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Prevalence of Musculoskeletal Disorder among Table Tennis Players in Puducherry

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Abstract
Background: Low back pain or disability and shoulder region pain or disability are the most common musculoskeletal disorders associated with various sports activities. Some sports activities and related MSD are under-detected; one such sport is table tennis players, where regular usage of specific muscle groups repetitively for a long period. As there is a paucity in determining the musculoskeletal disorder among table tennis players, this study was conducted to determine the early detection of functional limitation among table tennis players.
Method: This is a prevalence design; random sampling was used. 100 individuals were taken, but only 80 members were included based on inclusion and exclusion criteria. SPADI and ODI are the questionnaires that were introduced to all the participants, which include pain and disability. Each questionnaire was calculated, and the total score was found.
Result: This shows that there is severe disability in the shoulder joint SPADI (47%) and there is moderate disability in the low back (25%).
Conclusion: This study was conducted that there was a prevalence of musculoskeletal disorders among table tennis players in Pondicherry which as indicated by using the shoulder pain and disability index (SPADI) and Oswestry disability index (ODI).

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1. Introduction

The World Health Organization (WHO) defines MUSCULO-SKELETAL DISORDER (MSD) as "Health problems of the locomotor apparatus, i.e., Muscles, tendons, bone skeleton, cartilage, ligaments, and nerves. This includes any type of complaints, from slight transitory discomforts to irreversible and incapacitating injuries" [1].

In recent studies, it has been reported that athletes, table tennis players, cricket players, and football players spend considerable time developing particular skills, such as performers use specific muscle groups repetitively for a long period. This type of repetition might increase the injury risk. The survey that had been conducted with professional players indicated that the prevalence of musculoskeletal pain symptoms ranges from 50% to 80% [2].

Musculoskeletal Disorder (MSD) involves the analysis of the work to be done and determining the risk factors in order to analyze a series of preventive measures. In this, the factors that increase the risk of MSD are classified in work based on the bad posture, repetitive movements, physical exertion, mechanical pressure on the bodily tissues, and body vibration [3].

Low back pain or disability and shoulder region pain or disability are the most common public health problems. The Global one-year prevalence is around 38% for low back pain and typically 30-50% for shoulder region pain. Globally, low back pain and shoulder region pain are the main causes of disability in the population, reducing the quality of life of individuals [4].

It is the leading cause of activity limitation and work absence throughout much of the world, and it causes a great economic burden on individual communities and governments. The point prevalence of LBP is 28.51% found in an Asian country. The lifetime prevalence of low back pain is reported to be over 70%, but globally, the annual prevalence of LBP resolves within weeks but may recover in 24-50% of cases within 1 year [5]. The shoulder dysfunction can be assessed using the Shoulder Pain and Disability Index (SPADI) questionnaire [6]. It is a valid and reliable tool to assess the shoulder dysfunction regarding its pain and functional abilities. The Oswestry Index (ODI) questionnaire is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test has been around since 1980 and is considered the 'gold standard' of low back pain functional outcome tools.

Therefore, this study focuses on analyzing the prevalence of musculoskeletal disorders among table tennis players for the early detection and prevention of disability in this population.

2. Materials and Methodology

This prevalence study was conducted at Sri Aditya Table Tennis Academy, Pondicherry, involving 80 table tennis players selected through convenient sampling. The study population included players who had been playing for more than 3 years and were aged between 18 to 25 years, with complaints of shoulder pain, low back pain, or discomfort persisting for more than 6 months. Players with shoulder or low back disability due to previous injuries such as road traffic accidents (RTA), surgeries, recent upper limb fractures, or any trauma-related history were excluded. The study was conducted over a total duration of 6 months, with data collection carried out over 3 months. The tools used for assessment were the Shoulder Pain and Disability Index (SPADI) and the Oswestry Disability Index (ODI), which measured shoulder and lumbar disability as the dependent variables.

3. Procedure

1. Shoulder Pain and Disability Index (SPADI)

It is a patient-completed questionnaire with 13 items that assesses the pain level and extent of the difficulties faced in ADLs requiring the use of the upper extremities. Pain subscales have 5 items, and the disability subscale has 8 items. Patient is instructed to choose the number which describes the level of pain and extent of disability using the affected shoulder pain scale has a scoring total of 50, and disability has a scoring total of 80. The total score of SPADI is given as a percentage. When the score 0 indicates best and 100 indicates worst, the higher the score higher the disability. While scoring SPADI, any of the questions missed should be taken out of the total score. The pain scale has a scoring total of 50, and disability has a total score of 80. The total score of SPADI is given as a percentage.

2. Oswestry Disability Index (ODI)

It is patient patient-completed questionnaire that gives a subjective percentage score of the level of function (disability) in activities of daily living in those rehabilitating from low back pain. This examines the perceived level of disability in 10 everyday activities of daily living. It has 6 statements on each question, which are scored from 0 to 5, with the first statement scored 0 through to the last at 5. 0 indicates 'no pain' and 5 indicates 'worst imaginable pain'; it has a total score of 50. The total score of ODI is given as a percentage.

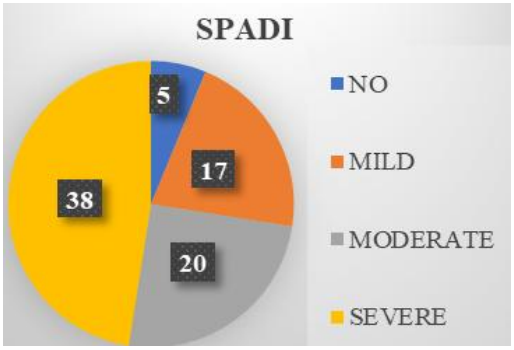
4. Statistical analysis

1. Shoulder Pain & Disability Index (SPADI)

All the data were fed into the Excel sheet for analysis. The Shoulder Pain & Disability Index scores obtained were categorized and tabulated.

