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PREVALENCE OF MUSCULOSKELETAL INJURIES IN RECREATIONAL WESTERN DANCERS

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Abstract

Background: Musculoskeletal injuries are common among western dancers because of the high physical demands of the activity, with an increased likelihood of injury in recreational western dancers in the adult and older-adult population, i.e. above age 30.

Objectives: To determine the prevalence of the most common musculoskeletal injuries in recreational western dancers above age 30, using the standardised Nordic Musculoskeletal Questionnaire (NMQ) as the outcome measure.

Methods: A cross-sectional observational study was conducted among 178 recreational (1–5 hours/week) western dancers above age 30 in Pune city, across dance forms including salsa, hip hop, contemporary, ballet, freestyle, belly dancing, and jazz. Eligible participants provided informed consent and completed a form recording age and gender together with the NMQ, which assesses musculoskeletal symptoms in nine anatomical regions over the preceding 12 months and 7 days, together with related activity limitation and medical consultation. Descriptive statistics (mean, standard deviation, frequency, and percentage) were calculated.

Results: Of 178 dancers, 148 (83.1%) reported musculoskeletal trouble in at least one body region. Mean age was 37.92 ± 6.79 years. The low back was the region most frequently affected over the preceding 12 months (18.3% of complaints) and 7 days (17.8% of complaints), while the knee was the region most often prompting medical consultation (18.7% of complaints).

Conclusions: A high proportion (83.1%) of recreational western dancers above age 30 reported musculoskeletal injuries, most commonly involving the low back and knee, underscoring the importance of early musculoskeletal screening and injury-prevention strategies in this population.

Keywords*: western dancers, recreational dancers, musculoskeletal injuries, above age 30, standard nordic musculoskeletal questionnaire.*

1. Introduction:

Dance is a combination of physical fitness, creativity, and expression, executed through precise and synchronised movement (1). It is described as a conscious effort by the body to create visual imagination through continuous movement in different directions and positions, following a pattern of symmetry and rhythm. Dance studies often distinguish western from classical dance groups; western dance forms include a variety of genres such as hip hop, belly dancing, break dancing, ballet, jazz, samba, salsa, and tap dancing (1,3). For the older population, dance as a recreational activity provides many physical and psychological benefits: multi-year recreational dance participation has been associated with superior sensory, motor, and cognitive performance in elderly individuals relative to non-dancing peers (9). Recreational dancers typically dance for 1–5 hours per week, spanning social events, dance classes, informal gatherings, or hobby practice (2,6).

The popularity of western dance forms is especially marked among teenagers and young adults, to the extent that it has become part of their subculture. These movements require the body to adopt positions that place the musculoskeletal system under strain (4), and can increase the risk of both acute and chronic musculoskeletal injury (1). Dancers are more likely to sustain lumbar spine, knee, ankle, and foot injuries (2), and some develop osteoarthritis, lumbar disc herniation, or sciatica-like problems later in life, causing pain, discomfort, and difficulty walking that ultimately affect quality of life. Dance participation is therefore not devoid of risk, particularly with respect to musculoskeletal injury (5).

Western dance encompasses a wide variety of movement demands: dynamic movements such as leaps, jumps, and rotations that require strength, power, and coordination; sustained holds and static balances that can cause fatigue and overuse; floor work such as sliding and rolling that can strain joints directly; and improvisation, which can lead to sudden, poorly controlled movements and accidental injury. Physiological changes associated with ageing — decreasing muscle mass and bone density, and reduced flexibility and mobility — further increase injury vulnerability (4). Even though dance is fundamentally beneficial to health and continues to improve physical function and quality of life across middle and older age (17), older participants should not overlook the fact that their bodies change physiologically and may not tolerate the same movement stress as in youth (4,15). The social and emotional benefits of dance participation should also not be discounted, as it has an overall positive effect on quality of life and wellbeing; however, dancers who identify strongly with the dancing body may under-report pain or continue to dance through discomfort as part of how ageing and embodiment are culturally understood within dance communities (13). Western dancers engage in strenuous, repetitive movements demanding extraordinary strength, flexibility, and endurance; these demands stress the body and raise the risk of overuse injury, which could adversely affect long-term health (3).

