

Season-Wise Performance Analysis of the Gujarat Giants Team in the Pro Kabaddi League

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Abstract

The Pro Kabaddi League (PKL) has played a pivotal role in transforming Kabaddi from a traditional sport into a highly popular professional league format, attracting mass viewership across India and abroad. The sport's visibility has further risen with the recent victories of both the men's and women's national teams at the Asian Games, which have significantly boosted public interest and fan following. Against this backdrop, the present study focused on examining the performance of the Gujarat Giants (GG) team across five PKL seasons, specifically from Season 5 to Season 9. A total of 166 matches were analyzed, and performance indicators such as Total Points, Total Raids, Total Raid Points, Total Tackles, and Total Tackle Points were taken into consideration. To determine whether performance varied between seasons, an ANOVA test with LSD Post-Hoc analysis was employed. The results revealed statistically significant differences ($p < 0.05$) in all key performance areas across the seasons, highlighting the dynamic nature of team performance. This type of performance analysis is crucial for Kabaddi, as it offers insights that can inform team strategies, enhance player development, and support data-driven decision-making for coaches, analysts, and management. Ultimately, it strengthens competitive preparation in an evolving professional sports landscape.

Keywords: Gujarat Giants, Pro Kabaddi League, Performance Analysis, Raid Points, Tackle Points.

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INTRODUCTION

Kabaddi is an ancient combat team sport originating from India which has shown significant evolution over the years in terms of its popularity and widespread viewing. (Sardar and Pandey, 2016). India is now the dominant force in the sport of Kabaddi, holding the title of reigning champion in both genders at the recent edition of the Asian Games held at Hangzhou in 2023. Historically played on the mud ground, the contemporary version of Kabaddi is played indoors on a synthetic rubber mat, adhering to specific dimensions (Sidhu, 1986). Each team in the sport of Kabaddi comprises of twelve players, out of which seven players play on the court and remaining five are substitutes. The game lasts 40 minutes, with a 5-minute break between halves. The goal is to raid or 'touch out' as many opponent players as possible without being tackled (Yallappa and Munireddy, 2019). Kabaddi players are classified as defenders, raiders, or all-rounder based on

their primary skills. The opposite team tries to stop the raider for points. Players that are touched or tackled are dismissed from the game, although they can return for one team point gained by the same team player for each tag or tackle (Yallappa and Munireddy, 2019). Kabaddi is a mentally and physically challenging game (Rao *et al.*, 2022). The comprehensive range of motions involved in a Kabaddi match necessitates that players possess a high level of general fitness to execute the requisite abilities accurately (Aggrawala *et al.*, 2019). Whether engaging in raiding or defending, a proficient Kabaddi player must have commendable levels of muscular strength, explosive power, agility, and prompt reaction time (Bhavya and Hanumanthaya, 2021; Jeyaraj and Gopinathan, 2014; Ryagi and Bhairaddy, 2017). A recent study on elite Kabaddi players highlighted that irrespective of the playing position, both raiders and defenders must possess similar physical fitness (Dinesh *et al.*, 2023). This complements the research work done in team sports, that each player's physical condition

affects the team's performance (Ni and Besharat, 2010; Kajbafnezhad *et al.*, 2011; Boyd *et al.*, 2018). Hence this becomes of paramount importance during the player auction process in team sports competitions, as team selectors priorities the status of players' physical capabilities.

Following the decade-long success of Indian-origin leagues such as the Indian Premier League (IPL) for cricket and the Indian Super League (ISL) for football, Kabaddi has become the first indigenous sport to establish its prestigious league. The Indian Men's Professional Kabaddi League, which was established in 2014, with 8 teams and then grown to 12 teams in the last season has managed to attract significant viewership and is currently ranked second only to the Indian Premier League (IPL) in terms of popularity (Jayakumar, 2020; Singh and Sharma, 2020; Bhagavatula, 2021; Shukla *et al.*, 2023). Numerous leagues sought to replicate the Indian Premier League's (IPL) financial model and achievements, but Kabaddi, in contrast to cricket, featured a much smaller pool of renowned players. Nevertheless, it is worth mentioning that Kabaddi has been extensively played in local community settings, hence possessing the potential to appeal to a diverse range of spectators from both rural and urban areas (Durgarani and Gokilavani, 2023). For the teams under consideration, the authors chose to analyze the Gujarat Giants' Pro Kabaddi League win-loss record. The Adani Wilmar Ltd. owned team joined PKL in the fifth season. The team reached the final round in season 5 in 2017 and season 6 in 2018, but never won the championship. They were runners-up to the Patna Pirates in 2017 and Bengaluru Bulls in 2018. In season 8 in 2022, the squad lost to Bengaluru Bulls in the Eliminator. Despite having talented players, several things affect a team's win or loss in a match or league. Kabaddi needs strategic thinking because coaches' and players' live decisions can change the outcome (Parmar, 2017). The aftermath of sporting events has become more important due to technological advances and the increased attention of coaches, match technicians, performance analysts, journalists, fans, and players (Trivedi *et al.*, 2020). New technologies that quantify team or individual performance have increased the need for post-match performance analysis (Gomez-Ruano and Leicht 2020). Performance analysis is a global topic, especially in sports and technology. In team sports, understanding what makes a win or lose is crucial (Spencer *et al.*, 2019; Kim *et al.*, 2019). Cricket is the most popular sport and has the most successful leagues in India hence several authors have studied team performance in IPL (Singh, 2001; Peterson *et al.*, 2008; Sinh, 2011; Dey *et al.*, 2015; Barot, 2020; Anuraj, 2023). There are a few recent quantitative analysis studies that examined the match statistics, along with Kabaddi's offensive and defensive strategies, and team strengths and offered many prediction methodologies (Parmar, 2017; Ranjitha, 2019). In their study, Mishra and Chaudhary (2015) found a statistically significant positive correlation between offensive capabilities,

