P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.93
IJPESH 2025; 12(5): 595-601

https://www.kheljournal.com
Received: 10-07-2025
Accepted: 15-08-2025

K Thivakaran
Faculty of General & Adapted Physical Education and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute, Coimbatore, Tamil Nadu, India

Dr. S Sakthivel
Assistant Professor, Faculty of General & Adapted Physical Education and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute, Coimbatore, Tamil Nadu, India

C Sabarish
Research Scholar, Faculty of General & Adapted Physical Education and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute, Coimbatore, Tamil Nadu, India

Corresponding Author:
Dr. S Sakthivel
Assistant Professor, Faculty of General & Adapted Physical Education and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute, Coimbatore, Tamil Nadu, India

Prevalence and management of injuries among female Kabaddi Players in Tamil Nadu: A cross-sectional survey

K Thivakaran, S Sakthivel and C Sabarish

DOI: https://www.doi.org/10.22271/kheljournal.2025.v12.i5i.4036

Abstract
The sport of Kabaddi, characterized by its high-intensity physical contact and dynamic movements, often exposes players to various injuries. This study investigates the prevalence, nature, and management strategies of injuries sustained by female Kabaddi players across Tamil Nadu. A total of 150 state level players from different districts were surveyed using a structured questionnaire, focusing on injury types, frequency, affected body regions, and management practices. The findings revealed a high incidence of lower limb injuries, particularly ankle and knee strains, followed by upper body contusions. Majority of the injuries were acute, occurring during competition rather than training sessions. Despite the prevalence, formal injury management and rehabilitation practices were inconsistent, with many athletes relying on traditional methods and inadequate medical support. The study underscores the urgent need for structured injury prevention programs, physiotherapy access, and awareness campaigns to enhance athlete safety and performance sustainability. These insights are vital for coaches, sports medicine professionals, and policymakers to implement targeted interventions tailored to the unique demands of female Kabaddi athletes.

Keywords: Kabaddi injuries, female kabaddi players, injury prevalence, injury management.

1. Introduction
Kabaddi, often referred to as the "Game of the Masses," is a traditional Indian sport that demands high levels of physical strength, stamina, agility, and mental alertness (Shetty and Pai, 2018) [48]. It is played extensively across India and is steadily gaining international recognition through professional leagues and inclusion in multi-sport events such as the Asian Games (Bisht and Bhandari, 2020) [7]. Kabaddi is unique in that it fuses offensive and defensive strategies, requiring both individual skill and team coordination. It's minimal equipment requirements and cultural roots make it especially popular in rural India, where accessibility and simplicity contribute to widespread participation (Singh and Singh, 2016).
The sport's historical origins can be traced back to ancient India, where it was played in various regional formats. The modern, standardized version of Kabaddi emerged following the establishment of the All-India Kabaddi Federation in 1950, and later the Amateur Kabaddi Federation of India (AKFI) in 1972, which formalized rules and promoted the sport nationwide (AKFI, 2023) [1]. The current competitive structure consists of two teams of seven players, with a "raider" attempting to tag defenders while continuously chanting "kabaddi" in a single breath—a distinctive feature that adds a unique aerobic component to the game (Shetty and Pai, 2018) [48].
Tamil Nadu has played a critical role in Kabaddi's national growth, hosting the first national championship in 1952 and nurturing a legacy of prominent players (AKFI, 2023) 1[]. The rise of women's Kabaddi has also marked a significant development, promoting gender inclusivity and empowerment through sports. However, female Kabaddi players continue to face physical, psychological, and social challenges, including injury vulnerability, gender bias, and limited access to professional training and healthcare support systems (Reddy *et al*., 2019) [44].

1.1 Injuries in kabaddi

Any injury sustained during physical activity, including exercise or sports participation, is broadly categorized as a sports injury. These range in severity from minor sprains and bruises to more serious conditions such as fractures and dislocations (Brukner and Khan, 2017) [8]. Sports injuries occur when the physical load applied to the body exceeds the tolerance of the involved tissues, which is influenced by the mechanical properties of muscles, ligaments, tendons, and bones. These properties are further affected by factors such as the type, magnitude, and frequency of loading, as well as individual characteristics like age, gender, previous injury history, and overall physical condition (Nigg and Herzog, 2007) [37].

