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Prevalence of musculoskeletal injury in adolescent kabaddi player in Mumbai using Nordic musculoskeletal questionnaire

Tejas Rohidas Milkhe, Dr. Ruturaj Shete
Department of Physiotherapy, Lokmanya Tilak College of Physiotherapy, Mumbai, Maharashtra, India
Corresponding Author: Dr. Ruturaj Shete

Abstract
Background: Kabaddi is a high-intensity contact sport that requires strength, agility, speed, and neuromuscular coordination. Due to rapid movements, tackling, and sudden directional changes, players are at a higher risk of developing musculoskeletal injuries. Adolescents are particularly vulnerable because their musculoskeletal system is still developing. Despite the growing popularity of kabaddi in India, limited research has been conducted on the prevalence of musculoskeletal injuries among adolescent kabaddi players.
Aim: To determine the prevalence of musculoskeletal injuries among male adolescent kabaddi players in Mumbai using the Nordic Musculoskeletal Questionnaire.
Methodology: A cross-sectional survey study was conducted among adolescent kabaddi players from sports academies in Mumbai. A total of 140 male kabaddi players aged between 13–18 years were included in the study using purposive sampling. Participants who had at least one year of playing experience and were actively participating in training or competitions were included. Data were collected using the Nordic Musculoskeletal Questionnaire after obtaining informed consent. Statistical analysis was performed using Microsoft Excel, and results were expressed in frequency and percentage.
Results: The findings showed that musculoskeletal injuries were commonly reported among adolescent kabaddi players. The knee joint had the highest prevalence of injury (23%), followed by the ankle (21%) and shoulder (18%). Approximately 49% of the participants reported experiencing musculoskeletal pain in the last 7 days, while 49% reported that their activities were affected due to pain in the past 12 months.
Conclusion: The study concludes that musculoskeletal injuries are common among adolescent kabaddi players, with the knee and ankle being the most affected joints. The high prevalence of lower extremity injuries highlights the need for preventive strategies such as strength training, neuromuscular conditioning, and proper warm-up programs to reduce injury risk and improve athletic performance.

Keywords: Kabaddi, musculoskeletal injuries, adolescent athletes, nordic musculoskeletal questionnaire, prevalence

Introduction

Kabaddi is a popular Indian sport which is originated from India and has spread to, Pakistan, Bangladesh, Iran, Japan, Nepal, Canada etc. It is also the national game of Bangladesh and Nepal. It is the state game of Haryana, Punjab, Tamil Nadu, Bihar and Maharashtra. Since 1990, it is part of the Asian games.

Kabaddi is one of the most popular sports in the India and Maharashtra. Kabaddi, India's indigenous sport, has experienced exceptional growth since the establishment of the Pro Kabaddi League (PKL) in 2014. What started as a rural pastime has grown into a worldwide phenomenon that captivates millions. PKL's revolutionary impact has changed kabaddi's landscape catapulting it to the forefront of Indian sports.

Kabaddi is a traditional game that is played in all regions of India and requires tremendous physical strength, stamina, agility, neuromuscular coordination, quick reflexes, intelligence and presence of mind in athletes. It involves rapid and forceful movements of the body during playing, hence injuries are inevitable. It requires offensive and defensive skills which makes the players prone to many types of sports-related injuries. Contact sports can be defined as the sport in which players physically interact with each other, trying to prevent the opposing player or athlete from winning the game or sport.

Adolescence, a vital period of growth and development, is distinguished by increased physical activity and athletic participation. However, this age group is also prone to injuries due to undeveloped skeletal and muscular systems.

Teenagers are playing kabaddi more frequently, which has increased participation to considerable degree and raised concerns about the frequency of musculoskeletal problems.

Kabaddi has been demonstrated to be among the most hazardous of semi contact team sports. Kabaddi requires a variety of physical and motor fitness with specific playing skills. It is non expensive sport and easy to reach every people.

In kabaddi injury are traditionally divided into contact and non-contact mechanism in which case contact refers to player to player contact. Some of the forces involved in a non-contact injury are transmitted from the playing surface to the injured body part. Not much studies have been made about survey in the area of injuries so the attempt has been made to conduct in this area.

