



## PREVALENCE OF MUSCULOSKELETAL INJURIES IN PROFESSIONAL BHARATNATYAM DANCERS IN MAHARASHTRA

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**ABSTRACT** **BACKGROUND:** Bharatanatyam, an ancient dance form, is distinguished by its grace and style, it includes traditional poses, rhythmic foot stamping, jumps, pirouettes, and positions where the knees are in contact with the floor. This dance style is characterized by a linear form of the body without any pronounced movement of the upper body and linear spatial patterns, which make the dance form extremely dynamic and powerful. It necessitates continuous delicate changes with incorporation of one leg positional holds, swift body turns, quick movement transitions, specific rigorous footwork, changes in positions and stances and maintenance of posture. **OBJECTIVE:** Primary objective: To find the prevalence of musculoskeletal injuries in professional Bharatanatyam dancers by using General Questionnaire Of Nordic Musculoskeletal questionnaire. Secondary objective: To compare musculoskeletal injuries in male and female professional dancers. **METHODS:** Subjects were selected according to the inclusion criteria. The study was explained to the subjects individually and written assent was taken from them. Data was collected via Nordic Questionnaire and data analysis was done. **RESULTS:** Among 91 female and 9 male dancers, 78% dancers reported pain. The most common site of pain was knee pain followed by lower back and hips/thigh pain. **CONCLUSION:** This study concludes that the prevalence of Musculoskeletal injuries in professional Bharatanatyam dancers in Maharashtra is very high, i.e. 78%. Females were more affected than males in this study.

**KEYWORDS :** Bharatanatyam dancers, pain, musculoskeletal injuries

### INTRODUCTION

Dance, previously considered as a leisure pursuit, however, with the changing times it is now a well-renowned profession with proper training acquired by the dancers in a systematic curriculum.[4] Constant performances, long hours of rehearsals, skill-based movements, artistic poses, and maintenance of postures are frequent among dancers.[4] Dance combines artistic expression and athletic conditioning united in specific movements characterized by precise harmonious gestures. Such techniques require adopting postures that place stress on the musculoskeletal system.<sup>[4]</sup>

Bharatanatyam the dance form selected for the present study, has a very well defined and structured foundation on which it functions.[5] Bharatanatyam is one of the most sublime and ancient of Indian classical dances; it originated in Tanjore, a town of Tamil Nadu in Southern India.[2] This dance form lays its foundation on the aesthetic beauty of angles and lines formed by various positions of different body parts.[2] Bharatanatyam is distinguished by its grace and style, it includes traditional poses, rhythmic foot stamping, jumps, pirouettes, and positions where the knees are in contact with the floor.<sup>[2]</sup>

This dance style is characterized by a linear form of the body without any pronounced movement of the upper body and linear spatial patterns, which make the dance form extremely dynamic and powerful. The dance is performed on the stage as "Nrittam", "Nrithyam" and "Natyam". The foundation of the pure dance form (Nritta) consists of basic steps known as "adavu". "Sthanakam" (posture) is one of the components of adavu which comprises of 3 basic positions namely<sup>[4]</sup> –

- 1) "Araimandi" (half squatting position)(Fig.1)
- 2) "Muzhumandi" (full squatting position)(Fig.1)
- 3) "Samapadam"(standing)(Fig.1)



FIG.1

There are various other postures which can lead to musculoskeletal injuries:

The kuttanam leads to extreme plantar flexion causing posterior impingement.[5]

In an attempt to increase turnout, the dancer hyperextends the hip by contracting the iliopsoas muscle and thereby also increasing lordosis. A similar compromise on the lower back and hyperlordosis also occurs when the dancer hyperextends her knees (Recurvatum).[5]

Bharatanatyam dancers are prone to have an excessive lumbar lordosis coupled with anterior pelvic tilt; main cause behind this postural deformity is shortening of hip flexors which pulls the pelvis down causing excessive lumbar lordosis.[1]

Gaining proficiency in this dance form requires rigorous training for prolonged periods of time while maintaining specific postures.[4]

A Bharatanatyam curriculum comprises of initial 5 to 7 years of training required to be qualified for a graduation. The training is provided and supervised by the dance teacher, qualified personnel.[3] Professional dancers were exposed to increased and vigorous rehearsals with a focus on perfectionistic movements as compared to students which predisposed them to musculoskeletal pain.[4]

Training in Bharatanatyam varies depending on the Guru (dance teacher) and the region in which the classes are conducted[4] Dance injuries are common during the competitions or shows, especially when dancers are submitted to a heavy workload of rehearsals and classes. Dancers are exposed to a greater risk of injury because of the duration and intensity of training.[4]

Health problems of dancers are worthy of attention for several reasons. First, as most professional dancers begin dancing at the age of 5 or 6, repetitive practice of movements that require extreme flexibility, strength, and endurance makes dancers prime candidates for overuse injuries, creating the potential for a greater impact on their future health. For many people, dance may not spring to mind when thinking about sports, but the physical demands placed on dancers' bodies make them just as susceptible as sport athletes to injury.[3]

Hence, the present study aimed to investigate the prevalence of musculoskeletal injuries and analyze risk factors in professional Bharatanatyam dancers.

### NEED OF STUDY

- Bharatanatyam dancers practice repetitive movements that require extreme flexibility, strength, and endurance which stress their bodies and make them prime candidates for overuse injuries which

may have an impact on their future health.[4]

- Professional dancers are exposed to increase and vigorous rehearsals with a focus on perfectionistic movements. [4]
- There is paucity of literature on prevalence of musculoskeletal injuries in Bharatnatyam dancers. Lack of research, particularly in Bharatnatyam dancers health, acts as a barrier to providing scientific recommendations to prevent injuries and offer appropriate treatment.
- Hence, the need of this study is to find the prevalence of musculoskeletal injuries in professional Bharatnatyam dancers.