Table 1: SPADI

Category	No of Individuals	Percentage
No Disability	5	7%
Mild Disability	17	21%
Moderate Disability	20	25%
Severe Disability	38	47%



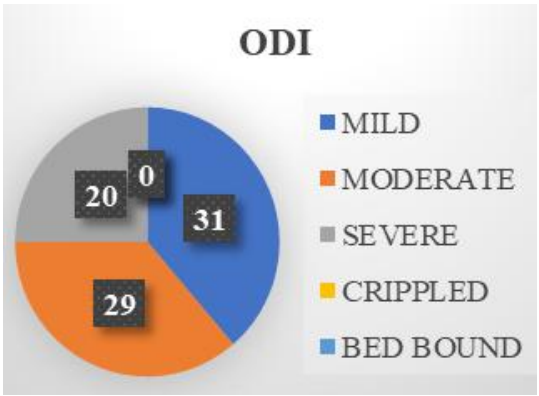
Graph 1: The prevalence of shoulder disability among 80 table tennis players using SPADI

2. Oswestry Disability Index (ODI)

All the data were fed into the Excel sheet for analysis. The Oswestry Disability Index scores obtained were categorized and tabulated.

Table 2: ODI

Category	No of Individuals	Percentage
Mild Disability	31	39%
Moderate Disability	29	36%
Severe Disability	20	25%
Crippled	0	0%
Bed Bound	0	0%



Graph 2: The prevalence of low back dysfunction among 80 table tennis players using the Oswestry Disability Index.

5. Results

The prevalence of disability was subcategorized as 47% of the population has severe shoulder disability & 25% of the population has severe low back disability. Therefore, the

shoulder joint is more affected when compared to the low back.

6. Discussion

This cross-sectional study was conducted to determine the prevalence of musculoskeletal disorders (MSDs) among table tennis players, with a specific focus on shoulder and low back dysfunction. A total of 80 players were included in the study, selected based on well-defined inclusion and exclusion criteria. Although the initial target was to include a larger sample size, the post-COVID-19 situation led to a compromise in player regularity and availability, resulting in a final sample of 80 participants. Despite this limitation, player interest and cooperation were notably high.

Table tennis is a high-speed sport requiring rapid movements, repeated trunk flexion, and frequent upper limb actions, placing significant biomechanical stress on the shoulder and lumbar spine. These repetitive and forceful actions make players susceptible to musculoskeletal dysfunction, particularly in the shoulder and lower back regions. In this study, outcome measures such as the Shoulder Pain and Disability Index (SPADI) and Oswestry Disability Index (ODI) were employed to assess the extent of dysfunction.

The findings from SPADI revealed that 47% of the participants experienced severe shoulder dysfunction, while 25% had moderate dysfunction, 21% had mild dysfunction, and only 7% reported no dysfunction. These results clearly indicate a high prevalence of shoulder-related disability among table tennis players, which is consistent with previous research. For example, Leyla Alizadeh Ebadi *et al*. (2018) conducted a study on table tennis players and found that upper extremity injuries, particularly those affecting the shoulder and clavicle, had the highest incidence, especially among males. This supports the current study's findings, emphasizing the shoulder as a major area of concern.

The ODI results showed that 39% of players reported mild lumbar disability, 36% had moderate disability, and 25% experienced severe disability. While not as pronounced as the shoulder findings, these results still highlight a significant burden of lumbar musculoskeletal disorders. The lumbar spine is commonly affected due to the repetitive forward-bending posture adopted by players during matches and training, leading to strain on the spinal musculature and potential development of pain and dysfunction.

From the analysis, it is evident that shoulder dysfunction is more prevalent than lumbar dysfunction in this population. However, both regions show a notable incidence of MSDs, indicating the need for targeted preventive and rehabilitative strategies. The variations in severity may be attributed to differences in individual biomechanics, playing techniques, training intensity, and ergonomic practices.

Early identification and management of MSDs are crucial in preventing long-term functional limitations and maintaining athletic performance. Incorporating structured physical activity of appropriate intensity, frequency, and duration can significantly enhance muscle strength, bone density, cardiovascular health, and overall fitness. Moreover, ergonomic interventions, such as proper posture education, equipment modifications, and workload adjustments, can play a vital role in reducing the risk of MSDs.

7. Conclusion

In conclusion, this study highlights the high prevalence of shoulder and lumbar dysfunction among table tennis players, emphasizing the importance of preventive care, proper training protocols, and ergonomic practices. Promoting awareness and implementation of these strategies can contribute to improved performance, reduced injury risk, and an enhanced quality of life for athletes. The study faced several limitations, including a relatively small sample size, which may restrict the generalizability of the findings. Participants encountered difficulties in understanding and completing the questionnaire due to unfamiliar terminology, necessitating additional guidance from the investigators. Furthermore, the study did not account for variables such as Body Mass Index (BMI), cultural and educational factors, or leisure activities, which may influence musculoskeletal health. Based on these limitations, it is recommended that future research include a larger and more diverse sample to better represent the broader table tennis player population. Increasing awareness about musculoskeletal disorders among players is essential to prevent the progression of disabilities. Additionally, early identification of issues and timely administration of appropriate physiotherapy interventions are crucial for enhancing motor function and supporting players in maintaining their daily activities and athletic performance.

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