Even though kabaddi is become more and more popular, little study has been done on the prevalence of musculoskeletal injuries among teenage players. By examining the frequency, kinds, and risk factors of musculoskeletal injuries among teenage kabaddi players, this research hopes to shed light on injury management and prevention tactics.

Methodology

This study adopted a cross-sectional survey design and was conducted among male adolescent kabaddi players in sports academies located in Mumbai district. The study aimed to determine the prevalence of musculoskeletal injuries among adolescent kabaddi players.

Sampling Method and Sample Size

A purposive sampling method was used to recruit participants who met the eligibility criteria. A total of 140 male adolescent kabaddi players were included in the study.

Inclusion Criteria

Participants were included in the study if they met the following criteria:
Male adolescent kabaddi players aged 10–19 years.
Currently participating in kabaddi training or competitions.
Having more than one year of playing experience in kabaddi.
Able to understand and complete the study questionnaire.

Exclusion Criteria

Participants were excluded if they met any of the following criteria:
Female adolescent kabaddi players.
Age less than 12 years or more than 18 years.
Individuals with no prior experience in kabaddi.
Players actively participating in other contact sports that could influence injury data.
Individuals unable to provide informed consent or complete the questionnaire.

Data Collection Procedure

Prior to participation, informed consent was obtained from all participants and necessary permission was taken from the respective sports academies. Demographic details such as age, playing experience, and training participation were collected using a structured data collection form.
Musculoskeletal injuries were assessed using the Nordic Musculoskeletal Questionnaire, a standardized and widely used tool for identifying musculoskeletal symptoms in different body regions. Participants were asked to report any musculoskeletal pain or injury experienced during their kabaddi playing activities.

Outcome Measure

The primary outcome measure used in the study was the Nordic Musculoskeletal Questionnaire, which evaluates the presence of musculoskeletal symptoms in various body regions including the neck, shoulder, elbow, wrist/hand, upper back, lower back, hip/thigh, knee, and ankle/foot.

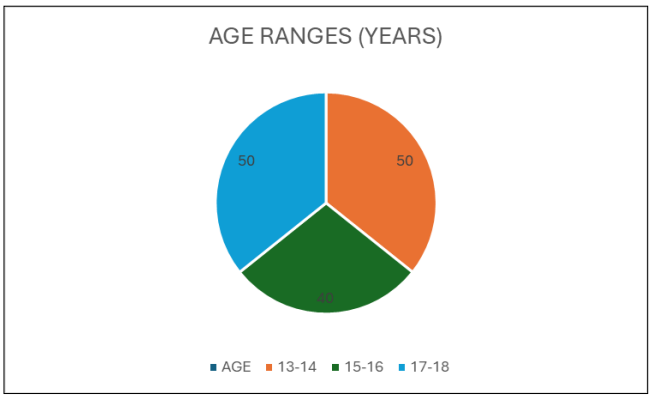
Data Analysis

All collected data were recorded systematically and entered into a database for analysis. Descriptive statistics such as frequency and percentage were used to determine the prevalence of musculoskeletal injuries among the participants.

Data Analysis And Results

Data analysis was done using Microsoft Excel for windows, the frequency distribution and percentage values were calculated and reported.

Demographic Data Analysis



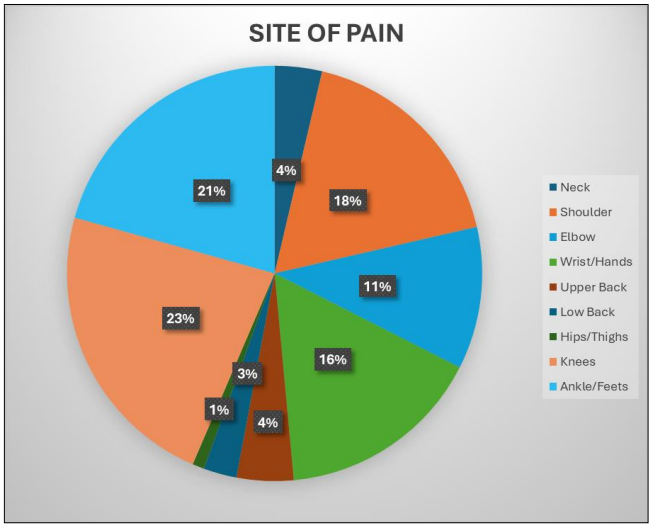
Graph 1: Age Wise Distribution Of Players