Understanding the relationship between biomechanical load and tissue adaptability is essential in both preventing and managing injuries. In high-intensity contact sports like Kabaddi, injuries frequently arise due to overtraining, poor biomechanics, inadequate recovery, and psychological stress (Kumar and Singh, 2018) [30]. The most common injuries among Kabaddi players include lower limb strains, sprains, ligament injuries, and overuse syndromes, particularly affecting the knee and ankle joints, which bear the brunt of sudden directional changes, tackles, and rapid movements inherent to the sport (Sharma *et al*., 2020) [46, 47].

1.2 Injury Prevalence Among Female Kabaddi Players

While the popularity of kabaddi has surged, especially among women at school, collegiate, and professional levels, so too has the concern regarding injury prevalence among female players. Understanding injury patterns is vital for developing targeted prevention and rehabilitation programs. Female players are more prone to non-contact or soft tissue injuries, like ACL tears, sprains, and muscle strains, especially in the lower limbs, while Male Kabaddi players often experience more contact injuries, such as fractures, dislocations, and contusions, especially from tackling and diving. A study by Sharma *et al*. (2020) [46, 47] found that 62.4% of female Kabaddi players had experienced at least one injury during their playing career, with lower limb injuries (41.3%) being the most prevalent, followed by upper limb injuries (28.7%) and head/neck injuries (12.5%).

Common injury types include sprains, strains, contusions, and ligament tears. Notably, knee and ankle injuries dominate the injury landscape, with the ankle being the most frequently injured joint due to sudden stops and directional changes (Kumar and Singh, 2018) [30]. Additionally, female kabaddi players may be more vulnerable to certain injuries due to biomechanical and hormonal differences, such as a higher incidence of anterior cruciate ligament (ACL) injuries. A comparative study by Reddy *et al*. (2019) [44] between male and female Kabaddi players reported that female players had a slightly higher injury rate during training sessions (18.2 injuries per 1000 training hours) compared to their male counterparts. This could be attributed to factors such as inadequate warm-up routines, lack of specialized coaching, and underdeveloped strength and conditioning programs tailored to female physiology.

1.3 Significance of Women in Kabaddi

The inclusion and rise of women in Kabaddi represent a critical step toward gender equity in Indian sports and contributes to the broader narrative of women's empowerment through sports participation. Women's Kabaddi not only challenges traditional gender norms but also offers a platform for physical fitness, leadership, and community representation (Bisht and Bhandari, 2020 7[]; Kaur and Sharma, 2020) [46, 47]. Participation in Kabaddi has been linked to improvements in strength, agility, endurance, and psychological resilience among female kabaddi players, fostering a sense of self-confidence and social identity (Mukherjee, Rao, and Nair, 2020) [36].

At the community level, women's involvement in Kabaddi has demonstrated the potential to inspire younger generations, promote inclusivity, and increase overall sports participation rates among girls, particularly in rural areas where opportunities for competitive sports are often limited (Raj and Mehta, 2019) [41]. The success of Indian women's teams in national and international competitions, such as the Asian Games, has enhanced the visibility of female kabaddi players and reinforced the viability of Kabaddi as a professional career pathway for women (AKFI, 2023) [1].

1.4 Barriers for Women in Kabaddi

Although women's participation in Kabaddi has grown in recent years, research indicates that female kabaddi players continue to encounter multiple barriers that limit their engagement, performance, and safety in the sport. Socio-cultural norms and gender stereotypes often frame Kabaddi as a male-dominated activity, discouraging female participation, particularly in rural areas where traditional gender roles are deeply embedded **(**Kaur and Sharma, 2020) [46, 47]. These societal attitudes can lead to reduced family support, fewer grassroots opportunities, and limited media visibility for female players (Raj and Mehta, 2019) [41]. Financial limitations, including lower prize money, fewer sponsorships, and reduced institutional funding compared to men's teams, further restrict the development of female Kabaddi athletes (Gupta *et al*. 2021) [19]. Overcoming these barriers requires gender-sensitive policies, targeted investment in women's Kabaddi, and awareness programs to dismantle stereotypes and provide equitable opportunities for female kabaddi players.

