ORIGINAL ARTICLE

Understanding the Impact of Musculoskeletal Symptoms on Dizziness among Adults in the Saudi Community

Abdulmalik B. Albaker[1], Nourah A. Alresaini[2], Atheer A. Algahtani[3], Eithar I. Albalawi[4], Hissah F. Alhammad[5], Mashaa S. Dosary[4], Taif A.Yaseen[4], Khames T. Alzahrani[6]

[1]Department of OrthopaedicS, College of Medicine, Majmaah University, Majmaah, Saudi Arabia, [2]Department of Physiothery, Batterjee Medical College, Jeddah, Kingdom of Saudi Arabia, [3]Department of Physiothery, King Abdulaziz University Graduate, Jeddah, Kingdomof Saudi Arabia, [4]Department of Physiothery, University of Tabuk Graduate, Tabuk, Saudi Arabia, [5]Department of Physical Therapy, Qassim University, Qassim, Saudi Arabia, [6]Department of Dental Surgery, PGD Endodontics from Stanford University, Saudi Board of Endodontics, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

Abstract

Introduction: Musculoskeletal pain is a frequent complaint among individuals experiencing long-term dizziness, often presenting in recognizable patterns across various body regions. This prevalence highlights the need for clinical attention to the musculoskeletal system in dizzy patients. Cervicogenic dizziness, originating from cervical spine dysfunction, is increasingly recognized. Despite the clear link between dizziness and musculoskeletal complaints, current literature often focuses on specific body parts, primarily examines clinical samples, and lacks standardized, culturally validated tools for simultaneous assessment. Consequently, the comprehensive impact of multisite musculoskeletal pain on dizziness in the general adult population, especially within Arabic-speaking groups, remains largely unexplored. **Objectives:** This study aims to investigate the relationship between musculoskeletal symptoms and the frequency and severity of dizziness among adults in the Saudi community, addressing a significant knowledge gap. **Methods:** A cross-sectional study was conducted from July to November 2025 using a structured, self-administered online questionnaire distributed through social media. Adults aged ≥18 years with neck or upper back pain were recruited using convenience sampling, while participants with diagnosed neurological/vestibular disorders (e.g., Ménière's disease and multiple sclerosis), traumatic musculoskeletal injury, or pregnancy were excluded. Measures included demographic characteristics and validated Arabic versions of the Dizziness Handicap Inventory and the Extended Nordic Musculoskeletal Questionnaire, with additional assessment using the Neck Disability Index (NDI) and the short International Physical Activity Questionnaire. Data were analyzed using the Statistical Package for the Social Sciences (version 20). **Results:** A total of 436 participants were included (mean age 35.0 ± 12.3 years), most of whom were female (65.1%) and Saudi nationals (91.3%). Overall, dizziness severity was predominantly low (84.2%), with 12.2% reporting moderate dizziness and 3.7% reporting high dizziness. Movement- and position-related triggers were commonly endorsed, including rapid head movement (44.3%), bending forward (27.3%), looking upward (22.5%), and turning over in bed (15.4%). Exertion-related worsening of dizziness was reported by 39.0%, while 14.9% reported interference with work/household responsibilities, and 10.3% perceived dizziness-related disability. Most of the participants had mild neck-related disability by NDI (89.9%), and most reported low physical activity (70.6%). Dizziness level was significantly associated with residential area (P = 0.0001), while physical activity level was associated with age, gender, and marital status (P = 0.002, 0.003, and 0.015, respectively). **Conclusion:** In this community sample with neck/upper back pain, dizziness was usually low in severity but commonly provoked by head/neck movements and exertion, supporting routine screening for dizziness triggers alongside musculoskeletal assessment in primary care.

Key words: Cervicogenic dizziness, dizziness, musculoskeletal symptoms, risk factors, Saudi Arabia

Address for correspondence:
Khames T. Alzahrani, Department of Dental Surgery, PGD Endodontics from Stanford University, Saudi Board of Endodontics, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia. Phone: ???. AQ2
E-mail: dr.khames.alzahrani@gmail.com

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INTRODUCTION

Musculoskeletal pain is a frequent complaint among individuals suffering from long-term dizziness, often presenting in recognizable patterns that affect various regions of the body.[1] The high prevalence of this type of pain among dizzy patients emphasizes the need for greater clinical attention to the musculoskeletal system in this population.[2] Furthermore, dizziness is closely linked to patients' physical health status, with pain symptoms often accompanying or worsening the overall condition.[3] In certain conditions, such as Whiplash-associated disorder (WAD), persistent dizziness has been associated with a combination of cervical musculoskeletal issues, physical dysfunction, and psychological factors, even after completing rehabilitation programs.[4] Cervicogenic dizziness is recognized as a condition where dizziness originates from cervical spine dysfunction, and it has been increasingly acknowledged over the past few decades due to advances in diagnostic methods.[5] In a large multi-center study, the prevalence of cervicogenic dizziness among patients with neck pain was reported to be substantial, highlighting its clinical significance.[6] Patients often present with a complex combination of symptoms, including neck pain, impaired balance, and motion sensitivity, which complicate diagnosis and management.[7]

