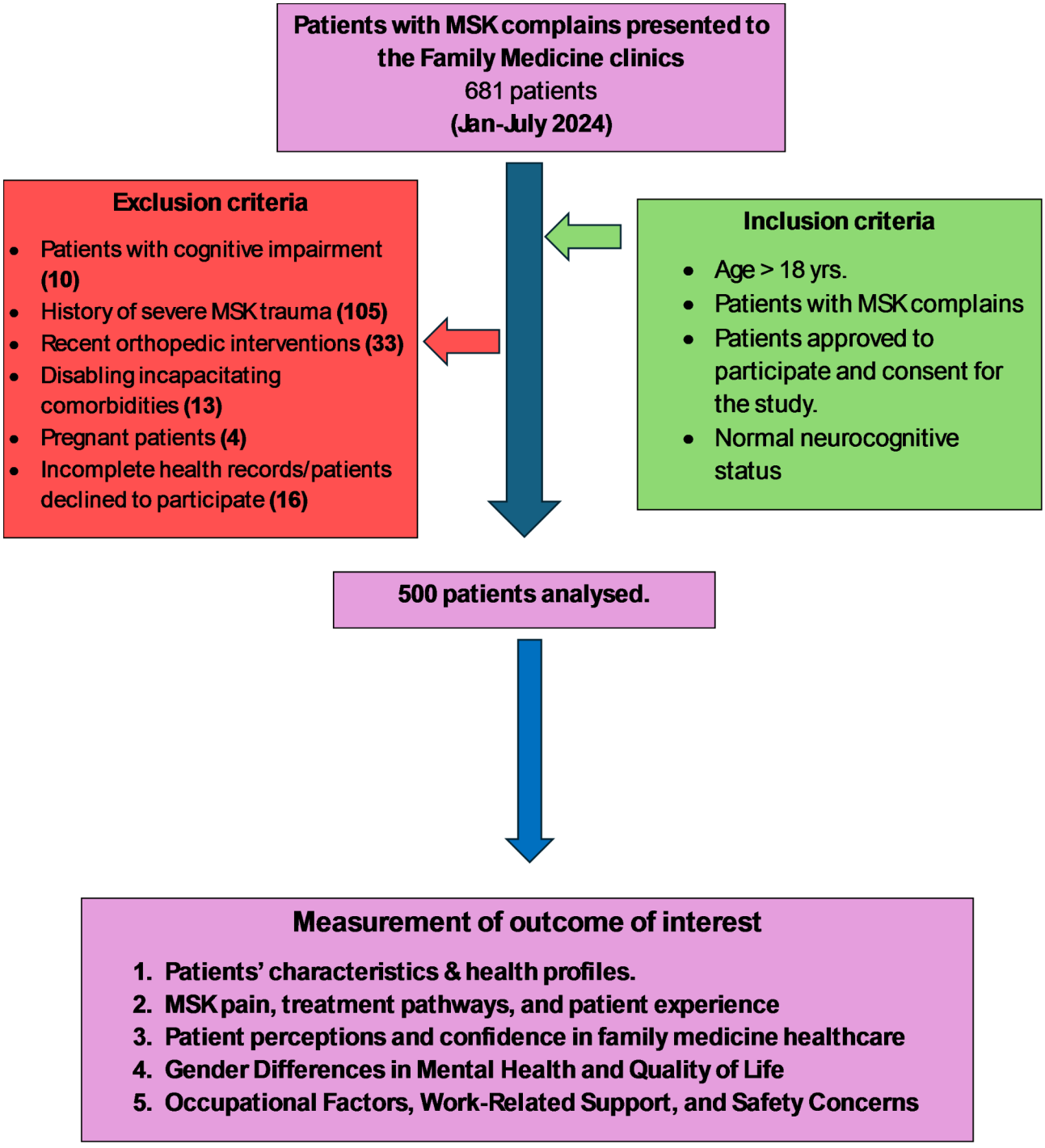

Fig. 1 flowchart summary of the study methodology

manage musculoskeletal issues (OR = 1.926, $p = 0.035$). Despite these variations, satisfaction with healthcare services was high for both genders (median score 8), and females perceived clinics as busier, though this was not statistically significant ($p = 0.082$). These findings emphasize nuanced gender differences in social support, confidence in healthcare, and psychosocial concerns, as detailed in Table 4.