specifically hand touch, foot touch, rotation, and the playing ability of male Kabaddi players. Two significant Kabaddi skills were analyzed from PKL season 7 data by another group Basavraj *et al.*, (2021). After analyzing offensive skills, the authors found that team success is substantially correlated with more successful hand touches and fewer unsuccessful hands and toe touches (Basavraj *et al.*, 2021). The research on defensive skills in Kabaddi showed that ankle hold, chain hold, and blocking correlated with match victory. The thigh hold skill did not significantly predict team success (Basavraj *et al.*, 2021). A similar study examined Session 3 PKL data and found that teams intentionally employed offensive and defensive skills to win matches and the better defending teams were more likely to win (Gurule and Muley, 2019).

Kabaddi game performance studies are scarce, according to literature review. Further research is needed to improve player performance and anticipate game dynamics and results. Given Kabaddi's growing popularity and viewership, it would be interesting to address its data shortage. This study compared the Gujarat Giant's performance from its Pro Kabaddi League (PKL) debut to its most recent seasons. Its secondary goal was to evaluate the Gujarat Giant squad's raid performance indicators, including total raids, successful raids, raid points, and raid success percentage, during the past five seasons. The study then compared the Gujarat Giant squad's tackle performance over the past five seasons, including total tackles, successful tackles, tackle points, and tackle success rate.

METHODOLOGY

Data Collection

The data for this study was obtained from Pro Kabaddi's official website, www.proKabaddi.com, as an open-source dataset. The Pro Kabaddi League features 12 teams competing in a double round-robin league and playoff format. Each season, 132 matches are played in the double round-robin league, followed by 5 matches to determine the winner. In the double round-robin league system, each team must play 22 matches, and the teams with the highest scores advance to the eliminator round, semi-final, and final. Thus, the Gujarat Giant men's squad, who competed in the Pro Kabaddi League from season 5 in 2017 until season 9 in 2022, had played a total of 116 matches. The performance variables analyzed in this study were, Total Points Scored, Total Raids, Successful Raids, Total Raid Points, Raid Success Rate, Total Tackle, Successful Tackle, Total Tackle Points, Tackle Success Rate, Total Tackle Points, and Tackle Success Rate were also collected for each of the 116 Gujarat Giant matches from seasons 5 to season 9.

Performance Variables

The overall standings can be defined as, *Win*, the total number of matches won by a team in a season; *Loss*, the total number of matches lost by a team in a season; *Tie*, the total number of matches tied by a team

in a season; *Points*, the total number of points scored by playing matches in a season. 'Raiding' or a 'Raid' is an attacking skill. This skill can be further defined as, *Total Raids*, the total raids by a team in a particular match; *Successful Raids*, the total number of successful raids by a team in a particular match; *Raid Points*, the total raids points by a team in a particular match; *Raid Success raid*, (total number of successful raids by a team in a particular match divided by total raids by a team in a particular match) multiplied by 100. 'Tackle' is a defensive skill of Kabaddi. This skill can be further defined as, *Total Tackles*, total tackles by a team in a particular match; *Successful Tackles*, the total number of successful tackles by a team in a particular match; *Tackle Points*, total tackle points by a team in a particular match; *Tackle Success Rate*, (total number of successful tackles by a team in a particular match divided by total tackles by a team in a particular match) multiplied by 100.

Statistical Analysis

The statistical study was conducted using SPSS. The data was analyzed using an ANOVA (Analysis of

Variance). Further, to examine the significant differences in the means of performance scores over several seasons the Post-Hoc LSD (Least Significant Difference) test was applied.

RESULTS

Season-wise Match Results

The overall standing of the Gujarat Giants team at the end of each season was drawn. The number of Wins, Loss, and ties secured by the team from season 5 to season 9 is presented in graphical representation in the Figure 1. It is evident that the Gujarat Giant team in season 5 had won 15 matches, lost 4 matches, and tied 3 matches; in season 6 had won 17 matches, lost 3 matches, and tied 2 matches; season 7 had won 7 matches, lost 13 matches, and tied 2 matches; season 8 had won 10 matches, lost 8 matches, and tied 4 matches; and in season 9 had won 9 matches, lost 11 matches, and tied 2 matches. Thus, the maximum matches were won in season 6 i.e. 17 matches and the maximum number of matches were lost in season 7 i.e. 13 matches.