1.5 Prevention of Injuries among Female Kabaddi Players

Injury prevention among female Kabaddi players necessitates a multifactorial and evidence-based approach. Structured strength and neuromuscular training focused on lower limb stabilization and core control has been shown to significantly reduce injury risk. Moreover, the implementation of proper warm-up protocols, biomechanically sound movement techniques, and sport-specific skill refinement is critical. Consideration of intrinsic factors such as hormonal fluctuations related to the menstrual cycle, alongside extrinsic elements including surface type and footwear design, further enhances preventive outcomes. Regular medical screenings, individualized load management, and education on injury awareness are essential components of a comprehensive injury prevention strategy (Alviana, 2022) [2].

2. Research Questions

1. What are the common types of injury in kabaddi?
2. Which is the most injury prone area in body?
3. When there is a maximum chance of occurrence of injury?
4. At which activity/skill the chance of injury is more?
5. What is the impact of playing surface on occurrence of injury?

3. Methodology

The intention of the study was to analyze the injury characteristic among women kabaddi players in Tamil Nadu. To complete the purpose of the study 150 state level women Kabaddi players was selected from various districts in Tamil Nadu, who has participated in state level Kabaddi tournaments held in Tamil Nadu during August 2024 to November 2024. The study was confined to Kabaddi players between the age group of 15-25 years. All the subjects were asked to fill the IOC questionnaire **(**Junge *et al*, 2015) for injury assessment and then it was analyzed.

4. Statistical Techniques

The intention of the study was to analyze the injury characteristics and sports achievement among women Kabaddi players in Tamil Nadu. To analyze the prevalence and management of injuries of the players, the data collected from above said method was tabulated using descriptive statistics such as mean and standard deviation which were found in order to get the basic idea of the distribution of injuries among women Kabaddi players of Tamil Nadu.

5. Results

Table 1: Demographic details of subjects

Team name	No. of players	Average age of players	Average year of Experiance
Chengalpattu	13	20	4.92
Chennai	3	21	5
Coimbatore	12	20	6.58
Dindugul	11	20	3.81
Erode	12	19	8
Kanchipuram	12	19	2.91
Karur	8	22	8.62
Namakkal	11	20	2.9
The niligiris	13	19	7.3
Sivagangai	11	21	7.54
Thiruvarur	9	19	3.2
Tirunelveli	12	20	3.08
Trichy	12	20	9.08
Villupuram	11	18	6.18

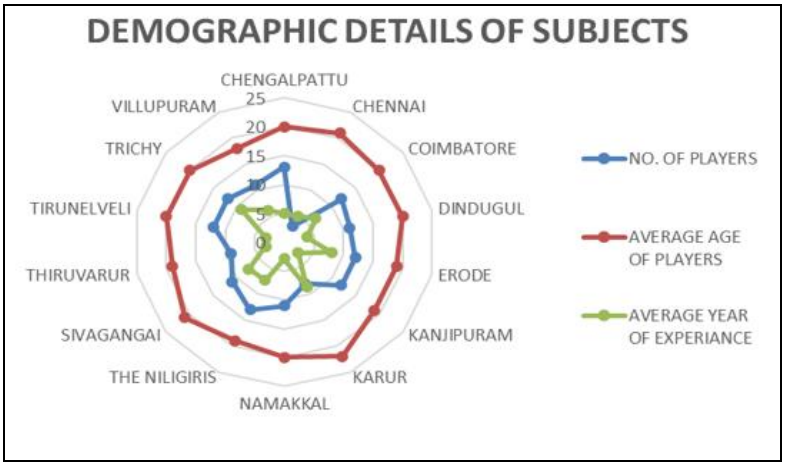


Table 2: Percentage of Occurrence of Different Types of Injury

Types of Injury	No. of occurrence	Percentage %
Ligament	17	11.33%
Dislocation (subluxation)	10	6.67%
Swelling	4	2.67%
ACL	14	9.33%
Sprain	42	28.00%
Contusion	26	17.33%
Twist	6	4.00%
Normal Pain	17	11.33%
Muscle Pain	3	2.00%
Bone Crack	1	0.67%
Contraction	9	6.00%
Fracture	1	0.67%
Total	150	100.00%