With the increasing uptake of dance for physical and mental fitness among older adults, there is a need to consider the risk factors associated with it (8,10). The interaction between age-related physiological change and the physical demands of diverse western dance forms produces a distinct risk profile that may also differ by age and sex (7,9). Literature on the prevalence of musculoskeletal disorders in older adults and the geriatric population who dance recreationally remains scarce. Addressing the factors contributing to musculoskeletal injury in this population is therefore critical, both for injury prevention and for preserving the well-documented benefits of recreational dance (8). Owing to these potential adverse effects, it is necessary to identify strategies that limit further musculoskeletal complications in this population. The purpose of the present study was therefore to determine the prevalence of musculoskeletal injuries in recreational western dancers above age 30.

2. Material and Methodology:

Participants

Sample size was calculated a priori using G*Power (version 3.1.9.7). The study was approved by the Institutional Ethics Committee of PES Modern College of Physiotherapy and written consent was taken before enrolment. The individual were selected based on the following inclusion criteria and exclusion criteria.

Inclusion criteria

- Recreational western dancers, typically dancing for 1–5 hours per week (2)
- Age above 30 years (8,9)
- Both male and female dancers (2,3)
- Participants willing to take part in the study

Exclusion criteria

- Pregnant women
- Any diagnosed neurological condition
- Recent road traffic accident
- Recent fractures or trauma
- Recent surgery (within 6 months)
- Any congenital deformity
- Any spinal deformity (e.g. scoliosis)
- Any other strenuous physical activity apart from dancing
- Participants unwilling to participate

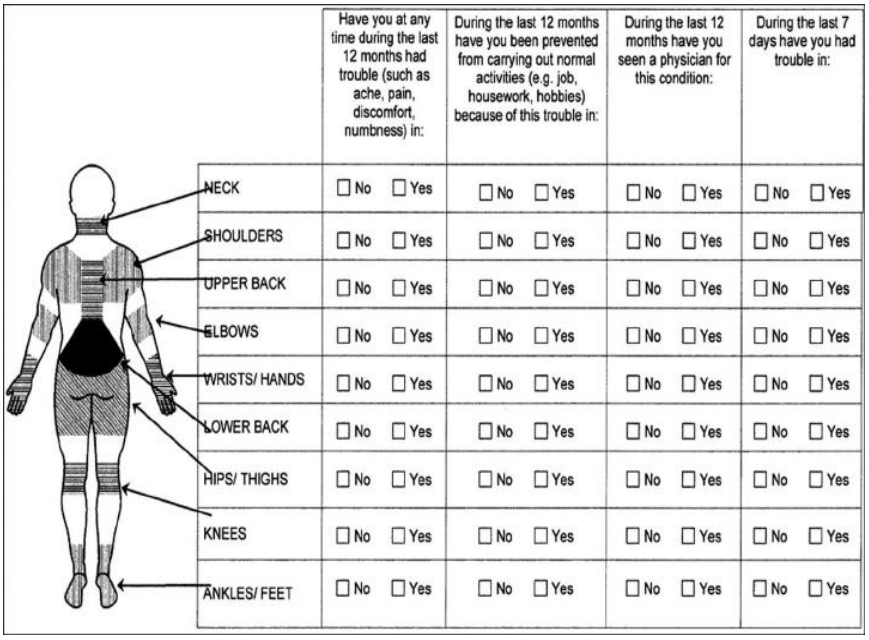
Procedure

- Ethical committee clearance was obtained from PES Modern College of Physiotherapy.
- Screening was performed against the inclusion and exclusion criteria.
- The study procedure was explained to participants individually.
- Participants signed an informed consent form prior to participation.
- Data were collected using the Nordic Musculoskeletal Questionnaire (NMQ).
- The collected data were analysed.