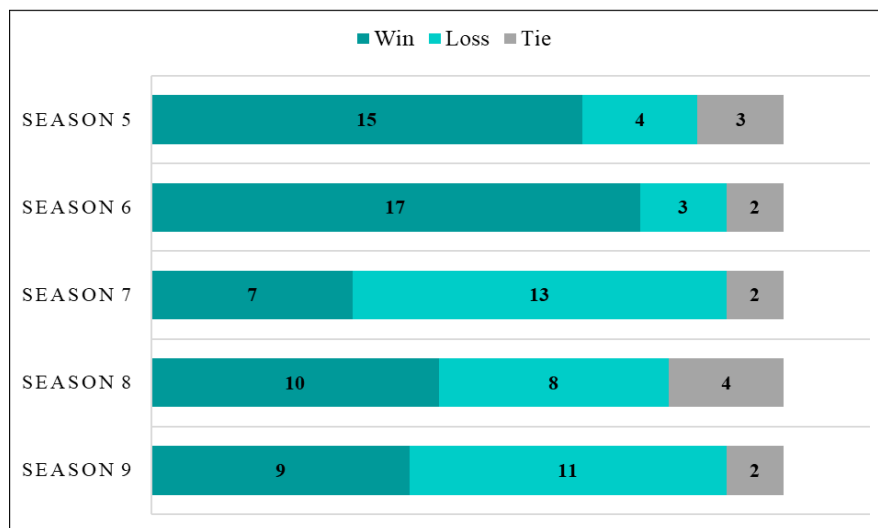


Figure 1: Graphical Representation of Season-wise Matches Win, Loss, and Tie

Season-wise Points Scored, Raids and Tackle stats

The season wise results pertaining to the Total Points, Total Raids, Successful Raids, Total Raid Points, Raid Success Rate, Total Tackle, Successful Tackle,

Total Tackle Points, and Tackle Success Rate of the Gujarat Giant team from season 5 to season 9 are presented in Table – 1.

Table 1: Table showing the Season-wise Points Scored, Raids and Tackle stats

Season	Total Points Scored	Total Team Raid	Total Successful Raids	Total Raid Points	Total Tackles	Total Successful Tackles	Total Tackle Points
Season 5	775	1055	355	463	497	242	254
Season 6	876	1069	392	540	586	258	276
Season 7	686	906	305	411	469	205	225
Season 8	737	941	348	444	529	185	207
Season 9	833	935	420	549	542	177	180

Descriptive Statistics of Performance Variables

The descriptive statistics of each variable i.e. Total Points, Total Raids, Successful Raids, Total Raid Points, Raid Success Rate, Total Tackle, Successful

Tackle, Total Tackle Points, and Tackle Success Rate of the Gujarat Giant team from season 5 to season 9 were computed. All results are presented as mean values along

with their respective standard deviations can be found in Table – 2.

Table – 2: Table showing the Season-wise Descriptive Statistics

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Total Points	Season 5	24	32.2917	7.01228	1.43138	20.00	45.00
	Season 6	25	35.0400	5.75529	1.15106	25.00	47.00
	Season 7	22	31.1818	8.39295	1.78938	19.00	50.00
	Season 8	23	32.0435	5.98087	1.24710	22.00	43.00
	Season 9	22	37.8636	9.04642	1.92870	18.00	51.00
	Total	116	33.6810	7.56835	.70270	18.00	51.00
Total Raids	Season 5	24	43.9583	1.82921	.37339	41.00	47.00
	Season 6	25	42.7600	2.08726	.41745	38.00	47.00
	Season 7	22	41.1818	2.17423	.46355	38.00	48.00
	Season 8	23	40.9130	1.67639	.34955	39.00	46.00
	Season 9	22	42.5000	2.22004	.47331	39.00	47.00
	Total	116	42.2931	2.26511	.21031	38.00	48.00
Successful Raids	Season 5	24	13.9583	4.20640	.85863	7.00	23.00
	Season 6	25	15.6800	2.51197	.50239	11.00	20.00
	Season 7	22	13.8636	4.22347	.90045	6.00	24.00
	Season 8	23	15.1304	2.91242	.60728	9.00	22.00
	Season 9	22	19.0909	4.39598	.93723	10.00	27.00
	Total	116	15.5172	4.09556	.38026	6.00	27.00

Comparative analysis of Performance Variables

It was found that there was a significant difference in all the variables tested i.e. Total Points, Total Raids, Successful Raids, Total Raid Points, Raid Success Rate, Total Tackle, Successful Tackle, Total Tackle Points, and Tackle Success Rate of Gujarat Giant team among the seasons-5 to season-9, as the obtained F

value of Total Points (3.176), Total Raids (8.952), Successful Raids (7.341), Total Raid Points (4.868), Raid Success Rate (7.776), Total Tackle (3.413), Successful Tackle (2.704), Total Tackle Points (3.147), and Tackle Success Rate (4.984) is significant at .05 level which can be found in the below Table – 3.

Table 3: Table showing Analysis of Variance Statistics Season-Wise

		Sum of Squares	df	Mean Square	F	Sig.
Total Points	Between Groups	676.460	4	169.115	3.176	.016*
	Within Groups	5910.738	111	53.250		
	Total	6587.198	115			
Total Raids	Between Groups	143.917	4	35.979	8.952	.000*
	Within Groups	446.117	111	4.019		
	Total	590.034	115			
Successful Raids	Between Groups	403.549	4	100.887	7.341	.000*
	Within Groups	1525.416	111	13.742		
	Total	1928.966	115			
Total Raid Points	Between Groups	600.195	4	150.049	4.868	.001*
	Within Groups	3421.555	111	30.825		
	Total	4021.750	115			
Raid Success Rate	Between Groups	2297.045	4	574.261	7.776	.000*
	Within Groups	8197.612	111	73.852		
	Total	10494.657	115			
Total Tackle	Between Groups	234.561	4	58.640	3.413	.011*
	Within Groups	1906.982	111	17.180		
	Total	2141.543	115			
Successful Tackle	Between Groups	110.483	4	27.621	2.704	.034*
	Within Groups	1133.957	111	10.216		
	Total	1244.440	115			
Total Tackle Points	Between Groups	129.277	4	32.319	3.147	.017*
	Within Groups	1139.930	111	10.270		
	Total	1269.207	115			

Tackle Success Rate	Between Groups	4469.697	4	1117.424	4.984	.001*
	Within Groups	24885.892	111	224.197		
	Total	29355.588	115			

* The mean difference is significant at the 0.05 level.