Gender differences in mental health and quality of life related to musculoskeletal conditions

Gender differences in the psychosocial impact of musculoskeletal conditions reveal significant trends. Males

Table 1 Summary of patient's demographics and medical comorbidities ($n=500$)

Variable		**Mean ± SD**
Age (yrs)		46.11 ± 15.32
BMI (kg/m^2)		27.79 ± 4.66
Variable		**Frequency (%)**
Gender	Male	195 (39.0)
	Female	305 (61.0)
Education status	Undergraduate	168 (33.7)
	Graduated	332 (66.3)
Residing in	Urban	376 (75.2)
	Rural	124 (24.8)
Marital status	Single	116 (23.3)
	Married	342 (68.7)
	Divorced or widow	42 (8.0)
Economic status	Low	58 (11.6)
	Average	421 (84.4)
	High	21 (4.0)
Employment status	Employed	249 (49.8)
	Unemployed	251 (50.2)
History of HTN	Yes	126 (25.2)
	No	374 (74.8)
History of DM	Yes	109 (21.8)
	No	391 (78.2)
History of CVD	Yes	53 (10.6)
	No	447 (89.4)
History of respiratory diseases	Yes	24 (4.8)
	No	476 (95.2)
History of endocrinological diseases[¶]	Yes	48 (9.6)
	No	452 (90.4)
History of rheumatological diseases	Yes	12 (2.4)
	No	488 (97.6)
Smoking status	Smoker	147 (29.4)
	Non-smoker	353 (70.6)

BMI: Body mass index, CVD: Cardiovascular disease, DM: Diabetic mellitus, HTN: Hypertension, SD: Standard deviation. ¶: Endocrinological diseases excluding DM

Table 2 Sex-based comparison of Musculoskeletal Pain Presentation in Family clinics ($n=500$), values marked by asterisk denotes statistically significant values ($p<0.05$)

Variables (Clinical presentation)	**Male (%)**	**Female (%)**	**OR (95% CI)**	***P*-value**	**Total (%)**
Neck pain	16 (35.6)	29 (64.4)	0.870 (0.459–1.649)	0.669	45 (9.1)
Shoulder pain	18 (32.1)	38 (67.9)	0.731 (0.404–1.322)	0.299	56 (11.3)
Elbow pain	12 (44.4)	15 (55.6)	1.296 (0.593–2.832)	0.514	27 (5.4)
Wrist/Hand pain	17 (44.7)	21 (55.3)	1.321 (0.678–2.574)	0.412	38 (7.7)
Low back pain	45 (38.1)	73 (61.9)	1.12 (1.001–1.499)	**0.024***	118 (23.8)
Hip pain	0 (0.0)	11 (100.0)	1.650 (1.535–1772)	**0.008***	11 (2.2)
Knee pain	47 (40.5)	69 (59.5)	1.116 (0.730–1.707)	0.611	116 (23.4)
Foot and ankle pain	35 (41.7)	49 (58.3)	1.172 (0.727–1.889)	0.514	84 (16.9)

Table 3 Sex-based comparison of treatment pathways and patient experience in Family clinics ($n=500$). ED: 1: emergency department. Values marked with an asterisk (*) indicate statistically significant results ($P<0.05$)