Outcome measure — Nordic Musculoskeletal Questionnaire

The NMQ (reported reliability 0.7; validity 0.8) is a standardised, widely used tool for assessing musculoskeletal disorders in occupational and clinical populations, originally developed and validated by Kuorinka et al. (18). It is intended to determine whether a population has musculoskeletal symptoms and, if so, in which body region(s) they are located. Viewed from the rear, the body is divided into nine anatomical regions, with questions answered for each. The NMQ asks, for example: "At any time during the last 12 months/7 days have you had trouble (ache, pain, discomfort) in the following regions?" Among the validated instruments available for quantifying musculoskeletal symptoms in dancers, generic tools such as the NMQ offer a practical, low-burden option for population-level prevalence screening, in contrast to region- or disease-specific tools that require more detailed clinical input (16).

Figure 1: Nordic Musculoskeletal Questionnaire.



3. Data Analysis:

Descriptive statistics — mean, standard deviation, frequency, and percentage — were calculated by entering responses into spreadsheets (Microsoft Excel).

4. Results:

A total of 178 participants were recruited according to the inclusion and exclusion criteria, and descriptive analysis was performed. Of these, 148 participants (83.1%) reported musculoskeletal trouble in at least one body region:

$$\textit{Participants injured / Total participants} \times 100 = 148/178 \times 100 = 83.1\%$$

Table 1. Age summary statistics.

Statistic	Value
Dataset count (n)	178
Mean age, years	37.92
Standard deviation, years	6.79

The mean age of participants was 37.92 ± 6.79 years.

Table 2. Have you at any time during the last 12 months had trouble in…?

Region	Total	%
Neck	68	15.3%
Shoulder	57	12.9%
Upper back	51	11.5%
Elbows	20	4.5%
Wrist/hands	26	5.9%
Lower back	81	18.3%
Hips/thighs	30	6.8%
Knees	62	14.0%
Ankle/feet	48	10.8%

Inference: The low back was the most affected region over the preceding 12 months.

Footnote — The denominator is N (total number of reported complaints, N = 443), not n (total number of participants, n = 178), as one participant may report trouble in more than one body region. Percentages may not total exactly 100% due to rounding.

Graph 1.

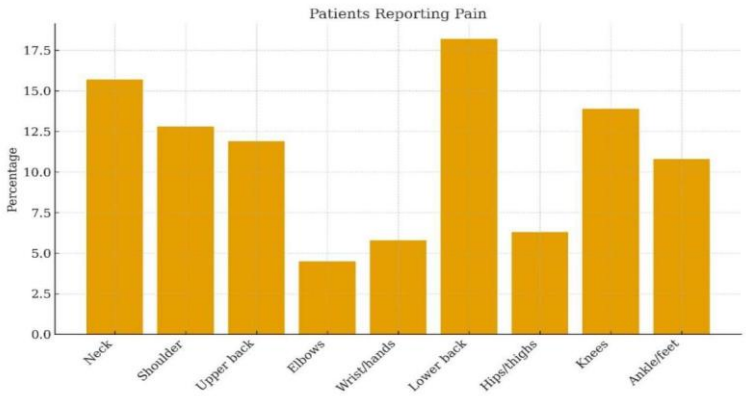


Table 3. During the last 12 months, have you had any trouble carrying out normal activities because of this?

Region	Total	%
Neck	34	15.0%
Shoulder	29	12.8%
Upper back	30	13.3%
Elbows	9	4.0%
Wrist/hands	13	5.8%
Lower back	38	16.8%
Hips/thighs	9	4.0%
Knees	37	16.4%
Ankle/feet	27	11.9%

Inference: The low back was the most affected region limiting normal activities.

Footnote — The denominator is the total number of complaints (N = 226), not the total number of participants (n = 178), as one participant may report a complaint in more than one body region. Percentages may not total exactly 100% due to rounding.

Graph 2.

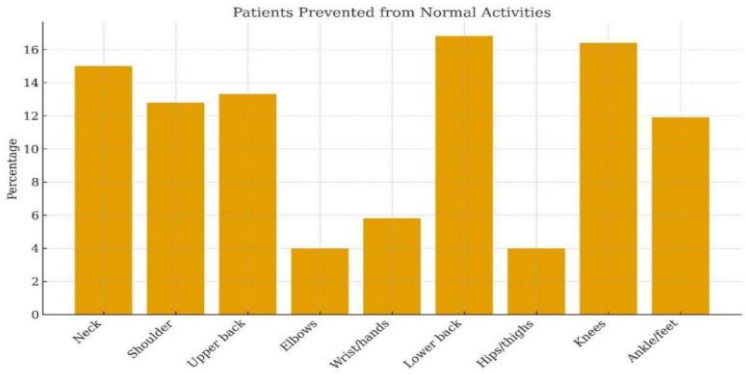


Table 4. During the last 12 months, have you seen a physician for this condition?