As the F-Ratio was found significant in all the variables tested, thus, the LSD (Least Significant Difference) Post-Hoc Test was applied to test the

significant difference between the means of the performance scores season-wise. The results pertaining to this can be found in Table – 4.

Table 4: Table showing Post Hoc LSD ANCOVA Statistics Season-Wise

Dependent Variable	(I) Season	(J) Season	Mean Difference (I-J)	Std. Error	Sig.
Total Points	Season 5	Season 6	-2.74833	2.08536	.190
		Season 7	1.10985	2.15388	.607
		Season 8	.24819	2.12931	.907
		Season 9	-5.57197*	2.15388	.011
	Season 6	Season 5	2.74833	2.08536	.190
		Season 7	3.85818	2.13318	.073
		Season 8	2.99652	2.10837	.158
		Season 9	-2.82364	2.13318	.188
	Season 7	Season 5	-1.10985	2.15388	.607
		Season 6	-3.85818	2.13318	.073
		Season 8	-.86166	2.17616	.693
		Season 9	-6.68182*	2.20020	.003
	Season 8	Season 5	-.24819	2.12931	.907
		Season 6	-2.99652	2.10837	.158
		Season 7	.86166	2.17616	.693
		Season 9	-5.82016*	2.17616	.009
	Season 9	Season 5	5.57197*	2.15388	.011
		Season 6	2.82364	2.13318	.188
		Season 7	6.68182*	2.20020	.003
		Season 8	5.82016*	2.17616	.009
Total Raids	Season 5	Season 6	1.19833*	.57291	.039
		Season 7	2.77652*	.59173	.000
		Season 8	3.04529*	.58498	.000
		Season 9	1.45833*	.59173	.015
	Season 6	Season 5	-1.19833*	.57291	.039
		Season 7	1.57818*	.58604	.008
		Season 8	1.84696*	.57923	.002
		Season 9	.26000	.58604	.658
	Season 7	Season 5	-2.77652*	.59173	.000
		Season 6	-1.57818*	.58604	.008
		Season 8	.26877	.59785	.654
		Season 9	-1.31818*	.60446	.031
	Season 8	Season 5	-3.04529*	.58498	.000
		Season 6	-1.84696*	.57923	.002
		Season 7	-.26877	.59785	.654
		Season 9	-1.58696*	.59785	.009
	Season 9	Season 5	-1.45833*	.59173	.015
		Season 6	-.26000	.58604	.658
		Season 7	1.31818*	.60446	.031
		Season 8	1.58696*	.59785	.009
Successful Raids	Season 5	Season 6	-1.72167	1.05939	.107
		Season 7	.09470	1.09419	.931
		Season 8	-1.17210	1.08171	.281
		Season 9	-5.13258*	1.09419	.000
	Season 6	Season 5	1.72167	1.05939	.107
		Season 7	1.81636	1.08368	.097

		Season 8	.54957	1.07107	.609
		Season 9	-3.41091*	1.08368	.002
	Season 7	Season 5	-.09470	1.09419	.931
		Season 6	-1.81636	1.08368	.097
		Season 8	-1.26680	1.10551	.254
		Season 9	-5.22727*	1.11773	.000
	Season 8	Season 5	1.17210	1.08171	.281
		Season 6	-.54957	1.07107	.609
		Season 7	1.26680	1.10551	.254
		Season 9	-3.96047*	1.10551	.001
	Season 9	Season 5	5.13258*	1.09419	.000
		Season 6	3.41091*	1.08368	.002
		Season 7	5.22727*	1.11773	.000
		Season 8	3.96047*	1.10551	.001
Total Raid Points	Season 5	Season 6	-2.30833	1.58662	.149
		Season 7	.60985	1.63875	.710
		Season 8	-.01268	1.62005	.994
		Season 9	-5.66288*	1.63875	.001
	Season 6	Season 5	2.30833	1.58662	.149
		Season 7	2.91818	1.62300	.075
		Season 8	2.29565	1.60412	.155
		Season 9	-3.35455*	1.62300	.041
	Season 7	Season 5	-.60985	1.63875	.710
		Season 6	-2.91818	1.62300	.075
		Season 8	-.62253	1.65570	.708
		Season 9	-6.27273*	1.67399	.000
	Season 8	Season 5	.01268	1.62005	.994
		Season 6	-2.29565	1.60412	.155
		Season 7	.62253	1.65570	.708
		Season 9	-5.65020*	1.65570	.001
	Season 9	Season 5	5.66288*	1.63875	.001
		Season 6	3.35455*	1.62300	.041
		Season 7	6.27273*	1.67399	.000
		Season 8	5.65020*	1.65570	.001
Raid Success Rate	Season 5	Season 6	-5.04412*	2.45587	.042
		Season 7	-1.90655	2.53655	.454
		Season 8	-5.28379*	2.50762	.037
		Season 9	-13.21478*	2.53655	.000
	Season 6	Season 5	5.04412*	2.45587	.042
		Season 7	3.13756	2.51217	.214
		Season 8	-.23967	2.48296	.923
		Season 9	-8.17066*	2.51217	.002
	Season 7	Season 5	1.90655	2.53655	.454
		Season 6	-3.13756	2.51217	.214
		Season 8	-3.37723	2.56279	.190
		Season 9	-11.30823*	2.59111	.000
	Season 8	Season 5	5.28379*	2.50762	.037
		Season 6	.23967	2.48296	.923
		Season 7	3.37723	2.56279	.190
		Season 9	-7.93099*	2.56279	.002
	Season 9	Season 5	13.21478*	2.53655	.000
		Season 6	8.17066*	2.51217	.002
		Season 7	11.30823*	2.59111	.000
		Season 8	7.93099*	2.56279	.002
Total Tackle	Season 5	Season 6	-2.73167*	1.18450	.023
		Season 7	-.60985	1.22341	.619
		Season 8	-2.29167	1.20946	.061
		Season 9			