Table 1: Age Wise Distribution of Participants

AGE (YEARS)	FREQUENCY (%) (n=140)
13-14	50 (35.71%)
15-16	40 (28.57%)
17-18	50 (35.71%)

Mean age of kabaddi players: 15±4.04 years

Interpretation: In my population 50 players of 140 are between the age group of 13-14 years, and 40 out 140 players range between the age group of 15-16 years, where's 50 out 140 players range between the age group of 17-18 years.

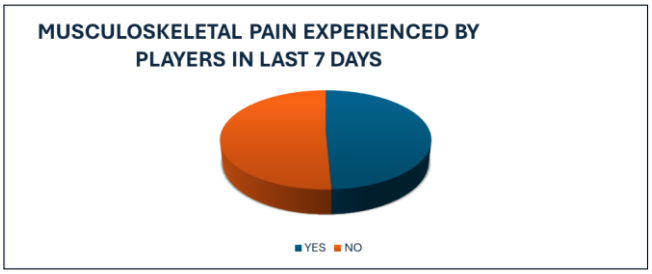


Graph 2: Frequency And Percentage Of Site Of Pain In Kabaddi Players

Table 2: Frequency and percentage of site of pain in kabaddi players

Site Of Pain	Frequency (%) (n=140)
Elbow	60 (11%)
Low Back	14 (3%)
Shoulder	96 (18%)
Wrist	87 (16%)
Neck	20 (4%)
Knee	124 (23%)
Hip	5 (1%)
Ankle	112 (21%)

Interpretation: The above pie chart shows that in my population the most painful sites are knee joint (23%) and ankle joint (21%), whereas the least painful is hip joint (1%).

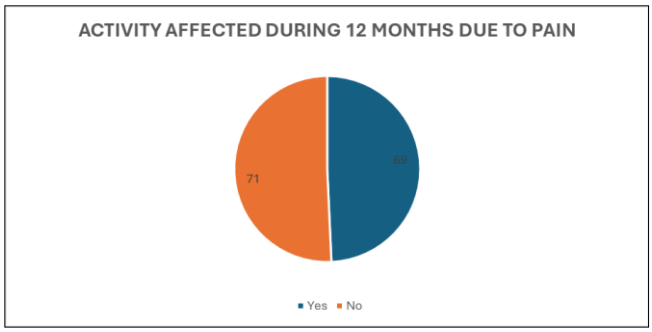


Graph 3: Frequency And Percentage Of Pain Experienced By Players In Last 7 Days

Table 3: Frequency and percentage of pain experienced by players in last 7 days

PAIN Experienced	Frequency (%) (n=140)
Yes	69 (49%)
No	71 (51%)

Interpretation: This graph explains that 69 (49%) players out of 140 experienced musculoskeletal pain in last 7 days



Graph 4: Frequency And Percentage Of Activity Affected Of The Players During 12 Months Due To Pain

Table 4: Frequency and percentage of activity affected of the players during 12 months due to pain

Activity Affected	Frequency (%) (n=140)
Yes	69 (49%)
no	71 (51%)

Interpretation: This pie chart explains that 69 players out of 140 complained of the activity getting affected during 12 months due to pain

Discussion

This study focuses on the musculoskeletal pain in kabaddi players. It basically tells us which musculoskeletal site is the most painful in them due to the technique required for throwing the put. The study was conducted on 140 kabaddi players from different sport academies in thane district using Nordic Musculoskeletal Questionnaire, of which 140 were males. The population in this study ranges between the age of 13-18 years (graph.1), where the Mean $\pm$ Standard Deviation of age of participants was 15($\pm$1.83) (table.1) years.