Region	Total	%
Neck	25	15.1%
Shoulder	20	12.0%
Upper back	17	10.2%
Elbows	7	4.2%
Wrist/hands	15	9.0%
Lower back	25	15.1%
Hips/thighs	8	4.8%
Knees	31	18.7%
Ankle/feet	18	10.8%

Inference: The knee was the region for which participants most often consulted a physician.

Footnote — The denominator is the total number of complaints (N = 166), not the total number of participants (n = 178), as one participant can report multiple complaints. Percentages may not total exactly 100% due to rounding.

Graph 3.

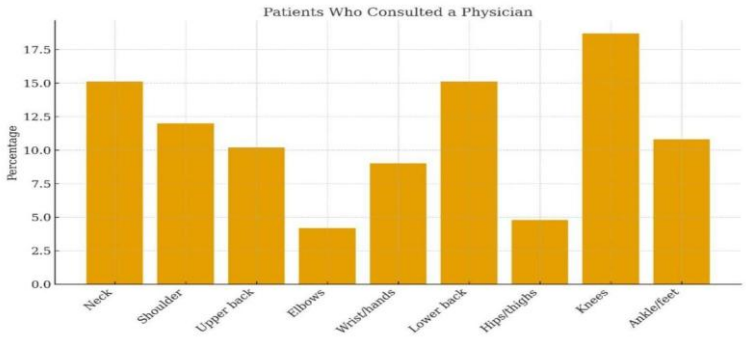


Table 5. During the last 7 days, have you had trouble in…?

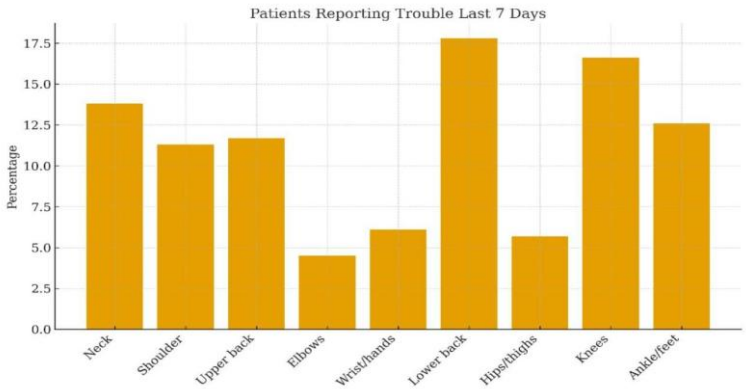
Region	Total	%
Neck	34	13.8%
Shoulder	28	11.3%
Upper back	29	11.7%
Elbows	11	4.5%
Wrist/hands	15	6.1%
Lower back	44	17.8%
Hips/thighs	14	5.7%
Knees	41	16.6%

Ankle/feet	31	12.6%

Inference: The lower back was the most affected region in the preceding 7 days.

Footnote — The denominator is the total number of complaints (N = 247), not the total number of participants, as one participant can report multiple complaints. Percentages may not total exactly 100% due to rounding.

Graph 4.



5. Discussion:

This study examined the prevalence of musculoskeletal injuries in recreational western dancers above age 30. The findings indicate that this prevalence is high (83.1%), suggesting that even moderate participation (1–5 hours per week) can produce overuse injury and strain (2,6). This study reports only the prevalence of musculoskeletal injuries and does not establish their cause; the mechanisms proposed below are therefore inferred from prior literature and from the biomechanics of dance movement rather than measured directly in this sample.