	Season 6	Season 9	-3.92803*	1.22341	.002
		Season 5	2.73167*	1.18450	.023
		Season 7	2.12182	1.21166	.083
		Season 8	.44000	1.19756	.714
	Season 7	Season 9	-1.19636	1.21166	.326
		Season 5	.60985	1.22341	.619
		Season 6	-2.12182	1.21166	.083
		Season 8	-1.68182	1.23607	.176
	Season 8	Season 9	-3.31818*	1.24973	.009
		Season 5	2.29167	1.20946	.061
		Season 6	-.44000	1.19756	.714
		Season 7	1.68182	1.23607	.176
	Season 9	Season 9	-1.63636	1.23607	.188
		Season 5	3.92803*	1.22341	.002
		Season 6	1.19636	1.21166	.326
		Season 7	3.31818*	1.24973	.009
		Season 8	1.63636	1.23607	.188
Successful Tackle	Season 5	Season 6	-.23667	.91340	.796
		Season 7	.76515	.94341	.419
		Season 8	2.03986*	.93264	.031
		Season 9	2.03788*	.94341	.033
	Season 6	Season 5	.23667	.91340	.796
		Season 7	1.00182	.93434	.286
		Season 8	2.27652*	.92347	.015
		Season 9	2.27455*	.93434	.017
	Season 7	Season 5	-.76515	.94341	.419
		Season 6	-1.00182	.93434	.286
		Season 8	1.27470	.95316	.184
		Season 9	1.27273	.96370	.189
	Season 8	Season 5	-2.03986*	.93264	.031
		Season 6	-2.27652*	.92347	.015
		Season 7	-1.27470	.95316	.184
		Season 9	-.00198	.95316	.998
	Season 9	Season 5	-2.03788*	.94341	.033
		Season 6	-2.27455*	.93434	.017
		Season 7	-1.27273	.96370	.189
		Season 8	.00198	.95316	.998
Total Tackle Points	Season 5	Season 6	-.45667	.91580	.619
		Season 7	.35606	.94589	.707
		Season 8	1.58333	.93510	.093
		Season 9	2.40152*	.94589	.013
	Season 6	Season 5	.45667	.91580	.619
		Season 7	.81273	.93680	.388
		Season 8	2.04000*	.92590	.030
		Season 9	2.85818*	.93680	.003
	Season 7	Season 5	-.35606	.94589	.707
		Season 6	-.81273	.93680	.388
		Season 8	1.22727	.95567	.202
		Season 9	2.04545*	.96623	.036
	Season 8	Season 5	-1.58333	.93510	.093
		Season 6	-2.04000*	.92590	.030
		Season 7	-1.22727	.95567	.202
		Season 9	.81818	.95567	.394
	Season 9	Season 5	-2.40152*	.94589	.013
		Season 6	-2.85818*	.93680	.003
		Season 7	-2.04545*	.96623	.036
		Season 8	-.81818	.95567	.394

Tackle Success Rate	Season 5	Season 6	4.93998	4.27895	.251
		Season 7	5.33958	4.41954	.230
		Season 8	14.93219*	4.36913	.001
		Season 9	16.08913*	4.41954	.000
	Season 6	Season 5	-4.93998	4.27895	.251
		Season 7	.39960	4.37706	.927
		Season 8	9.99221*	4.32615	.023
		Season 9	11.14915*	4.37706	.012
	Season 7	Season 5	-5.33958	4.41954	.230
		Season 6	-.39960	4.37706	.927
		Season 8	9.59261*	4.46525	.034
		Season 9	10.74955*	4.51459	.019
	Season 8	Season 5	-14.93219*	4.36913	.001
		Season 6	-9.99221*	4.32615	.023
		Season 7	-9.59261*	4.46525	.034
		Season 9	1.15694	4.46525	.796
	Season 9	Season 5	-16.08913*	4.41954	.000
		Season 6	-11.14915*	4.37706	.012
		Season 7	-10.74955*	4.51459	.019
		Season 8	-1.15694	4.46525	.796

* The mean difference is significant at the 0.05 level.

Key statistical parameters of Raids and Tackles

Total Raids, Successful Raids, and Total Raid Points by a Gujarat Giants team in a specific match are the primary statistics components associated with raiding in Kabaddi. Total Raid refers to the total number of raids performed by a team during a given match. Successful

raids refer to the total number of raids in which the raider was successful in securing one or more points. Finally, the total number of raid points indicates the number of points obtained through raiding. A graphical representation of raid stats across all the season is described in Figure 2.