The most prevalent type of injury reported was sprains, accounting for 28% of all injuries, highlighting the intense physical demands and frequent joint stress involved in the sport. Contusions (17.33%) and ligament injuries (11.33%) were also common, reflecting the frequent physical contact and techniques of Kabaddi. Both normal pain and ligament injuries were equally reported (11.33%), suggesting a combination of acute incidents and general musculoskeletal discomfort among players. Anterior Cruciate Ligament (ACL) injuries made up 9.33%, indicating a significant concern for knee stability and rotational forces. Less frequent but notable injuries included dislocations or subluxations (6.67%), muscle contractions (6%), and twists (4%), while swelling (2.67%), muscle pain (2%), bone cracks (0.67%), and fractures (0.67%) were relatively rare.

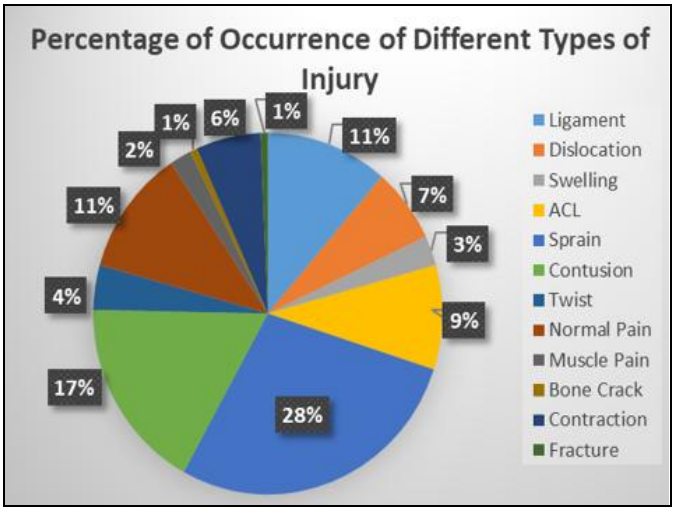
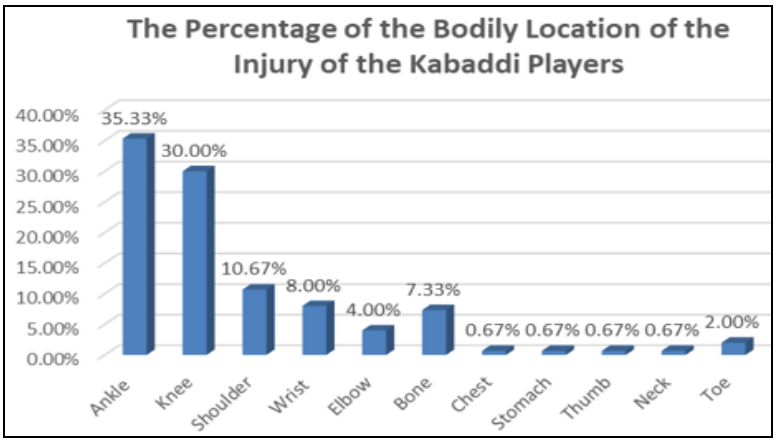


Table 3: The Percentage of the Bodily Location of the Injury of the Kabaddi Players

Location of injury	Frequency	Percent %
Ankle	53	35.33%
Knee (Medial, Lateral)	45	30.00%
Shoulder	16	10.67%
Wrist	12	8.00%
Elbow	6	4.00%
Bone	11	7.33%
Chest	1	0.67%
Stomach	1	0.67%
Thumb	1	0.67%
Neck	1	0.67%
Toe	3	2.00%
Total	150	100%



The table illustrates the distribution of injury locations among female Kabaddi players. The ankle was the most commonly affected area, accounting for 35.33% of injuries, followed by the knee (medial and lateral) with 30%, both of which are heavily involved in the sport's rapid movements and contact. Shoulder (10.67%) and wrist (8%) injuries were also notable, reflecting the impact of falls and tackles. Other affected areas included the bone (7.33%), elbow (4%), and less commonly, the chest, stomach, thumb, neck, and toe, each below 2%.