Numerous research have investigated the connection between dizziness and musculoskeletal complaints, with a particular emphasis on persistent dizziness and dysfunction related to the cervical region. 94.5% of patients with chronic dizziness in the cross-sectional study by Moen *et al*.[1] reported having musculoskeletal pain, most often in the lower back, shoulder, and neck. The study found that higher scores on the Dizziness Handicap Inventory (DHI) and greater dizziness severity were significantly correlated with a greater number of musculoskeletal pain sites. This suggests that dizziness is not just a result of vestibular dysfunction but is frequently linked to a wide range of musculoskeletal complaints.

Building on this, Moen *et al*.[8] discovered that even after obtaining professional recommendations, people who came with both psychological distress and musculoskeletal pain were more likely to have poor outcomes and ongoing disability linked to dizziness. This suggests that the prognosis of dizziness may be influenced by both physical and emotional variables, and that a biopsychosocial approach should be used to address dizziness.

Regarding Saudi Arabia, Alharbi *et al*.[9] in a comprehensive epidemiological investigation, found that dizziness was a very common occurrence, affecting 42.97% of Saudi adults. However, the study pointed out that vestibular or systemic reason continued to be the main focus, and musculoskeletal causes were not regularly evaluated. It did not examine potential physical causes, such as dysfunction of the neck or shoulders, even if it was helpful in describing demographic patterns of dizziness.

Although the insightful information these studies offer, they all have similar limitations. Specifically, the majority of current literature focuses on specific body parts, like the neck, rather than a thorough musculoskeletal profile; focuses primarily on clinical samples (such as patients with chronic dizziness), rather than community-dwelling adults; and fails to use standardized and culturally validated tools to assess musculoskeletal symptoms and dizziness severity at the same time. The impact of multisite musculoskeletal pain on the feeling of dizziness in the overall adult population, especially in Arabic-speaking groups, is thus still clearly unknown. To examine this association in a Saudi population, no previous research has used the Arabic DHI and the Arabic Extended Nordic Musculoskeletal Questionnaire (Ar-NMQ-E).

Musculoskeletal symptoms and dizziness are both commonly reported among adults and can significantly affect daily functioning and quality of life. While each condition has been extensively studied on its own, its potential interrelationship – particularly involving the cervical and upper back regions – has received limited attention, especially within Saudi Arabia.

This study aims to fill a knowledge gap by exploring the relationship between musculoskeletal symptoms and dizziness among Saudi adults. Although both issues are prevalent, dizziness is often misunderstood or misattributed, and its possible association with musculoskeletal dysfunction remains under-recognized.

The results may contribute to improved diagnostic clarity and encourage clinicians to consider musculoskeletal factors when evaluating patients with dizziness, ultimately enhancing patient care.

Objectives

The objective is to investigate the relationship between musculoskeletal symptoms and the frequency and severity of dizziness among adults in the Saudi community.

METHODS

Study design and setting

This study was a cross-sectional study conducted between July 2025 and November 2025. The aim was to investigate the relationship between musculoskeletal pain, particularly neck and upper back pain, and dizziness among adults in Saudi Arabia. Data were collected using a structured questionnaire developed by the researcher.

Subjects: Participants, recruitment, and sampling procedure

Participants were adults from Saudi Arabia who experienced neck or upper back pain. They were invited to participate

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through clinics and healthcare centers. A convenience sampling method was employed, whereby participants were selected based on availability and willingness to participate. All participants were provided with detailed information about the study and gave informed consent before enrollment.

Sample size

To ensure the reliability and generalizability of the study findings, an appropriate sample size was calculated. This calculation ensured that the results accurately represented the target adult population in Saudi Arabia and allowed for meaningful statistical analysis. For this cross-sectional study, a standard statistical formula was applied to estimate the required number of participants to assess the relationship between musculoskeletal symptoms and dizziness.

Using a 95% confidence level and a 5% margin of error, the following formula was used:

$$n = (Z^2 \times P \times [1-P])/d^2$$

Where:

- n = required sample size
- Z = Z-score for the desired confidence level (1.96 for 95%)
- P = estimated prevalence (0.5 was used to ensure maximum variability)
- d = margin of error (0.05)

The calculation was as follows:

$$n = (1.96^2 \times 0.5 \times [1-0.5])/(0.05^2)$$

$$n = (3.8416 \times 0.25)/0.0025$$

$$n = 0.9604/0.0025$$

$$n = 384.16$$

Accordingly, the minimum required sample size was approximately 384 participants. The sample size calculation was confirmed using the Qualtrics Sample Size Calculator to ensure accuracy.