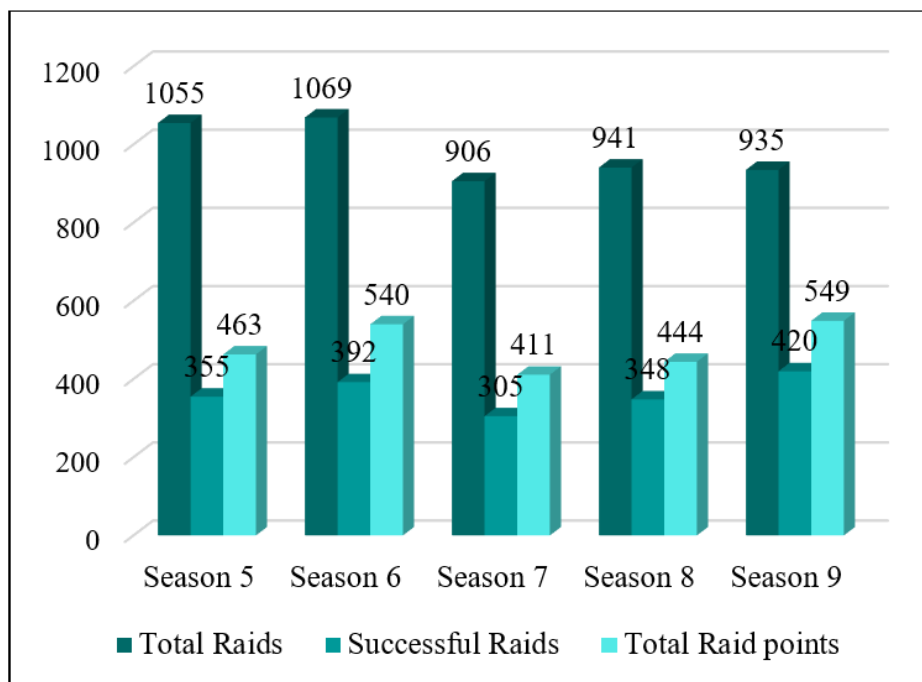


Figure 2: Graphical Representation of Season-wise Raid Stats

Similarly, Tackle data such as Total Tackle indicate the number of times the defensive team attempted to tackle the raider in a given match. Successful tackles refer to how many times the defender

successfully tackled the raider. Total Tackle Points are the points earned from tackling in a single match. All the tackle stats are graphically described in Figure 3.

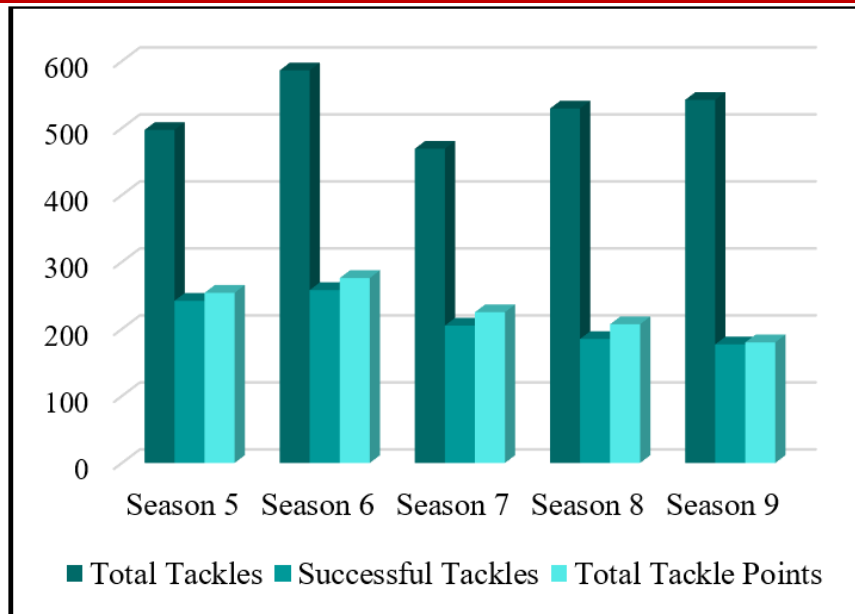


Figure 3: Graphical Representation of Season-wise Tackle Stats

When considering the overall performance of the team in the contest, another crucial factor to consider is the success rate of raiding and tackling, which are both vital talents. From all the matches in a season played by the team Gujarat Giants, mean success rate of raid and tackle was individually calculated as depicted in Figure 4 and 5. It is interesting to see the, variation in these two

success rates. There is an evident contrast between the success rates of raids and tackles especially in the first and the latest season. In season one, Gujarat Giants recorded the least successful rate of raiding whereas the tackle rate was quite high. In season 9, the team performance exhibited a complete reversal of these two rates as represented in Figure 4 and 5.