Table 4: The Percentage of the Injury During Attack or Defense of the Playing Situation

Playing situation	Frequency	Percent %
Raid	49	32.67%
Defence	98	65.33%
Slipped	1	0.67%
Chase	2	1.33%
Total	150	100%

The data reveals that the majority of injuries among female Kabaddi players occurred during defensive play, accounting for 65.33% of cases. Injuries during raids were the next most common at 32.67%, indicating that both offensive and defensive actions carry significant risk. A very small percentage of injuries occurred while chasing (1.33%) or due to slipping (0.67%).

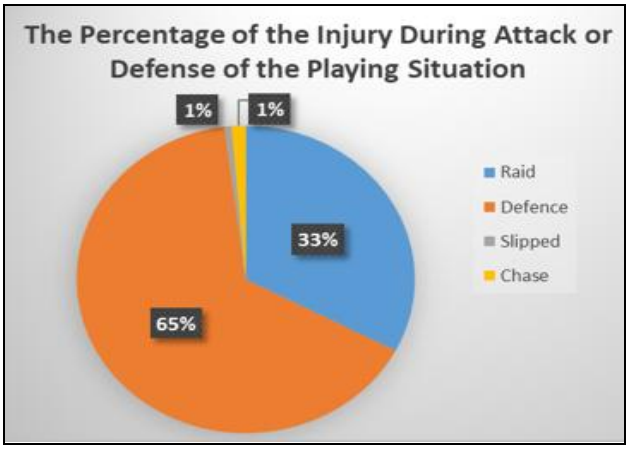


Table 5: The Percentage of the Particular Activity During Which Injury Occurred

Skills	Frequency	Percent %
Blocking	17	11.33%
Kick	7	4.67%
Escape	14	9.33%
Diving	2	1.33%
Chase	6	4.00%
Defence	1	0.67%
Tackle	43	28.67%
Hand Touch	5	3.33%
Attack	21	14.00%
Pushing	11	7.33%
Jumping	12	8.00%
Release	11	7.33%
Total	150	100%

The table highlights the frequency of injuries associated with specific Kabaddi skills. Tackling emerged as the leading cause, with 28.67% of injuries, followed by attacking (14%), blocking (11.33%), and escape maneuvers (9.33%). Skills like jumping (8%), release (7.33%), and pushing (7.33%) also contributed significantly to injuries, while lower frequencies were observed in kicking (4.67%), chasing (4%), hand touches (3.33%), and diving (1.33%).

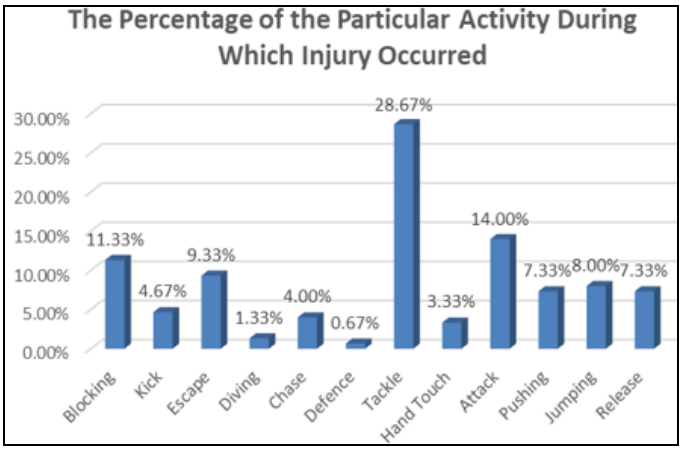
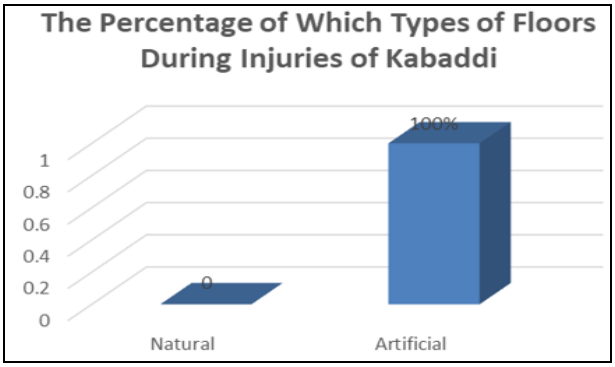