Inclusion and exclusion criteria

Specific inclusion and exclusion criteria were established to ensure the selection of an appropriate and representative sample while minimizing potential confounding variables. Participants were eligible if they were Saudi nationals, male or female, aged 18 years or older, and willing to provide informed consent. Participants were excluded if they had a history of diagnosed neurological or vestibular disorders, such as Meniere's disease, multiple sclerosis, or vestibular neuritis. Individuals receiving treatment for musculoskeletal injuries related to trauma or surgery were also excluded, as were pregnant women, due to the potential influence of pregnancy-related balance disturbances and musculoskeletal symptoms.

Method of data collection and instruments

This study utilized previously adapted Arabic versions of validated instruments, including the Ar-NMQ-E and the DHI. The Ar-NMQ-E had been developed and cross-culturally adapted through forward and backward translation, expert committee review, and pilot testing to ensure linguistic accuracy and cultural relevance. The DHI used in this study was the Jordanian Arabic version, which had been psychometrically validated for assessing dizziness-related handicap among Arabic-speaking populations.[10]

The International Physical Activity Questionnaire (IPAQ) was used as a standardized instrument for assessing physical activity and sedentary behavior. The short form of the IPAQ, recommended for national surveillance, was employed in this study.[11] The Neck Disability Index (NDI), a ten-item questionnaire derived from the Oswestry Low Back Pain Index, was used to assess disability related to neck pain and WADs.[12]

In addition, findings from a multicenter cross-sectional study examining the prevalence, patterns, and associated factors of musculoskeletal disorders among healthcare workers in Northern Saudi Arabia were considered.[13]

Before full-scale data collection, the questionnaire underwent pilot testing with 10 participants to assess clarity, comprehensibility, and relevance. Feedback from the pilot study was used to refine the questionnaire. Data from the pilot test were excluded from the final analysis.

Scoring system

The questionnaire consisted of 27 items distributed across five domains: One item assessing risk factors, four items assessing dizziness symptoms, one item assessing the impact of dizziness on activities of daily living (ADLs), two items assessing musculoskeletal symptoms, ten items from the NDI, four items from the IPAQ, and five items collecting demographic information. Demographic variables were used for descriptive purposes only and were not scored.

Scored items were evaluated using a 3-point Likert scale, where "Yes" was scored as 2 points, "Sometimes" as 1 point, and "No" as 0 points. Domain-specific scores were calculated by summing responses within each domain. The maximum possible scores were 2 for risk factors, 8 for dizziness symptoms, 10 for dizziness impact on ADLs, and 4 for musculoskeletal symptoms.

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Risk factors were classified as high risk (80–100%, 2 points), moderate risk (60–79%, 1 point), or low risk (<60%, 0 points). Overall dizziness severity was classified as severe (80–100%, 14–18 points), moderate (60–79%, 10–13 points), or mild (<60%, 0–9 points). The impact of dizziness on ADLs was categorized as high (80–100%, 8–10 points), moderate (60–79%, 6–7 points), or low (<60%, 0–5 points). Musculoskeletal symptoms were similarly classified as high (80–100%, 4 points), moderate (60–79%, 3 points), or low (<60%, 0–2 points).

The NDI total score ranged from 0 to 50 points and was categorized into three disability levels: Mild disability (0–14 points, <30%), moderate disability (15–24 points, 30–48%), and severe disability (≥25 points, ≥50%). The IPAQ short form assessed weekly physical activity by calculating total MET-minutes per week. Participants were categorized as having low (<600 MET-min/week), moderate (600–2999 MET-min/week), or high (≥3000 MET-min/week) physical activity levels.[14]

Pilot test

The questionnaire was distributed to a small group of participants to evaluate feasibility, clarity, and ease of completion. This pilot testing ensured the simplicity of the questionnaire and the practicality of the study procedures. Data collected during the pilot phase were excluded from the final analysis.

Data entry and analysis

Data were entered using Microsoft Office Excel (2021). Statistical analysis was subsequently performed using the Statistical Package for the Social Sciences (SPSS), version 21.0 (IBM SPSS Statistics for Microsoft Windows).

RESULTS

Table 1 displays various demographic parameters of the participants with a total number of 436. The sample is quite young (mean age 35.0 ± 12.3 years) with significant representation at the age levels, especially those ≤25 years (27.8%), 26–30 years (22.7%), and those ≥56 years of age do not take up much of the sample (8.5%). The sample is mainly Saudi (91.3) and female (65.1), and needs to be considered when the findings are applied to more diverse groups of people. Regional distribution in the north (45.4) and the west (29.6) is also focused, with little representation of the southern and the eastern territories. The primary marital status is married (52.5%) and single (42.2%).

As shown in Figure 1, among 436 participants who might experience dizziness, 250 (57.3%) did not avoid strenuous home activities, 39 (8.9%) avoided them, and 147 (33.7%) did so sometimes.