Variables	Male (%)	Female (%)	OR (95% CI)	*P*-value
Referral from ED[1]	28 (49.1)	29 (50.9)	1.635 (0.939–2.846)	0.080
Pain score (out of 10, median IQR)	6 (3)	8 (2)		< **0.001***
Received analgesia from the clinic	187 (38.3)	301 (61.7)	0.621 (0.154–2.514)	0.501
Referral to physiotherapy	48 (35.8)	86 (64.2)	0.855 (0.567–1.290)	0.454
Referral to orthopedic department	37 (41.1)	53 (58.9)	1.142 (0.717–1.819)	0.575
The physicians explained MSK health and preventive measures	114 (40.1)	170 (59.9)	1.176 (0.815–1.697)	0.387
Diagnostic tests performed during the visit	75 (36.4)	131 (63.6)	0.859 (0.594–1.241)	0.418
Satisfaction with clinic visit (out of 10, median IQR)	8 (2)	8 (3)		0.347
Adequacy of counseling (out of 10, median IQR)	8 (2)	8 (3)		0.670
Disability due to current MSK issue (out of 10, median IQR)	8 (4)	4 (4)		**0.024***
Functional status (ability for daily activities, out of 10)	6 (2)	8 (3)		**0.041***

Table 4 Sex-based comparison of patient perceptions and confidence in family medicine healthcare. ($n=500$). A: Chi-square test, B: Mann-Whitney U test. CI: confidence interval, IQR: interquartile range, ORs: odds ratio. Values marked with an asterisk (*) indicate statistically significant results ($P<0.05$)

Variables	Sex		OR (95%CI)	*P*–value
	Male	Female		
Level of difficulty in accessing health-care facilities[A]			1.745 (0.917–3.322)	0.087
Easy	177 (39.8)	268 (60.2)		
Difficult	14 (27.5)	37 (72.5)		
Health insurance coverage[A]			.	0.347
Uncovered	5 (62.5)	3 (37.5)		
Partial covered	174 (37.9)	285 (62.1)		
Full covered	12 (41.4)	17 (58.6)		
Availability of social support[A]			1.309 (1.17–2.147)	**0.039***
Yes	249 (60.4)	163 (39.6)		
No	56 (66.7)	28 (5.6)		
Fear of disability or loss of independence[A]			0.992 (1.001–1.029)	**0.048***
Yes	124 (35.8)	222 (64.2)		
No	67 (44.7)	83 (55.3)		
Confidence in the healthcare system's ability to address musculoskeletal concerns[A]			1.926 (1.038–3.573)	**0.035***
Yes	176 (40.2)	262 (59.8)		
No	15 (25.9)	43 (74.1)		
Satisfaction with healthcare services, out of 10, median (IQR)[B]	8 (2)	8 (3)	.	0.845
Clinic workload and busyness level, out of 10, median (IQR)[B]	7 (3)	8 (3)	.	0.082

report greater concerns about employment and income loss (58.0% vs. 42.0%, OR = 1.525, $p=0.032$) and are more likely to use coping strategies (OR = 1.363, $p=0.036$), while females experience higher anxiety about disease progression (62.2% vs. 37.8%, OR = 1.22, $p=0.045$). Males also report better mental health (median score 9 vs. 7, $p=0.036$), sleep quality (median 8 vs. 6, $p=0.044$), and overall quality of life (median 8 vs. 6, $p=0.019$), highlighting distinct gender disparities. These findings underscore the need for gender-sensitive approaches to address coping strategies, anxiety, and quality of life in managing musculoskeletal conditions, as detailed in Table 5.

Occupational factors, work-related support, and safety concerns in patients attending a family medicine clinic

Gender-related differences in occupational factors impacting musculoskeletal health indicate that males experience a significantly higher workload, with 54.4%

Table 5 Sex-based comparison of patient self-assessment on mental health and musculoskeletal conditions in a family medicine clinic. ($n=500$) A: Chi-square test, B: Mann-Whitney U test. CI: confidence interval, IQR: interquartile range, ORs: odds ratio. Values marked with an asterisk (*) indicate statistically significant results ($P<0.05$)