Among the 140 participants, it was found that prevalence of musculoskeletal pain was highest in the knee [23% (n=124)] and ankle [21%(n=112)], and least in hip [1%(n=5)] (graph.2). In the study 71 players out of 140 complained of musculoskeletal pain in last 7 days (graph.3). The most common prevalence was shoulder pain. Players even complained of their activities getting affected due to pain in the past 12 months (graph.4).

In the last study done by Pal s, kumar , Indian Kabaddi players of 80 professional national-level male Kabaddi players (mean age=21.65 years) presenting with various sports-related injuries were identified in the 1st All India Inter-University Kabaddi Tournament (2014-2015) held in Punjabi University, Patiala. It was found that out of 80 players, the prevalence of present injury was 42.5% (n=34) and 62.5% (n=50) of injuries were recorded in the past two years

The phases of a kabaddi game consist of

The present study aimed to determine the prevalence of musculoskeletal injuries among male adolescent kabaddi players in Mumbai using the Nordic Musculoskeletal Questionnaire. The findings of the study revealed that knee injuries (23%) were the most prevalent musculoskeletal injuries, followed by ankle/foot injuries (21%) and shoulder injuries (18%). These results indicate that kabaddi players are particularly susceptible to injuries involving the lower extremity joints due to the dynamic, high-impact, and contact nature of the sport.

Kabaddi is a high-intensity contact sport that requires rapid acceleration, sudden deceleration, cutting maneuvers, lunging, and tackling movements. These activities impose substantial biomechanical stress on the lower limb joints, particularly the knee and ankle joints. The present study observed that the knee joint had the highest prevalence of injuries (23%). This finding is consistent with previous studies conducted on kabaddi athletes, which also reported the knee as the most commonly injured joint due to repetitive twisting, pivoting, and high-impact tackles involved during raiding and defensive actions.

Biomechanically, the knee joint acts as a major load-bearing joint during activities such as squatting, lunging, jumping, and rapid directional changes. During kabaddi play, defenders often attempt to block or tackle the raider by holding the lower limb, which may cause excessive valgus stress, rotational forces, and sudden hyperflexion or hyperextension of the knee joint. These mechanisms increase the risk of injuries such as anterior cruciate ligament (ACL) tears, meniscal injuries, and collateral ligament sprains. Studies have shown that twisting movements and collisions are among the most common mechanisms responsible for knee injuries in contact sports like kabaddi.

The second most prevalent injury site observed in this study was the ankle and foot region (21%). The ankle joint plays a crucial role in maintaining balance, propulsion, and stability during running, jumping, and sudden directional changes. Kabaddi involves quick footwork, sudden stops, and pivoting actions that significantly increase the stress on the ankle joint complex. These repetitive high-impact movements predispose athletes to injuries such as ankle sprains, ligament tears, and tendinopathies. Previous research on kabaddi players has also reported a high prevalence of ankle injuries, particularly ligament sprains, due to landing instability and forceful tackles during defensive maneuvers.

Shoulder injuries (18%) were also commonly reported among the players in the present study. Although kabaddi is predominantly a lower-limb intensive sport, the shoulder joint is heavily involved during tackling, pushing, pulling, and resisting opponents. The shoulder joint has the greatest range of motion among all joints in the human body but

relatively less structural stability, which makes it vulnerable to injuries during high-force contact situations. During defensive actions, players often use their upper limbs to grab or restrain the raider, which may lead to excessive abduction, external rotation, or direct impact on the shoulder joint. This can result in injuries such as rotator cuff strain, shoulder dislocation, or acromioclavicular joint sprain. Similar findings were reported in previous studies where shoulder injuries accounted for a significant proportion of upper-limb injuries among kabaddi players.

The higher prevalence of lower extremity injuries observed in this study can also be explained by the biomechanical demands of kabaddi gameplay. Raiders frequently perform movements such as lunges, kicks, toe touches, and rapid directional changes while attempting to evade defenders. These movements generate high ground reaction forces and joint loading on the knee and ankle joints. Similarly, defenders perform sudden tackles and chain formations that require strong lower limb stabilization, which may further increase the risk of musculoskeletal injuries in these joints. Previous epidemiological studies on kabaddi injuries have also reported that lower limb injuries are more common compared to upper limb injuries due to the sport's aggressive physical nature and repetitive mechanical loading on the lower extremities.