Table 1: Sociodemographic characteristics of participants (*n*=436)

Parameter	No.	Percentage
Age (Mean: 35.01, Standard deviation: 12.3)		
25 or less	121	27.8
26–30	99	22.7
31–40	80	18.3
41–55	99	22.7
56 or more	37	8.5
Nationality		
Saudi	398	91.3
Non-Saudi	38	8.7
Gender		
Female	284	65.1
Male	152	34.9
Residential area		
Northern region	198	45.4
Southern region	11	2.5
Central region	85	19.5
Eastern region	13	3.0
Western region	129	29.6
Marital status		
Single	184	42.2
Married	229	52.5
Divorced	12	2.8
Widowed	11	2.5

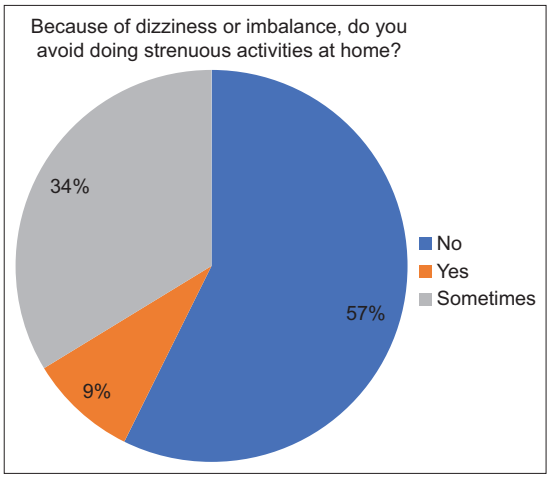

Figure 1: Relationship of dizziness and strenuous activities among participants

Table 2 gives a clear description of symptoms associated with dizziness and their functional influence within a non-Meniere's/multiple sclerosis/pregnant group. A significant majority (72.7) indicated issues (pain, discomfort, or uneasiness) in the past year, but only 36.0% could access

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Table 2: Parameters related to the medical state of participants and level of dizziness (*n*=436)

Parameter	No.	Percentage
Have you been diagnosed with any of the following: Multiple sclerosis, Meniere's disease, or pregnant?		
No	436	100.0
Yes	0	0
Have you ever experienced a problem (pain, discomfort, or uneasiness) at any time in the past 12 months?		
No	119	27.3
Yes	317	72.7
If your answer to the previous question was "Yes," did you visit a doctor, physiotherapist, chiropractor, or any other healthcare provider because of this problem in the past 12 months?		
No	279	64.0
Yes	157	36.0
Does looking upward increase your feeling of dizziness or imbalance?		
No	338	77.5
Yes	98	22.5
Does moving your head quickly cause an increase in dizziness or imbalance?		
No	243	55.7
Yes	193	44.3
Does turning over in bed cause an increase in dizziness or imbalance?		
No	369	84.6
Yes	67	15.4
Does bending forward increase your dizziness or imbalance?		
No	317	72.7
Yes	119	27.3
Do you find it difficult to lie down in bed or get up from bed because of dizziness or imbalance?		
No	362	83.0
Yes	74	17.0
Does physical exertion, such as playing sports, dancing, or doing household chores (like cleaning the house), increase your dizziness?		
No	266	61.0
Yes	170	39.0
Because of dizziness or imbalance, do you avoid doing strenuous activities at home?		
No	250	57.3
Yes	39	8.9
Sometimes	147	33.7
Does dizziness or imbalance interfere with your work or household responsibilities?		
No	371	85.1
Yes	65	14.9
Do you feel that dizziness or imbalance causes you some kind of disability?		
No	391	89.7
Yes	45	10.3
Do you engage in regular physical exercise in your lifestyle?		
No	206	47.2
Yes	230	52.8

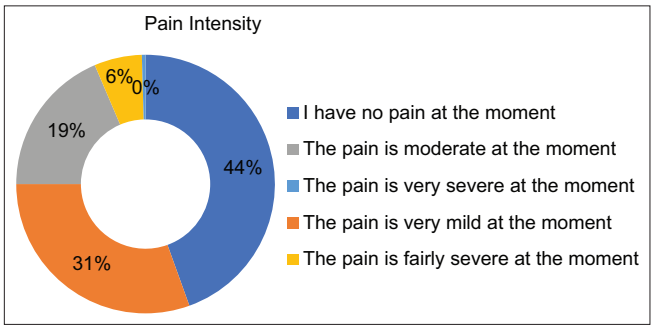

Figure 2: Neck pain intensity among participants

professional care, indicating a possible discrepancy in seeking health or symptom evaluation. Movements with different frequencies provoked symptoms: head movements (44.3%) and looking up (22.5%) were more likely than turning over in bed (15.4%) to increase dizziness. Dizziness had a minor impact on the daily functions, with 14.9% of those with work/household interference, and 10.3% perceived disability, and 39.0% being affected with exertion-related dizziness, and 33.7% occasionally avoiding strenuous activities. The use of physical activities was equal (52.8% yes).