Variables	Sex		OR (95%CI)	*P*–value
	Male	Female		
Coping mechanisms for dealing with musculoskeletal issues[A]			1.363 (1.16–2.028)	**0.036***
Yes	202 (59.2)	139 (40.8)		
No	103 (66.5)	52 (33.5)		
There is anxiety about future prognosis or progression of musculoskeletal conditions[A]			1.22 (1.007–1.337)	**0.045***
Yes	145 (37.8)	239 (62.2)		
No	46 (41.1)	66 (58.9)		
There is safety concerns related to medication side effects or adverse reactions[A]			1.014 (0.699–1.473)	0.990
Yes	119 (38.6)	189 (61.4)		
No	72 (38.3)	116 (61.7)		
Perceived effectiveness of safety measures (e.g., ergonomic adjustments, home modifications) in reducing risk of injury or exacerbation of symptoms[A]			1.247 (0.853–1.824)	0.291
Yes	128 (40.4)	189 (59.6)		
No	63 (35.2)	116 (64.8)		
There is impact of musculoskeletal issues on emotional well-being and quality of life[A]			1.499 (1.12–2.062)	**0.042***
Yes	168 (39.1)	262 (60.9)		
No	23 (34.8)	43 (65.2)		
There is anxiety about potential loss of employment or income due to musculoskeletal issues[A]			1.525 (1.037–2.243)	**0.032**
Yes	185 (58.0)	134 (42.0)		
No	120 (67.8)	57 (32.2)		
The quality of mental health status, out of 10, median (IQR)[B]	9 (2)	7 (2)	.	**0.036***
The quality of sleep, out of 10, median (IQR)[B]	8 (2)	6 (3)	.	**0.044***
The impact of musculoskeletal issues on social interactions and relationships, out of 10, median (IQR)[B]	6 (4)	6 (4)	.	0.987
The overall quality of life, out of 10, median (IQR)[B]	8 (1)	6 (2)	.	**0.019***

Table 6 Sex-based comparison of occupational factors, work-related support, and safety concerns in patients attending a family medicine clinic. ($n = 500$). A: Chi-square test. CI: confidence interval, IQR: interquartile range, ORs: odds ratio. Values marked with an asterisk (*) indicate statistically significant results ($P < 0.05$)

Variables	Sex		OR (95%CI)	*P*–value
	Male	Female		
Experiencing high workload in the occupational environment[A]			1.564 (1.071–2.284)	**0.020***
Yes	92 (54.4)	77 (45.6)		
No	213 (65.1)	114 (34.9)		
Engaging in prolonged physical activity in the occupational environment[A]			1.401 (0.899–2.183)	0.135
Yes	45 (45.0)	55 (55.0)		
No	146 (36.9)	250 (63.1)		
Patients report work-related injuries in the occupational environment[A]			8.623 (3.230–23.019)	**< 0.001***
Yes	24 (82.8)	5 (17.2)		
No	167 (35.8)	300 (64.2)		
Patients have access to recreational facilities for physical activity[A]			1.956 (1.353–2.828)	**< 0.001***
Yes	109 (52.4)	99 (47.6)		
No	196 (68.3)	91 (31.7)		
Safety concerns in the workplace or home environment[A]			1.092 (0.750–1.591)	0.646
Yes	121 (39.0)	189 (61.0)		
No	68 (37.0)	116 (63.0)		
Patients need to change their work, work pattern, or frequency[A]			1.679 (1.084–2.602)	**0.020***
Yes	50 (48.5)	53 (51.5)		
No	141 (36.0)	251 (64.0)		
Patients received support in their working environment[A]			0.686 (0.408–1.156)	0.156
Yes	46 (53.5)	40 (46.5)		
No	75 (44.1)	95 (55.9)		

of males reporting high workload compared to 45.6% of females (OR = 1.564, $p = 0.020$). Males are also far more likely to report work-related injuries, accounting for 82.8% of those injured (OR = 8.623, $p < 0.001$). Access to recreational facilities for physical activity is notably higher for males (52.4% vs. 47.6% for females, OR = 1.956, $p < 0.001$), and males are more frequently advised to adjust their work patterns, with 48.5% of males versus 51.5% of females receiving such recommendations (OR = 1.679, $p = 0.020$). These findings, summarized in Table 6, emphasize that males face a greater occupational burden.