The mechanisms underlying injury in various body regions are derived from previous studies and from the biomechanics of dance steps. Irregularities in biomechanics, incorrect movement technique, and age-related physiological change may all contribute to these injuries. Western dance, even performed recreationally, includes dynamic movements such as leaps and spins that load the musculoskeletal system. Poor core strength, reduced flexibility, and inadequate warm-up — particularly in older adults — can lead to repetitive microtrauma and, over time, chronic pain (7). Loss of muscle elasticity and bone density with ageing further compounds injury risk (8). At the same time, dance remains a beneficial activity for physical function and quality of life across middle and older age (17), so the clinical priority is to manage this risk through screening and conditioning rather than to discourage participation.

Injuries of the low back region were the most prevalent in this age group. According to previous studies, possible contributing factors include poor core strength, decreased flexibility and muscle elasticity, anterior pelvic tilt, tightness of the back extensors, or weak hamstrings; the posture adopted in many dance forms is hyperlordotic (11). Low back pain in dancers has been linked to hyperlordosis arising from forced hip turnout, which produces anterior pelvic tilt and elongation of the abdominal muscles, resulting in core weakness. This imbalance reinforces lumbar lordosis and increases loading on the facet joints and nerve roots, contributing further to pain and functional limitation (7,11).

The knee was the second most prevalent region of injury. The contributing factors are likely multiple: forced turnout at the knee places strain on the medial contractile and non-contractile structures (14), leading to weakening of medial structures and overactivity of the lateral knee stabilisers, which can result in patellofemoral pain associated with biomechanical muscle imbalance around the knee. Imbalance in the muscle groups surrounding the knee, together with misalignment during landing or pivoting manoeuvres, exposes the joint to abnormal forces and predisposes to chronic pain and structural damage over time (11).

Injuries in the neck, shoulder, and upper back regions may reflect postural adaptation and overuse; maintaining static postures and balances can strain the muscles of this region (12).

The observed prevalence of ankle and foot injury suggests a considerable postural demand associated with the high-intensity movements of western dance. High-intensity steps often require the body to move rapidly in multiple directions; these quick, repetitive, and sudden multidirectional movements impose direct biomechanical strain and require robust postural control and adequate shock absorption at the foot and ankle. Poor posture, or inadequate strength and flexibility, can lead to misalignment and uneven force distribution, increasing the risk of ligament sprain, tendinopathy, and overuse injury in these regions (3).

Taken together, these findings emphasise the importance of preventive screening as part of injury-prevention and rehabilitation strategies for recreational western dancers, particularly given that both age-related physiological change (9) and the culturally embedded identity many dancers place in continued participation (13) may lead older recreational dancers to under-report early symptoms.

Clinical Implication:

This study highlights the need for early preventive screening, conditioning programmes, and musculoskeletal assessment in recreational western dancers, with particular focus on:

- Structured warm-up and cool-down routines.
- Core stability and flexibility training.
- Proper footwear and a stable, even dance surface.
- Gradual progression in dance intensity.
- Awareness sessions to promote physiotherapy and injury-prevention strategies.
- Screening for age-related risk factors such as diabetes, hypertension, osteoporosis, or vitamin deficiencies, to inform a tailored prehabilitation or rehabilitation programme.
- Incorporating musculoskeletal risk screening into recreational dance sessions, since early identification can aid prevention.

Limitation:

- Current occupation and the specific timing of dance sessions were not taken into consideration.
- The sample was limited to Pune city, which may limit generalisability.

The cross-sectional design and self-reported outcome measure cannot establish causation or capture injury mechanism.

Future Scope:

- Future research should record responses in a larger and more geographically diverse sample.
- Objective assessments of motor control, loading, and biomechanics should be employed to identify injury mechanisms.
- Factors such as weight, BMI, and other age-related risk factors should be included for broader, more in-depth research.
- A detailed breakdown of dance session frequency and duration would allow more precise exposure-response analysis.
- Interventional studies developing exercise programmes tailored to this population, according to need and injury level, are warranted.

6. Conclusion:

This study concludes that the prevalence of musculoskeletal injuries in recreational western dancers above age 30 is 83.1%, most commonly affecting the low back and knee, underscoring the need for early screening and injury-prevention strategies in this population.

7. Footnotes:

- **Conflict of Interest***:* None
- **Data Availability Statement**: The data that support the findings of this study are available from the authors, upon reasonable request.
- **Acknowledgement**: None
- **Funding**: None
- **Author's Contribution**: All author contributed equally

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