As shown in Figure 2, among 436 participants who might experience neck pain, 194 (44.5%) reported no pain, 133 (30.5%) very mild pain, 81 (18.6%) moderate pain, 26 (6.0%) fairly severe pain, and 2 (0.5%) very severe pain.

Table 3 reveals that the proportion of individuals reporting minimal current pain and preserved functionality is significant, but a significant minority groups suffer from meaningful disability in several domains. 44.5% of them reported no pain, and 56.2% reported unaffected reading and high percentages of them were still independent in personal care (87.6%), and recreation activities (69.0%). Nevertheless, there are significant impairments in lifting (46.3% can lift heavy weights without pain, with only approximately 20% reporting that they have significant lifting limitations), headaches (16.3% report that moderate-to-severe frequent headaches), concentration (approximately 13% report that they have fair-to-great difficulty), work ability (approximately 10% report that they have reduced capacity), and sleep disturbance (approximately19% report

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Table 3: Participants' neck disability index (*n*=436)

Parameter	No.	Percentage
Pain intensity		
I have no pain at the moment	194	44.5
The pain is very mild at the moment	133	30.5
The pain is moderate at the moment	81	18.6
The pain is fairly severe at the moment	26	6.0
The pain is very severe at the moment	2	0.5
Personal Care (Washing, Dressing, etc.)		
Ican look after myself normally without causing extra pain	382	87.6
I can look after myself normally, but it causes extra pain	44	10.1
It is painful to look after myself, and I am slow and careful	5	1.1
I need some help but can manage most of my personal care	5	1.1
Lifting		
I can lift heavy weights without extra pain	202	46.3
I can lift heavy weights, but it gives extra pain	118	27.1
Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed (e.g., on a table)	24	5.5
Pain prevents me from lifting heavy weights, but I can manage light to medium weights if conveniently positioned	32	7.3
I can only lift very light weights	52	11.9
I cannot lift or carry anything	8	1.8
Reading		
I can read as much as I want with no pain in my neck	245	56.2
I can read as much as I want with slight pain in my neck	149	34.2
I can read as much as I want with moderate pain in my neck	39	8.9
I can't read as much as I want because of moderate pain in my neck	3	0.7
Headaches		
I have no headaches at all	126	28.9
I have slight headaches, which come infrequently	167	38.3
I have moderate headaches, which come infrequently	72	16.5
I have moderate headaches, which come frequently	54	12.4
I have severe headaches, which come frequently	17	3.9
Concentration		
I can concentrate fully when I want to with no difficulty	221	50.7
I can concentrate fully when I want to with slight difficulty	158	36.2
I have a fair degree of difficulty concentrating when I want to	44	10.1
I have a lot of difficulty concentrating when I want to	9	2.1
I have a great deal of difficulty concentrating when I want to	3	0.7
I cannot concentrate at all	1	0.2
Work		
I can do as much work as I want to	278	63.8
I can only do my usual work, but no more	113	25.9
I can do most of my usual work, but no more	40	9.2
I cannot do my usual work	3	0.7
I can hardly do any work at all	2	0.5
Driving		
I can drive my car without any neck pain	213	48.9
I can drive my car as long as I want with slight pain in my neck	76	17.4
I can drive my car as long as I want with moderate pain in my neck	22	5.0
I can't drive my car as long as I want because of moderate pain in my neck	4	0.9
None	121	27.8
Do you have insomnia (how many hours?)		
I have no trouble sleeping	142	32.6
My sleep is slightly disturbed (<1 h sleepless)	152	34.9
My sleep is mildly disturbed (1–2 h sleepless)	60	13.8
My sleep is moderately disturbed (2–3 h sleepless)	42	9.6
My sleep is greatly disturbed (3–5 h sleepless)	20	4.6
My sleep is completely disturbed (5–7 h sleepless	20	4.6
Can you do recreational activities (hobbies, family gatherings, etc.)?		
I am able to engage in all my recreation activities with no neck pain at all	301	69.0

(Contd...)

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Table 3: *(Continued)*

Parameter	No.	Percentage
I am able to engage in all my recreation activities with some pain in my neck	108	24.8
I am able to engage in most, but not all, of my usual recreation activities because of pain in my neck	20	4.6
I am able to engage in a few of my usual recreation activities because of pain in my neck	3	0.7
I can hardly do any recreation activities because of pain in my neck	1	0.2
I can't do any recreation activities at all	3	0.7

that they have around 2 hours of sleeplessness). Driving and recreational activities are mostly restricted.

Table 4 shows IPAQ-generated patterns of activities of the participants, showing significantly low levels of vigorous and moderate activities and higher levels of walking. Most (58.5% of those who reported vigorous physical activity in the past week) and only small percentages were active on more than 1 day; also, 51.4% were not active at all. Walking was more common; in contrast, 23.2% walked daily, and only 10.3% did not walk at all, making walking the major type of activity. The level of sedentary behavior is large: 31.0% participated in the highest sitting category on weekdays and 24.1% in the lowest category, indicating that there is a large range of sitting, but a significant proportion of the population is engaged in sedentary behavior.