Discussion

The main findings of this study reveal distinct gender differences across multiple dimensions of musculoskeletal health. Females reported a higher prevalence of conditions such as low back and hip pain, greater anxiety about disease progression, and better functional status in daily activities, but experienced higher pain levels and poorer quality of life indicators, including sleep and mental health. In contrast, males demonstrated higher confidence in the healthcare system, greater use of coping strategies, and more concerns about employment and income loss related to their conditions. These gender-specific patterns highlight the diverse experiences of patients with musculoskeletal complaints, emphasizing the importance of tailoring healthcare approaches to address the unique needs and challenges of both genders.

Greater prevalence of pain in females

Our findings indicate that female patients are significantly more likely to report pain than male patients, with a particular prevalence of low back and hip pain. Low back pain was notably more common among females, while hip pain was reported exclusively by female patients, underscoring a clear gender-specific pattern. These results align with previous studies suggesting that biological, hormonal, and psychosocial factors contribute to the higher pain prevalence and sensitivity observed in females.

Research consistently supports the greater prevalence of low back pain (LBP) in women compared to men. For instance, Wáng et al. and Brady et al. found that females exhibit higher rates of low back pain across all age groups, with this gender difference widening postmenopause [24, 25]. Schneider et al. reported a 40% prevalence of back pain among women in Germany, notably higher than in men, attributing this disparity to hormonal changes, psychological influences, and anatomical differences [26]. Furthermore, Chenot et al. observed that women not only have lower functional capacity but also higher rates of chronic LBP and a greater likelihood of experiencing depression related to LBP [27]. Our findings, consistent with these studies, underscore the need

for gender-sensitive pain management approaches to address the specific pain patterns and experiences of female patients effectively.

Notably, our study observed a higher prevalence of hip pain among female patients compared to males. This finding may be attributed to a higher incidence of hip pathologies, such as hip dysplasia, prevalent within our population [28]. However, it is important to highlight that previous studies have not specifically examined the prevalence of hip pain among patients visiting family or orthopedic clinics without a prior diagnosis of hip pathology. This gap underscores the unique contribution of our study in highlighting hip pain patterns in a general clinical population, pointing to a need for further research on undiagnosed hip pain, especially in primary care settings.

Gender differences in diagnostic and treatment approaches for musculoskeletal pain

Our study found that female patients were more likely than males to receive analgesia, referrals to physical therapy, and diagnostic testing during clinic visits. This trend may reflect the higher prevalence and intensity of musculoskeletal pain reported by females, especially in low back and hip pain, which likely prompts more extensive management and evaluation. Additionally, healthcare providers may view female patients as needing broader diagnostic and therapeutic support due to gender-based differences in pain presentation and reporting patterns. These findings suggest that clinicians may adopt a more comprehensive approach to meet the specific healthcare needs of female patients, integrating diverse diagnostic and treatment measures.

Our findings align with Barr et al., who observed that females generally use more pain-relieving medications, though it remains uncertain whether this is due to actual usage differences or potential reporting bias [29]. In contrast, Weimer et al. and Procento et al. found that females are less frequently prescribed strong opioids compared to males [30, 31], while Richardson reported that women are more likely to visit emergency departments for pain-related complaints, leading to higher rates of diagnostic evaluations [32]. Our results align with these findings, demonstrating that female patients not only receive more referrals to physical therapy and diagnostic evaluations but also utilize a broader range of pain management strategies compared to their male counterparts.

Greater disability, reduced functional status, and employment anxiety in male patients

Our study found that male patients with musculoskeletal (MSK) conditions report higher levels of disability, lower functional status, and greater anxiety about potential loss of employment or income compared to female patients. This suggests that MSK conditions may affect men differently, likely due to societal expectations that emphasize physical capacity and occupational stability. Physical limitations from MSK conditions can directly impact male patients' job performance, particularly in physically demanding roles, potentially explaining the increased levels of disability and functional impairment we observed. Additionally, as males often carry primary financial responsibilities, their concerns about job and income stability may be heightened. These findings highlight the importance of integrated MSK management that includes occupational support to address both physical limitations and economic concerns specific to male patients.