Table 6: The Percentage of Which Types of Floors During Injuries of Kabaddi

Playing Surfaces	Frequency	Percent %
Natural	0	0%
Artificial	150	100%
Total	150	100%

The data clearly shows that 100% of the injuries occurred on artificial playing surfaces, with no injuries reported on natural surfaces. This suggests a potential link between the nature of the surface and injury risk in Kabaddi.



Discussion of Findings

The findings of this cross-sectional study present significant insights into the injury patterns, risk factors, and treatment practices among female Kabaddi players in Tamil Nadu, a region that has historically played a pivotal role in the development of the sport in India (AKFI, 2023) [1]. The study reveals that injuries are not only prevalent but are often associated with specific phases of gameplay, playing surfaces, and biomechanical stressors.

Prevalent Injury Types and Locations

The results demonstrate that sprains (28%) are the most common type of injury, followed by contusions (17.33%), ligament injuries (11.33%), and ACL injuries (9.33%). These findings are in alignment with prior research, where Kabaddi athletes were found to experience a high prevalence of lower limb injuries, especially in the ankle and knee joints (Sharma *et al*., 2020;) [46, 47]. The dominance of sprains and ligament injuries is consistent with the sport's dynamic nature involving rapid acceleration, deceleration, tackling, and rotational movements, all of which exert substantial stress on the joints.

Also, the ankle (35.33%) and knee (30%) were identified as the most injury-prone regions. This is congruent with earlier studies indicating that these joints are particularly susceptible due to frequent directional changes, physical collisions, and repetitive jumping or squatting maneuvers (Brukner and Khan, 2017) [8]. Injuries to the shoulder (10.67%) and wrist (8%) were also notable, reflecting the risk of falls and defensive maneuvers such as blocking and diving.

Activity-Specific and Phase-Specific Injury Risks

During defensive plays 65.33% of injuries were occurred, especially during tackling (28.67%), followed by attacking (14%) and blocking (11.33%). These results reinforce the observations made by Reddy *et al*. (2019) [44], who noted that defensive actions in Kabaddi, particularly tackles, are inherently high-risk due to direct physical engagement and unpredictability of opponents' movements.

Interestingly, none of the injuries occurred on natural surfaces, with 100% recorded on artificial mats. While artificial surfaces are known for providing better traction and standardized play conditions, they are also linked with increased injury incidence, particularly non-contact lower extremity injuries, due to higher friction and surface stiffness (Dragoo *et al*., 2012) [13]. This suggests a critical need to reassess the safety and material properties of playing surfaces used in regional and state-level tournaments.

Conclusions

This study highlights a high prevalence of injuries among female Kabaddi players in Tamil Nadu, with sprains, ligament injuries, and ACL tears being the most common—primarily affecting the ankle and knee. Most injuries occurred during defensive actions, particularly tackling, and were exclusively reported on artificial playing surfaces, suggesting a strong link between surface type and injury risk.

The findings point to a critical lack of structured injury prevention, rehabilitation, and medical support. To address this, there is a pressing need for comprehensive injury prevention programs, enhanced coach and player education, and better access to physiotherapy services. Implementing such measures can significantly reduce injury incidence, promote player's longevity, and support the safe development of women's Kabaddi.

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