Table 5 shows that low dizziness level was the most common reported among participants (84.2%), followed by moderate dizziness (12.2%), while high dizziness was the least reported (3.7%).

Table 6 shows that most of the participants reported mild disability regarding neck mobility (89.9%), with fewer experiencing moderate disability (9.6%) and only a minimal proportion showing severe disability (0.5%).

Table 7 shows that most of the participants had low physical activity (70.6%), while moderate activity was reported by 22.5%, and only 6.9% demonstrated good activity.

Table 8 shows that the dizziness level has a statistically significant relation to residential area (P = 0.0001). It also shows a statistically insignificant regard to nationality, age, gender, and marital status.

Table 9 shows that neck disability level has a statistically significant relation to marital status (P = 0.009). It also shows a statistically insignificant regard to nationality, age, gender, and residential area.

Table 4: Parameters related to th International Physical Activity Questionnaire (n=436)

Parameter	No.	Percentage
During the past 7 days, on how many days did you do vigorous physical activities (heavy lifting, aerobics, fast cycling) for at least 10 min at a time?		
0	255	58.5
1	37	8.5
2	44	10.1
3	50	11.5
4	23	5.3
5	18	4.1
6	2	0.5
7	7	1.6
During the past 7 days, on how many days did you do moderate physical activities (carrying light loads, cycling at a regular pace, doubles tennis) for at least 10 min at a time?		
0	224	51.4
1	47	10.8
2	45	10.3
3	66	15.1
4	24	5.5
5	11	2.5
6	8	1.8
7	11	2.5
During the past 7 days, on how many days did you walk for at least 10 min at a time (including work, home, travel, recreation)?		
0	45	10.3
1	43	9.9
2	51	11.7
3	49	11.2
4	62	14.2
5	58	13.3
6	27	6.2
7	101	23.2
During the past 7 days, how much time did you usually spend sitting on a weekday?		
0	105	24.1
1	16	3.7
2	50	11.5
3	42	9.6
4	31	7.1
5	42	9.6
6	15	3.4
7	135	31.0

Table 10 shows that physical activity level has a statistically significant relation to age (P = 0.002), gender (P = 0.003),

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Table 5: Dizziness score results

???	Frequency	Percentage
High dizziness level	16	3.7
Moderate dizziness level	53	12.2
Low dizziness level	367	84.2
Total	436	100.0

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Table 6: Neck disability index score results

???	Frequency	Percent
Mild disability	392	89.9
Moderate disability	42	9.6
Severe disability	2	0.5
Total	436	100.0

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Table 7: Physical activity score results

???	Frequency	Percentage
Good physical activity	30	6.9
Moderate physical activity	98	22.5
Low physical activity	308	70.6
Total	436	100.0

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and marital status (P = 0.015). It also shows a statistically insignificant relation to nationality and residential area. Participants aging 25 years or less, of male gender, and single were found to have higher physical activity levels than the others.

DISCUSSION

Musculoskeletal symptoms and dizziness are often very closely related, and the interplay between these symptoms may have an impact on the perception of symptoms, balance confidence, and daily activity patterns. The present cross-sectional study aimed to investigate the relationship between musculoskeletal symptoms and frequency and severity of dizziness among adults in the Saudi community, focusing on the adults reporting neck or upper back pain (n = 436).

A significant finding was the predominantly low score of dizziness in this community sample (84.2%), with smaller proportions reporting moderate (12.2%) and high (3.7%) scores in dizziness levels. This pattern is suggestive of the fact that the symptoms of dizziness in community-dwelling adults with cervical or upper thoracic symptoms are often

Table 8: Relation between dizziness level and sociodemographic characteristics

Parameters	Dizziness level		Total (n=436) (%)	P-value
	High or moderate dizziness (%)	Low dizziness level (%)		
Nationality				
Saudi	61 (88.4)	337 (91.8)	398 (91.3)	0.355
Non-Saudi	8 (11.6)	30 (8.2)	38 (8.7)	
Age				
25 or less	19 (27.5)	102 (27.8)	121 (27.8)	0.987
26–30	15 (21.7)	84 (22.9)	99 (22.7)	
31–40	13 (18.8)	67 (18.3)	80 (18.3)	
41–55	15 (21.7)	84 (22.9)	99 (22.7)	
56 or more	7 (10.1)	30 (8.2)	37 (8.5)	
Gender				
Female	48 (69.6)	236 (64.3)	284 (65.1)	0.400
Male	21 (30.4)	131 (35.7)	152 (34.9)	
Residential area				
Northern region	36 (52.2)	162 (44.1)	198 (45.4)	0.0001
Southern region	8 (11.6)	3 (0.8)	11 (2.5)	
Central region	10 (14.5)	75 (20.4)	85 (19.5)	
Eastern region	1 (1.4)	12 (3.3)	13 (3.0)	
Western region	14 (20.3)	115 (31.3)	129 (29.6)	
Marital status				
Single	28 (40.6)	156 (42.5)	184 (42.2)	0.758
Married	39 (56.5)	190 (51.8)	229 (52.5)	
Divorced	1 (1.4)	11 (3.0)	12 (2.8)	
Widowed	1 (1.4)	10 (2.7)	11 (2.5)	