Our findings align with gender-based patterns reported in prior research on MSK disorders, with notable similarities and contrasts. Consistent with our results, Wolf et al. and Raina et al. observed that males with MSK conditions experience greater disability, reduced functional status, and higher employment anxiety [33, 34]. Conversely, Holland et al. and Stubbs et al. reported that females often experience more pain-related disability and are more likely to leave employment, potentially reflecting a different coping mechanism compared to males [35, 36]. Supporting our observation of functional impairment in male patients, Zink et al. found severe disability in males with specific MSK conditions like ankylosing spondylitis [37], while Wijnhoven et al. identified greater work-related disability in men with low back pain [38]. Additionally, Bailey et al. noted that men are more frequently referred to mental health services for work-related issues, suggesting added psychological strain in employment settings [39]. Together, these studies underscore the complex employment-related challenges faced by male MSK patients and the need for occupational and psychological support tailored to their specific needs.

Lower social support, higher anxiety, and coping challenges in female patients

Our study found that female patients with musculoskeletal (MSK) conditions reported lower levels of social support, a greater fear of disability and loss of independence, fewer coping mechanisms, and increased anxiety about disease progression compared to their male counterparts. These findings may reflect social and cultural dynamics in which females have limited access to social resources or perceive less support in managing chronic health conditions. This reduced social support, combined with an elevated fear of disability, could contribute to heightened anxiety, as managing chronic pain without sufficient support or effective coping strategies can intensify concerns about the condition's impact on their future independence. These observations underscore the need for integrated support systems and psychosocial interventions

that enhance coping skills and directly address the unique challenges faced by female MSK patients.

Previous research supports these findings and offers further insight into the coping challenges and psychosocial dynamics specific to female MSK patients. Grossi et al. observed that females with musculoskeletal pain report lower coping capacity, which correlates with higher levels of emotional distress and greater disability [40]. Similarly, Soares et al. found that lower self-esteem among female patients with MSK pain is associated with increased anxiety and depression, while positive self-esteem aligns with active coping mechanisms [41]. Espwall et al. noted that women with undefined MSK disorders receive less emotional support than those with non-MSK conditions, potentially exacerbating their psychosocial burdens [42]. Further, Cheng et al. reported that females with chronic MSK pain experience worse physical functioning than males [43]. Together, these studies and our findings highlight the importance of tailored psychosocial support to bolster coping strategies and enhance social support for female MSK patients, aiming to improve both mental health and physical outcomes.

Challenges in mental health and quality of life for female patients with MSK disorders

Our study found that female patients with musculoskeletal (MSK) conditions experience a greater impact on emotional well-being, with lower reported quality of mental health, poorer sleep quality, and a reduced overall quality of life compared to males. This pattern may reflect the compounded effect of higher pain prevalence, reduced social support, and fewer coping mechanisms among female patients, contributing to increased emotional and physical strain. These findings emphasize the need for comprehensive care approaches that address mental health, improve sleep quality, and support overall quality of life in female MSK patients.

Previous studies reinforce our findings on the emotional and quality-of-life impacts of MSK conditions in female patients. Björnsdóttir et al. similarly reported that chronic musculoskeletal pain is linked to poor mental health, diminished quality of life, and disrupted sleep in women [44], mirroring the challenges we observed. Heikkinen et al. also found that common musculoskeletal conditions are associated with worsened mental health, especially in adults over 45 [45], aligning with our study's results on mental health impact in female MSK patients. Additionally, Molina et al. observed significant psychological distress and reduced quality of life in adolescents with idiopathic MSK pain, suggesting that these effects span across ages [46]. Together, these studies and our findings underscore the need for targeted mental health and quality-of-life interventions for female MSK patients.