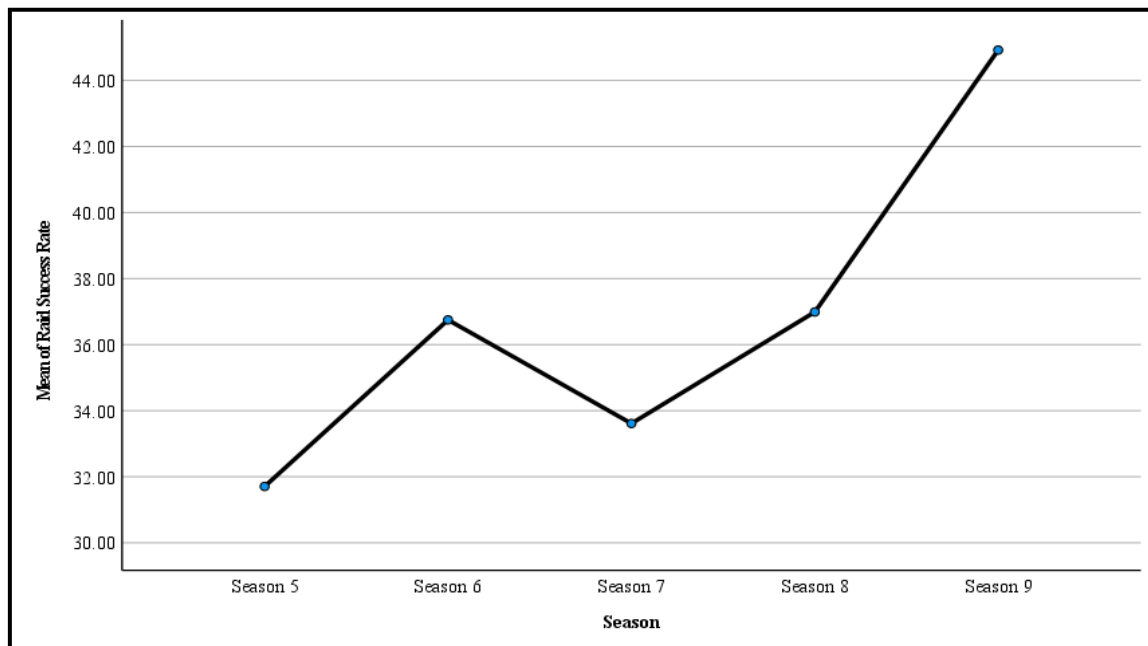


Figure 4: Graphical Representation of Mean of Raid Success Rate Season-wise

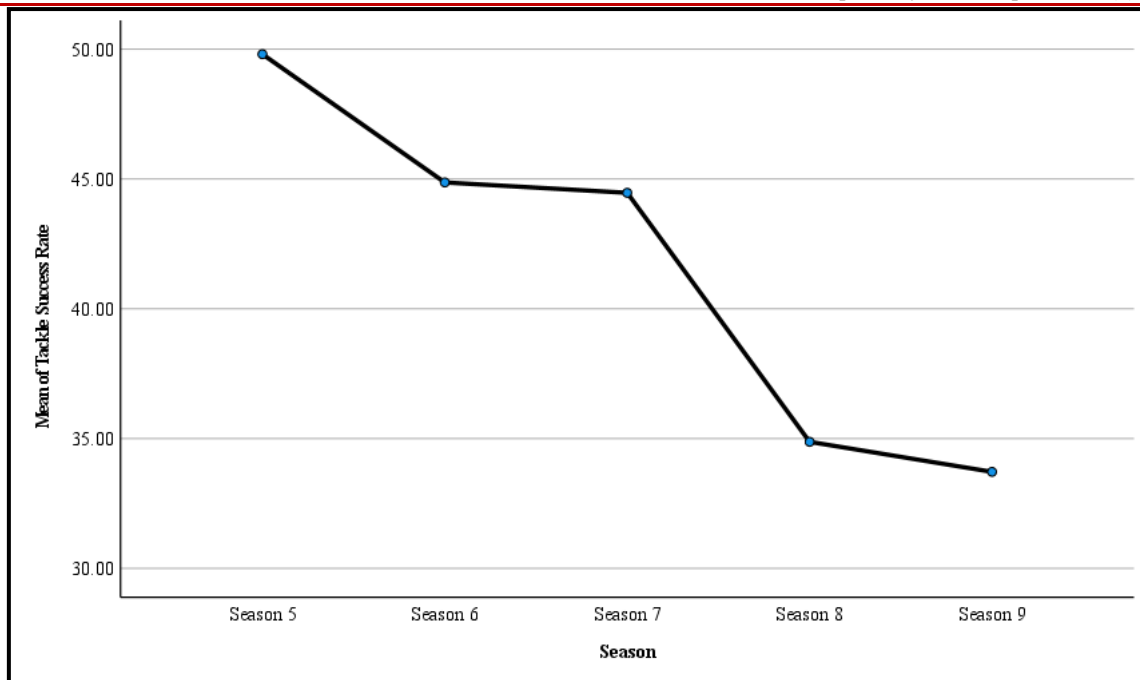


Figure 5: Graphical Representation of Mean of Tackle Success Rate Season-wise

DISCUSSION

The following discussion pertains to the statistics of the Gujarat Giants, a team participating in the Pro Kabaddi League, during a span of five seasons, with the resulting interpretation of the team's raid and tackle performance. The study explored the various tactical variables in sports that are linked to team performance, both in terms of winning and losing. However, the analysis depends on the statistical significance and data provided by the team of authors with a close affiliation with the sport.