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*P-value was considered significant if ≤0.05

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Table 9: Neck disability level in association with sociodemographic characteristics

Parameters	Disability level		Total (*n*=436) (%)	*P*-value
	Severe or moderate disability (%)	Mild disability (%)		
Nationality				
Saudi	41 (93.2)	357 (91.1)	398 (91.3)	0.638
Non-Saudi	3 (6.8)	35 (8.9)	38 (8.7)	
Age				
25 or less	12 (27.3)	109 (27.8)	121 (27.8)	0.284
26–30	13 (29.5)	86 (21.9)	99 (22.7)	
31–40	3 (6.8)	77 (19.6)	80 (18.3)	
41–55	12 (27.3)	87 (22.2)	99 (22.7)	
56 or more	4 (9.1)	33 (8.4)	37 (8.5)	
Gender				
Female	31 (70.5)	253 (64.5)	284 (65.1)	0.435
Male	13 (29.5)	139 (35.5)	152 (34.9)	
Residential area				
Northern region	173 (44.1)	25 (56.8)	198 (45.4)	0.342
Southern region	11 (2.8)	0 (0.0)	11 (2.5)	
Central region	78 (19.9)	7 (15.9)	85 (19.5)	
Eastern region	13 (3.3)	0 (0.0)	13 (3.0)	
Western region	117 (29.8)	12 (27.3)	129 (29.6)	
Marital status				
Single	162 (41.3)	22 (50.0)	184 (42.2)	0.009
Married	211 (53.8)	18 (40.9)	229 (52.5)	
Divorced	12 (3.1)	0 (0.0)	12 (2.8)	
Widowed	7 (1.8)	4 (9.1)	11 (2.5)	

AQ5 **P*-value was considered significant if ≤0.05

present, but they are usually experienced as a low-level complaint rather than a highly disabling syndrome. These results are in contrast to those reported in specialist dizziness settings, where musculoskeletal comorbidities seem to be concentrated in the subgroup of patients with persistent dizziness and higher symptom burden. For example, in a cross-sectional study of 150 patients with long-term dizziness attending a clinic at an otorhinolaryngology hospital, Moen *et al.* reported that musculoskeletal pain was found in 94.5% of patients, and the number of pain sites and the intensity of pain were associated with the severity of dizziness; moreover, the number of pain sites was also associated with DHI.[1] The disparity between these findings from the clinic-based and largely low-dizziness-severity in the current community sample may be a reflection of differences in chronicity and referral patterns.

Although the severity of dizziness was mostly low, a number of symptom triggers were commonly. Rapid head movement increased the degree of dizziness in 44.3% of people, and looking upward (22.5%) was seen to increase the degree of dizziness, compared to bending forward (27.3%) and turning over in bed (15.4%), which were less often reported but were present. These findings are in favor of the clinical relevance of movement- and position-related screening questions when assessing adults presenting with neck or upper back complaints, especially as provocation may be a contributory factor to fear of movement and subtle restriction of activity. In the present sample, exertion-related worsening of dizziness was reported by 39.0% and 8.9% reported avoiding strenuous activities (an additional 33.7% reported avoiding them sometimes). Nevertheless, the perceived functional impact was small for the majority of the participants. 14.9% reported that they interfere with work or home responsibilities, and 10.3% reported the feeling of disability.

An additional observation with practical implications is the fact that symptom reporting did not necessarily lead to healthcare utilization. Nearly three-quarters of the patients reported having a problem (pain, discomfort, or uneasiness) in the last 12 months, but only about one-third of them reported seeking professional care. This discrepancy may be due to normalization of symptoms, difficulty accessing, competing demands, or uncertainty about the

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Table 10: Physical activity level in association with sociodemographic characteristics

Parameters	Activity level		Total (*n*=436) (%)	*P*-value
	High or moderate activity (%)	Low physical activity (%)		
Nationality				
Saudi	119 (93.0)	279 (90.6)	398 (91.3)	0.422
Non-Saudi	9 (7.0)	29 (9.4)	38 (8.7)	
Age				
25 or less	46 (35.9)	75 (24.4)	121 (27.8)	0.002
26–30	31 (24.2)	68 (22.1)	99 (22.7)	
31–40	28 (21.9)	52 (16.9)	80 (18.3)	
41–55	14 (10.9)	85 (27.6)	99 (22.7)	
56 or more	9 (7.0)	28 (9.1)	37 (8.5)	
Gender				
Female	70 (54.7)	214 (69.5)	284 (65.1)	0.003
Male	58 (45.3)	94 (30.5)	152 (34.9)	
Residential area				
Northern region	51 (39.8)	147 (47.7)	198 (45.4)	0.107
Southern region	1 (0.8)	10 (3.2)	11 (2.5)	
Central region	33 (25.8)	52 (16.9)	85 (19.5)	
Eastern region	5 (3.9)	8 (2.6)	13 (3.0)	
Western region	38 (29.7)	91 (29.5)	129 (29.6)	
Marital status				
Single	68 (53.1)	116 (37.7)	184 (42.2)	0.015
Married	57 (44.5)	172 (55.8)	229 (52.5)	
Divorced	2 (1.6)	10 (3.2)	12 (2.8)	
Widowed	1 (0.8)	10 (3.2)	11 (2.5)	