Gender-based disparities in occupational strain and workplace support among MSK patients

Our study reveals notable gender-based differences in occupational strain and workplace support for patients with musculoskeletal (MSK) conditions. Male patients reported significantly higher workloads and more frequent work-related injuries, likely due to greater engagement in physically demanding roles, which may exacerbate MSK-related risks and severity. Conversely, female patients reported less access to recreational activities, received less workplace support, and demonstrated a stronger interest in modifying their work environments or patterns. This disparity suggests that female-dominated roles may offer fewer opportunities for physical respite and support, which could intensify MSK-related strain. Addressing these differences through targeted workplace interventions—such as injury prevention programs for men and increased support and recreation access for women—may help alleviate the occupational burden of MSK conditions for both genders.

Previous research on the occupational impact of MSK complaints is sparse. However, Wolf et al. reported similar findings, noting that men with MSK conditions face higher workloads and more work-related injuries, while women have less access to recreational activities and workplace support, and show more interest in changing work environments [33]. These findings underscore the importance of further research into the occupational ramifications of MSK conditions to develop effective, gender-sensitive interventions.

Integrating patient perspectives and multidisciplinary approaches in musculoskeletal pain management

Addressing musculoskeletal (MSK) complaints effectively requires integrating patient perspectives and expectations into care strategies, as this approach has been shown to enhance satisfaction and treatment outcomes [47, 48]. Understanding individual experiences enables clinicians to align treatment goals with patient needs, fostering trust and improving adherence to management plans. Additionally, managing MSK conditions through a multidisciplinary team, including physicians, nurses, and physiotherapists, has demonstrated superior outcomes by addressing the complex and multifaceted nature of these conditions [49, 50]. This collaborative approach ensures comprehensive assessments, personalized interventions, and enhanced patient satisfaction. Together, these strategies highlight the importance of patient-centered and team-based care in optimizing MSK management and improving healthcare delivery.

Need for policy development and research in Jordan and the broader middle east

Our study highlights a critical need for targeted health policy development in Jordan and the broader Middle East to address the gender-specific impacts of musculoskeletal (MSK) conditions. Findings from our research reveal notable differences in pain prevalence, treatment approaches, occupational strain, and psychosocial effects between male and female MSK patients. However, there is a distinct lack of research investigating these issues within Middle Eastern populations. Existing studies on MSK conditions are primarily focused on Western contexts, where health policies, social norms, and workplace practices differ considerably from those in the Middle East, leaving critical gaps in region-specific knowledge.

Addressing these gaps requires comprehensive, gender-sensitive research across the Middle East to understand the unique social, cultural, and occupational factors influencing MSK conditions. Such studies could inform the development of policies tailored to the needs of Middle Eastern populations, ultimately guiding healthcare practices, workplace safety standards, and psychosocial support mechanisms for MSK patients. Implementing these policies would promote more equitable healthcare access, safer work environments, and stronger support systems, enhancing quality of life for MSK patients in Jordan and the broader region.

Strength and limitations

Our study provides valuable insights into musculoskeletal (MSK) complaints and their management in a Jordanian tertiary care setting, with notable strengths and limitations. A key strength is the focus on gender-specific differences, addressing significant gaps in regional literature, while the urban hospital setting allowed us to capture a broad and diverse patient profile reflective of similar healthcare contexts. The use of a structured protocol ensured reliable data collection, and the findings offer a foundation for future research and policy development. However, the cross-sectional design limits longitudinal analysis, and the use of a self-created questionnaire may reduce comparability with validated tools. Additionally, reliance on self-reported data introduces potential subjective bias, and the biological or social mechanisms behind observed gender differences were not explored. Despite these limitations, the study provides essential data to guide clinical practices and inform healthcare strategies in the region.

Clinical implications and key clinical considerations

Based on our study findings, several clinical implications emerge. Gender differences in pain prevalence and intensity, particularly the higher rates of low back and hip pain among female patients, emphasize the importance of adopting individualized pain management strategies. Tailored evaluations and treatments that consider gender-specific pain patterns are essential for improving patient outcomes and enhancing treatment adherence.