**CRITERIA**

**Inclusion Criteria:**

- Bharatnatyam dancers with a minimum of 5-7 years of formal dance training along with a formal degree or qualification in dance.[2]
- Professional dancers(practicing for atleast 3-5 hours)
- Age – 18 – 50 years.
- Both Male and Female dancers.
- Participants who are willing to participate in the study.

**Exclusion Criteria:**

- Any diagnosed neurological conditions.(e.g.stroke,peripheral nerve injuries,radiculopathies)
- Presence of any congenital deformities (e.g.kyphosis, scoliosis, limb length discrepancy)[3]
- Any recent surgeries[3]
- Any form of physical training other than dancing.
- Any recent trauma(e.g.fractures,RTA)
- Any spine deformities(e.g.scoliosis,kyphosis)[3]
- Obese population (BMI > 30)

**OUTCOME MEASURES:**

**STANDARDISED GENERAL QUESTIONNAIRE OF THE NORDIC MUSCULOSKELETAL QUESTIONNAIRE[8] :**

The questionnaire consists of structured, forced, binary or multiple choice variants and can be used as self administered questionnaire or in interviews.

The general questionnaire was designed to answer the following question: "Do musculoskeletal troubles occur in a given population, and if so, in what parts of the body are they localised?" With this consideration in mind, a questionnaire was constructed in which the human body (viewed from the back) is divided into nine anatomical regions.

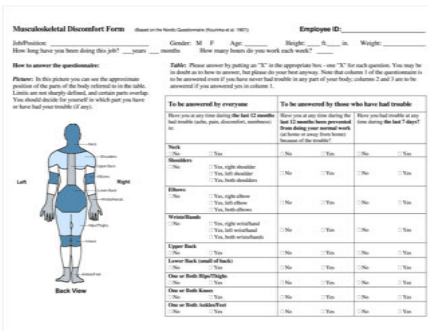
These regions were selected on the basis of two criteria:

- Regions where symptoms tend to accumulate.
- Regions which are distinguishable from each other both by the respondent and a health surveyor

The verbal questions deal with each anatomical area in turn, and inquire whether the respondent has, or has had, troubles in the respective area during the preceding 12 months, whether this pain is disabling and whether it is ongoing. Fig.3 shows the anatomical areas and the layout of the questionnaire.

The standardized general questionnaire of the Nordic musculoskeletal pain questionnaire has advantages compared to other survey methods, as respondents find it easier to complete the Nordic Musculoskeletal Questionnaire's simpler questionnaire.

Reliability -77%.  
Validity -80%.



**RESULTS**

- This study was carried out in 100 professional Bharatnatyam dancers by using General questionnaire of the Nordic musculoskeletal pain questionnaire
- In the present study it was found that trouble during last 12 months' component of Nordic musculoskeletal questionnaire; knee was highly affected with a prevalence (29.5%), followed by lower back(17.3%) , hip/thighs (14.4%), shoulders (11.5%), neck (9.4%), upper back (8.6%), less affected in ankles/feet (6.5%) and no affection in elbows.
- It was found that during last 12 months been prevented from doing normal work' component of Nordic musculoskeletal questionnaire prevalence of knee pain was highest (42.9%), lower back (28.6%), shoulders(14.3%), ankles/feet(9.5%), upper back (4.8%), wrists/hands and elbow and hips/thighs and neck(0%)
- It was also found that in last 7 days' component of Nordic musculoskeletal questionnaire prevalence of knee pain was highest (50%), lower back (16.7%), hips/thighs and ankle/feet(9.3%), neck and shoulder(5.6%), upper back and wrists/hands(1.9%), elbows(0%).

BODY PART	HAVE YOU EXPERIENCED PAIN IN LAST 12 MONTHS			HAVE YOU EXPERIENCED PAIN IN LAST 7 DAYS		
		MAL ES	FEMA LES	TOTAL	MALES	FEMAL ES
NECK	13(9.4%)	1(10%)	12(10.3%)	3(5.6%)	1(33.3%)	2(3.9%)
SHOULDERS	16(11.5%)	1(10%)	15(12.9%)	3(5.6%)	0(0%)	3(59%)
ELBOWS	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
WRISTS	4(2.9%)	0(0%)	0(0%)	1(1.9%)	0(0%)	1(2.0%)
UPPER BACK	12(8.6%)	2(20%)	10(8.6%)	1(1.9%)	0(0%)	1(2.0%)
LOWER BACK	24(17.3%)	1(10%)	23(19.8%)	9(16.7%)	0(0%)	9(17.6%)
HIPS/THIGHS	20(14.4%)	1(10%)	19(16.4%)	5(9.3%)	0(0%)	5(9.8%)
KNEES	41(29.5%)	4(40%)	37(31.9%)	27(50%)	2(66.7%)	25(49.0%)
ANKLE	9(6.5%)	0(0%)	0(0%)	5(9.3%)	0(0%)	5(9.8%)

**CONCLUSION**

- This study concludes that the prevalence of Musculoskeletal injuries in professional Bharatnatyam dancers in Maharashtra is very high, i.e.78%.
- This study also concludes that Knee pain is the most prevalent form of Musculoskeletal disorder in professional Bharatnatyam dancers followed by Lower back pain, Hips/Thigh pain.
- Females were more affected than male in this study.

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