Season-wise performance of the Gujarat Giants

In the quest to understand the considerable variation in the performance of the Gujarat Giant squad from season 5 to season 9, the percentage difference in total raid points and total tackle points across all the seasons was also calculated. At first, the percentage of raid points was calculated by dividing the total raid points from the total points scored (for each season) then multiplying it by 100. The percentage of tackle points was calculated in the same way. Then from the obtained values, a percentage difference was calculated. According to the data, the Gujarat Giants had only a 35.43% and 38.94% difference in Total Raid and Total Tackle points at the end of season 5 and season 6 where the team stood as runner-up. In contrast, this percentage difference for the rest of the seasons was as high as 43.29% and 52.75%. This is complemented by a recent study on Kabaddi defensive skills analysis, which found that better-defending teams are more likely to win (Gurule and Muley 2019). It is noteworthy that, although they were the runners-up in their inaugural season, the overall number of raids and successful raids was comparatively lower than in other seasons. While they

managed to secure the most raid points in the most recent season, which was also the personal best for the squad across all seasons, yet they were unable to advance to the qualification rounds. This observation highlights the distinctiveness of Kabaddi as a sport, as the emphasis on the quality of raiding supersedes the focus on the quantity of raiding. Similarly, in the first season, the Gujarat Giants team recorded a higher rate of successful tackles and total tackle points at the end of season despite the total number of tackles being really low. This is also suggestive of a great amount of accuracy shown by the team in their attempts to tackle the opponents. Season 9's performance emphasizes the importance of being balanced in defensive and offensive skills, as the team demonstrated a high contrast between raiding exceptionally effectively and defending poorly.

Factors Influencing Team Performance

There exist multiple aspects that contribute to the outcome of a team sport, including the quality of the opponent team, the composition of the squad, the individual form of the players, the tactical plans employed, the availability of training facilities, and adherence to principles of fair play. These are the general factors that could be true in the case of any team. For example, when key players are there in their prime form it elevates the team's performance but if the main players fail to deliver during a certain match or a season, then it results in poor outcomes for the overall team. In team sports, there is always both dependency and pressure on key players to perform well. It is also important to have a balanced team composition. Every year at least four to five players are changed in the roster, adding new players or removing the old ones could be both an advantage and a disadvantage for a team. A mix of experienced and amateur players can impact how they interact during the

training and on the game day. Gaining an understanding of a co-player's playing style, weaknesses, and strengths requires a significant investment of time (Kumar, 2015). The motivation of each player is a significant factor in the context at hand. It is crucial to consider whether players are driven by personal goals or by a collective focus on the team, as this will greatly influence the general dynamics of the team (Yadav, 2018). Tactical strategies are another important factor impacting team performance such that every team has its distinct playing style; coaches frequently evaluate their opponent's tactics and modify their approach based on the opponent's weaknesses. An ideal Kabaddi team has an even distribution of raiders and defenders; therefore the position in the chain formation on the court is important. This formation will determine the team's playing strategies as well as which player the opposing raider may target to touch out (Singh *et al.*, 2023). Coaches strive to create effective game plans that neutralize the opponent's strengths while maximizing their own. Changes in tactics require time to adopt and implement, which can lead to fluctuating team performance. Because Kabaddi is a team contact sport, external factors such as the availability of appropriate training facilities and sports science assistance may make a significant difference. If players' nutrition and recovery are compromised, the likelihood of injury increases, resulting in frequent player dropouts (Dahiya and Kumar, 2023). Travelling to different destinations for away matches can add to the sleep deprivation and fatigue of players. The regulations and scoring methods of the PKL appear to be significantly different from those of the AKFI competitions, which may pose an additional difficulty to scoring and winning the match. When it comes to individual roles, raiders are the primary players for scoring points for the team due to the nature of the sport and the scoring style, as the chances of collecting more points in a single raid are significantly higher. If a raider is able to tag as many players as possible, he can gain anywhere from 1 to 9 points and up to 10 points with bonus. When it comes to defenders tackling, there is only a bleak chance of collecting more points in one go. There is a restriction of 1 point or a maximum of 2 points, sometimes known as a "super tackle" (Khullar, 2023). As a result, it is safe to infer that teams with a high number of tackle points will add to the score and have a better chance of winning the match.

CONCLUSION

The following conclusions can be drawn from the current study's findings: The aforementioned data and findings indicate that the Gujarat Giant team's performance was inconsistent and varied over all seasons. Also, all the performance parameters of the team were significantly different across all the seasons. This could be attributed to the fact that each year the squad is different or coached by different people leading to variation in performance parameters. Since its inaugural season, the team exhibited commendable performance, securing a runner-up position in the first

two seasons of the Pro Kabaddi League (PKL). This achievement was mostly attributed to the club's favorable raiding and tackle-point ratios. However, over time, the squad's performance experienced a slow decline. Considering the compact playing field of Kabaddi as a team sport, it is evident that players in various positions must possess comparable skills and make equal contributions towards earning points. The chain formation for defense in Kabaddi encompasses a big deal of responsibilities on the defenders for being quick in reaction and agile to deflect the raider, or at best, tackle him out of the mat. While being raided by the opponent raider, the defending team is only engaged in defensive actions, which include the participation of their own side's raider in the defense chain. This salient fact underscores the significance of superior defensive strategies in the sport of Kabaddi. In order to achieve success, coaches and athletes must prioritize the improvement of their teams' defensive ability. The composition of the squad, including the substitutes, has a key role in determining the likelihood of winning by ensuring a balanced distribution of raid and tackle points. Therefore, the authors believe that the integration of analytics in the sport of Kabaddi has the potential to yield significant benefits, as it provides a diverse range of information at both the team and individual player levels.

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Declaration of Interest Statement

The authors report there are no competing interests to declare.

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