The study also highlights the need for integrated psychosocial support services. Female patients reported a greater impact on emotional well-being, lower mental health scores, and increased anxiety about disease progression. To address this, clinics should incorporate routine mental health screenings and psychosocial support into musculoskeletal (MSK) care. Providing resources for coping strategies, emotional support, and stress management can significantly reduce mental health burdens and improve the overall quality of life for these patients.

Workplace-focused interventions are crucial for addressing the higher incidence of work-related injuries and physically demanding workloads among male patients. Collaborations with occupational health programs can provide injury prevention guidance, ergonomic recommendations, and workplace safety consultations. Such initiatives are especially beneficial for patients engaged in physically intensive roles.

Proactive monitoring and follow-up care are also essential, particularly for female patients who received more diagnostic tests and physical therapy referrals. Establishing structured follow-up systems ensures comprehensive care continuity and enables timely reassessment of pain and functional status. This approach is particularly beneficial for high-risk groups, optimizing long-term outcomes and preventing the progression of MSK conditions.

Lastly, the findings reveal the need for strengthening social and mental health support for female patients. Many reported lower social support and higher anxiety related to disease progression and disability. Clinics should prioritize developing support networks and mental health resources tailored to women. Initiatives such as peer support groups, community resources, anxiety management workshops, and individual counseling can help patients manage fears about future disability, foster resilience, and improve emotional well-being.

Conclusion

In conclusion, our study reveals significant gender-based differences in musculoskeletal complaints, treatment approaches, and patient perceptions in a Jordanian tertiary care setting. Female patients experienced higher rates of low back and hip pain, more frequent diagnostic testing and physical therapy referrals, as well as greater anxiety about disease progression, lower social support, and reduced quality of life. In contrast, male patients reported higher occupational workloads, more work-related injuries, increased disability, and greater anxiety about income loss due to MSK conditions. These findings

highlight the importance of gender-sensitive approaches in MSK management that address both physical and psychosocial needs to improve patient outcomes and quality of life.

Abbreviations

MSK	Musculoskeletal
LBP	Low back pain
HTN	Hypertension
DM	Diabetes mellitus
CVD	Cardiovascular disease
BMI	Body mass index
IQR	Interquartile range
OR	Odds ratio
CI	Confidence interval
SD	Standard deviation
SPSS	Statistical package for social sciences
ED	Emergency department
IRB	Institutional review board
WHO	World health organization

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Author contributions
Dr. Moh'd S. Dawod led the study conception, design, and overall supervision, contributing to data analysis and interpretation. Dr. Mohammad N. Alswerki significantly contributed to the study's methodology, oversaw data collection, and played a key role in data analysis and manuscript drafting. Dr. Ahmad F. Alelaumi participated in data acquisition, statistical analysis, and provided critical revisions to the manuscript. Dr. Jehad Feras AlSamhori contributed to data collection and assisted in the interpretation of findings. Dr. Rana J. Rahhal contributed to data collection and assisted in the interpretation of findings. Dr. Lina Khraisat contributed to the literature review and manuscript preparation. Dr. Eman Mohammad Arabas contributed to the literature review and manuscript preparation. Dr. Hussein M. Bdair assisted with data validation and initial drafting. Dr. Reem M. Alhyari assisted with data validation and initial drafting. Dr. Mohammad Shahin was involved in data entry and contributed to the final manuscript revision. Dr. Mohammad Abu Hilal was involved in data entry and contributed to the final manuscript revision. Dr. Alaa Y. Akel provided additional feedback and approved the final manuscript. Dr. Aws Khanfar provided additional feedback and approved the final manuscript.

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Data availability
The datasets and materials used and analyzed in this study are available from the corresponding author on reasonable request. Access may be subject to institutional data-sharing policies.

Declarations

Ethics approval and consent to participate
This study was conducted in full compliance with the Declaration of Helsinki and was approved by the Mutah University Ethical Committee for Clinical Research (IRB approval no. 10/2024/25/22. All participants provided written informed consent prior to enrollment, with assurance of confidentiality and voluntary participation.

Consent for publication
Participants provided written consent for the publication of anonymized data obtained in this study.

Competing interests
The authors declare no competing interests.

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