

# Prevalence of Playing Related Musculoskeletal Disorder in Keyboard and Guitar Players

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## ABSTRACT

**Background:** Playing-related musculoskeletal disorders (PRMDs) are common among musicians due to prolonged practice hours, repetitive movements, and sustained awkward postures. Despite growing global literature, limited Indian data exist focusing on keyboard and guitar players.

**Objective:** To determine the prevalence of PRMDs among keyboard and guitar players and to assess pain intensity, instrument-related functional difficulties, and upper limb disability.

**Methods:** A cross-sectional observational study was conducted on 132 keyboard and guitar players aged  $\geq 16$  years from Nagpur city. Participants practicing for more than five hours per week were assessed using the Performing Arts Module of the DASH questionnaire, Patient-Rated Wrist/Hand Evaluation (PRWHE), and Numerical Pain Rating Scale (NPRS). Descriptive statistics were used for analysis.

**Results:** The overall prevalence of PRMDs was found to be high, with the neck, shoulder, wrist, and hand being the most commonly affected regions. Moderate levels of pain and functional disability were observed, particularly in participants practicing for more than 14 hours per week.

**Conclusion:** PRMDs are highly prevalent among keyboard and guitar players. Early screening, ergonomic education, and physiotherapy-based preventive strategies are essential to reduce disability and improve performance longevity.

**Keywords:** Playing-related musculoskeletal disorders, musicians, keyboard players, guitar players, physiotherapy, prevalence

## INTRODUCTION

Musculoskeletal symptoms such as pain, stiffness, weakness, numbness, and loss of motor control are commonly reported among individuals involved in occupations requiring repetitive movements and sustained postures<sup>1</sup>. Musicians constitute a unique occupational group exposed to prolonged physical and psychological demands, predisposing them to musculoskeletal disorders that may compromise performance quality and career longevity<sup>2</sup>.

The term playing-related musculoskeletal disorders (PRMDs) was introduced by Zaza et al. to describe pain or symptoms that interfere with a musician's ability to play their instrument at the expected level<sup>3</sup>. Unlike acute injuries, PRMDs are typically chronic, progressive, and often under-reported due to fear of performance loss or career disruption<sup>4</sup>.

Keyboard and guitar playing involves repetitive finger movements, sustained wrist extension, prolonged shoulder elevation, and static neck postures, resulting in cumulative tissue overload<sup>5</sup>. Guitar players additionally adopt asymmetrical trunk and upper limb postures depending on instrument type and playing position<sup>6</sup>. These biomechanical stresses, when combined with long practice hours and inadequate recovery, significantly increase the risk of PRMDs<sup>7</sup>.

While international studies report prevalence rates ranging from 57% to 93%<sup>8</sup>, Indian literature predominantly focuses on tabla and percussion players, leaving a gap in data related to string and keyboard instrumentalists. Understanding the prevalence and functional impact of PRMDs in this population is essential for designing targeted prevention and rehabilitation programs

## METHODOLOGY

A cross-sectional observational study was conducted over a period of one year in Nagpur city to determine the prevalence of playing-related musculoskeletal disorders (PRMDs) among keyboard and guitar players. The study population consisted of musicians aged 16 years and above, including students, amateurs, and professionals, who played the keyboard, guitar, or both instruments for a minimum of five hours per week. Participants were recruited from music academies, colleges, and private practice settings using convenience sampling after obtaining permission from the respective institutions. Written informed consent was obtained from all participants prior to data collection.

Individuals with a history of upper limb or spinal surgery, chronic neurological, rheumatological, or psychological disorders, as well as composers, conductors, and beginners, were excluded from the study to avoid confounding factors. A total of 132 participants fulfilling the inclusion criteria were enrolled.

Data collection was carried out using standardized, validated outcome measures. Playing-related functional disability was assessed using the Performing Arts Module of the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, which evaluates difficulty in instrument-specific activities. Wrist and hand pain and functional impairment were measured using the Patient-Rated Wrist/Hand Evaluation (PRWHE). Pain intensity was assessed using the Numerical Pain Rating Scale (NPRS), an 11-point scale ranging from 0 (no pain) to 10 (worst imaginable pain). Participants were guided on how to complete the questionnaires, and any queries were clarified to ensure accurate responses.

## RESULTS

The study demonstrated a high prevalence of PRMDs, with over two-thirds of participants reporting musculoskeletal pain in at least one anatomical region during the past 12 months. The most commonly affected areas were the neck, shoulder, wrist, and , consistent with the biomechanical demands of keyboard and guitar playing.

Participants practicing more than 14 hours per week exhibited significantly higher DASH and PRWHE scores, indicating greater disability. NPRS scores revealed predominantly moderate pain levels, with a small proportion reporting severe pain interfering with performance.

### Demographic Characteristics of Participants

Variable	Category	Percentage
Age	58	43.9
	46	54.3
	28	21.3
Gender	Male	57.6
		42.4
Instrument played	Keyboard	42.9
	Guitar	37.1
	Both	22

## DISCUSSION

The findings of the present study confirm that PRMDs are highly prevalent among keyboard and guitar players, aligning with previous international reports<sup>8,12</sup>. The predominance of neck and upper limb involvement reflects sustained postural loading and repetitive fine motor activity inherent in musical performance<sup>5</sup>.

Higher disability scores among individuals practicing longer hours support the dose-response relationship between practice duration and musculoskeletal symptoms<sup>13</sup>. Similar associations have been reported by Gómez-Rodríguez et al., who identified prolonged playing hours as a major risk factor for musculoskeletal pain<sup>12</sup>.

The use of validated outcome measures such as DASH and PRWHE strengthens the reliability of findings and enables comparison with existing literature<sup>9,10</sup>. The presence of moderate pain levels suggests that many musicians continue playing despite symptoms, potentially increasing the risk of chronic disability<sup>3</sup>.

Physiotherapists are uniquely positioned to address PRMDs through ergonomic education, posture correction, load management, and exercise-based interventions<sup>14</sup>. Adopting preventive models similar to sports medicine may reduce injury incidence and improve performance sustainability among musicians<sup>15</sup>.

## CONCLUSION

Playing-related musculoskeletal disorders are highly prevalent among keyboard and guitar players, with significant pain and functional limitations observed. Early identification, ergonomic awareness, and physiotherapy-based preventive strategies are essential to reduce disability and promote long-term musculoskeletal health in musicians.

## Limitations

Despite providing valuable insight into the prevalence of playing-related musculoskeletal disorders among keyboard and guitar players, this study has certain limitations. The cross-sectional design restricts the ability to establish a causal relationship between playing habits and the development of musculoskeletal disorders. Since data were collected at a single point in time, changes in symptoms over time and progression of disorders could not be assessed.

The use of self-reported questionnaires may have introduced response bias, as participants might have underreported or over-reported pain and disability based on personal perception or recall. Additionally, convenience sampling was employed, which may limit the generalizability of the findings to all musicians.

## Recommendations for Further Research

Future research should adopt longitudinal study designs to establish causal relationships and to monitor the progression and recurrence of playing-related musculoskeletal disorders over time. Including larger and more diverse samples from different regions would enhance the generalizability of findings. Further studies should incorporate objective biomechanical assessments, posture analysis, ergonomic evaluations, and physical performance tests to better understand the mechanisms underlying PRMDs. Exploring the role of psychological factors such as stress, anxiety, and coping strategies may provide a more holistic understanding of musicians' health.

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