Furthermore, adolescent athletes may be more susceptible to musculoskeletal injuries because their musculoskeletal system is still developing. Factors such as inadequate conditioning, poor landing mechanics, insufficient warm-up, muscle imbalance, and lack of proprioceptive training may contribute to a higher risk of injury in this population. Therefore, preventive strategies such as strength training, neuromuscular training, proprioceptive exercises, and proper biomechanical technique training should be incorporated into training programs to reduce injury risk among kabaddi players.

Overall, the findings of the present study highlight that knee, ankle/foot, and shoulder joints are the most commonly affected anatomical regions among male adolescent kabaddi players. These injuries can significantly impact athletic performance and may lead to long-term musculoskeletal complications if not managed appropriately. Therefore, early identification of injury patterns and implementation of sport-specific injury prevention programs are essential for improving player safety and performance.

Limitations

Despite providing important insights into the prevalence of musculoskeletal injuries among male adolescent kabaddi players in Mumbai, the present study has certain limitations that should be acknowledged.

Firstly, the study was conducted on a limited sample of adolescent kabaddi players from a specific geographical region (Mumbai). Therefore, the findings may not be fully generalizable to kabaddi players from other regions, different age groups, or professional levels of play.

Secondly, the data on musculoskeletal injuries were collected using the Nordic Musculoskeletal Questionnaire, which is a self-reported assessment tool. As a result, the responses depended on the participants' memory and understanding of their symptoms, which may introduce recall bias or reporting bias.

Thirdly, the study design was cross-sectional in nature, which only allowed the assessment of the prevalence of injuries at a particular point in time. This design does not establish causal relationships between the sport-specific biomechanical demands of kabaddi and the occurrence of musculoskeletal injuries.

Additionally, the present study did not evaluate the severity, duration, or specific clinical diagnosis of the injuries. Factors such as training intensity, playing position, duration of sports participation, and previous injury history were also not assessed, which may influence the risk of musculoskeletal injuries among kabaddi players.

Finally, biomechanical assessment and physical examination of the joints were not performed in this study. Including objective clinical assessments, imaging techniques, or biomechanical analysis in future studies may provide a more comprehensive understanding of injury mechanisms in kabaddi players.

Therefore, future research with larger sample sizes, longitudinal study designs, and objective clinical assessments is recommended to better understand the risk factors and mechanisms associated with musculoskeletal injuries in kabaddi athletes.

Conclusion

The present study evaluated the prevalence of musculoskeletal injuries among male adolescent kabaddi players in Mumbai using the Nordic Musculoskeletal Questionnaire. The findings revealed that musculoskeletal injuries are common among kabaddi players, with the knee being the most frequently affected joint (23%), followed by the ankle/foot (21%) and shoulder (18%). The predominance of knee and ankle injuries indicates that the lower extremities are subjected to significant biomechanical stress due to the dynamic and high-impact nature of kabaddi, which involves rapid acceleration, sudden changes in direction, lunging, jumping, and tackling movements.

The involvement of the shoulder joint further highlights the role of upper limb engagement during defensive maneuvers such as gripping, pushing, and tackling opponents. The high prevalence of injuries observed in this study suggests that the physical demands and repetitive loading patterns associated with kabaddi may predispose adolescent players to musculoskeletal injuries, particularly in load-bearing joints.

These findings emphasize the need for structured injury prevention strategies, including strength training, neuromuscular conditioning, flexibility exercises, and sport-specific biomechanical training. Incorporating proper warm-up routines, proprioceptive training, and physiotherapy-based rehabilitation programs may help reduce the incidence of injuries and enhance athletic performance among kabaddi players.

Therefore, understanding the distribution and pattern of musculoskeletal injuries is essential for developing effective preventive and management strategies aimed at improving the safety, health, and long-term performance of adolescent kabaddi players

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