AQ5 **P*-value was considered significant if ≤0.05

correct specialty choice when dizziness has coexisted with musculoskeletal pain. In the community setting, this highlights the importance of having clear triage pathways and awareness on the part of the clinician that the issue of dizziness may not be discussed unless it is actively asked, especially in patients presenting with neck or upper back complaints as the main symptom in Saudi primary care practice at the present time.

The wider literature supports the view that musculoskeletal pain is common in patients with dizziness and may be under-recognised during the dizziness management pathways. In their systematic review, Moen *et al*. found that the prevalence of musculoskeletal pain in dizziness populations ranged from 43% to 100% in the included studies; pain magnitude is generally about 5–7/10. Moreover, neck and shoulder pain are the most reported, but pain in other areas of the body is also present.[2] The current study provides an additional piece of evidence that even if they are recruited from the community based on symptoms in the neck or upper back, movement and exertion-related dizziness experiences are still common in participants.

Neck-related disability in this study was mostly mild, with 89.9% falling under the category of mild disability, 9.6% of moderate disability, and 0.5% of severe disability. This high proportion of mild disability may have been a contributor to the low classification of overall dizziness; however, mild average disability may mask clinically important subgroups with symptom clustering across pain, dizziness, headaches, and sleep disruption. In a longitudinal study of 150 patients who experience persistent vestibular dizziness, Moen *et al.* reported that levels of VSS-SF and DHI decreased with follow-up, though not to a clinically relevant degree overall, and that patients with psychological distress reported a higher level of dizziness severity and disability in addition to a greater burden of pain.[1] Patients who reported ≥4 pain sites or pain intensity ≥4/10 at baseline continued to report severe dizziness and moderate disability 12 months later, and the link between pain (particularly number of pain sites) and dizziness severity was greater for patients with psychological distress.[1] While the current study does not allow one to conclude prognosis, the existence of a subgroup with moderate-to-high levels of dizziness implies that clinical identification of those with a higher degree

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of symptom provocation and functional impact may have clinical importance.

At the population level, these results also need to be considered in the context of the overall epidemiology of dizziness in Saudi Arabia. In a national epidemiologic study, Alharbi *et al*. reported that dizziness was common among the Saudi population (42.97% of respondents).[9] Although the current study differs in sampling and is not a prevalence study of the general population, the classification of dizziness severity, the consistency of the findings between dizziness and general population prevalence, may indicate the importance of structured dizziness assessment in Saudi adults and the need to elucidate on potentially modifiable contributors, including musculoskeletal symptoms.

Limitations should be considered when interpreting the present results. The cross-sectional design prevents causal inference and does not clarify whether musculoskeletal symptoms precede dizziness, whether dizziness contributes to pain through altered movement patterns, or whether both share common drivers. Convenience sampling and online self-reporting may limit generalizability and introduce selection bias, including over-representation of female participants and certain regions. In addition, dizziness etiologies were not clinically verified; therefore, vestibular and non-vestibular causes could not be differentiated, and residual confounding (e.g., migraine, anxiety, medication use, and occupational exposures) is possible. Finally, symptom duration and recurrence were not characterized in detail.

CONCLUSION

The results of this study emphasize the high correlation of musculoskeletal symptoms and dizziness in the Saudi adult population, especially in neck or upper back pain. The findings suggest that although dizziness is common in the community population, its severity is usually low. However, the study shows that some movements and physical efforts can make the dizziness worse, with many subjects reporting that they had a moderate effect on their daily activities. The results show the importance of the musculoskeletal factors in the evaluation of dizziness, as it contributes to functional limitations and discomfort. Despite the prevalence of dizziness, healthcare utilization is low, suggesting the possibility of awareness and access to appropriate healthcare. Overall, the study presents the need for more holistic methods of dizziness management that address vestibular and musculoskeletal aspects to achieve better outcomes for the patient.

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ETHICAL APPROVAL

The study was fully explained to all participants, and it was emphasized that participation was voluntary. Written informed consent was obtained from each participant before enrollment. All collected information was securely stored and used exclusively for research purposes.

INFORMED CONSENT

Written informed consent was obtained from all study participants.

DATA AND MATERIALS AVAILABILITY

All data generated or analyzed during this study are included in this published article.

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