

The Use of Rank-sum Ratio on the Attack and Defensive Ability of the Top 8 Men's Basketball Competition in the 16th Asian Games

LIU Yi^{1,*}; GU Lei²

¹ Female, Department of Sports and Art, Hunan University of Chinese Medicine, Changsha, Hunan, China.

² Public Lesson Department, Hunan Traditional Chinese Medical College, Zhuzhou, Hunan, China.

*Corresponding author.

Address: The Public Course Department, Hunan Traditional Chinese Medicine College, Gao Jiaao, Lu Song Area, Zhuzhou, Hunan Province, 412012, China.

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Abstract

Aim: This essay focuses on the attack and defensive ability of the top 8 men's basketball teams in the 16th Asian Games. The authors try to compare their characters and find out problems. **Methods:** Documentation analysis, Rank-sum ratio and related analysis have been used in this report. According to this report, it is found that in the TOP 8, China owns the highest Offensive Ability RSR Level, The Jordan have the lowest. If, on the other hand, the South Korea is the highest team in Defensive ability RSR level, the North Korea team is the lowest. From the aspects of Integrating Offensive and Defensive ability RSR level, the South Korea is still the highest and the North Korea is the lowest. Considering the Integrating Offensive and Defensive ability RSR, the authors divided the TOP 8 into 3 levels. China and South Korea are the superiors. They own the strongest Offensive and Defensive Ability. North Korea is in lower class, this class is weak in TOP 8. Jordan, the Philippines, Qatar, Japan, Iran are in the middle class. The coaches can adjust their training plans with pertinence, according to the statistics on Offensive and Defensive Ability showed in this Asian Game. The author hopes this research can offer a reference in the training.

Key words: The 16th Asian Games; Men's Basketball; Attack Defense; Rank-sum ratio

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The Men's basketball competition in the Asia Games is one of the highest basketball games in the Asia. A research on the offensive and defensive ability of the top 8 teams in the game may be helpful in finding the problems in the offensive and defensive aspects and the characters of the top 8 teams. The research can also give some suggestions in making a targeted training plain to improve the team performance. Basket-ball is team sport and the technology statistics can show the using of tactics and skills. So the offensive and defence ability can be reported by those data. This paper tries to use Rank Sum Ration to analysis all the indexes of the Top 8 teams. The analysis will be helpful in making sense the development of the Asia basketball games and can provide a guidance in the training plan making.

1. RESEARCH OBJECT AND RESEARCH METHODS

1.1 Research Object

The Top 8 team in the Men's Basketball Competition of the 16th Asian Games.

1.2 Research Methods

1.2.1 Literature Review

We got related data about the Top 8 teams through the official website of Chinese Basketball Association and collected the data from all games of the Top 8.

1.2.2 Mathematical Statistics

The software Microsoft excel, SPSS11.0 may be used in the RSR analysis. The RSR is a comprehensive index,

it can report many different indexes. The RSR function: $RSR = \sum R(m \times n)$. In the function $\sum R$ is the rank sum of all the indexes, the m is the number of the indexes, n is the number of the object. In the research, the RSR should get out at first, the higher RSR, the higher comprehensive level. Some studies show that the RSR is suitable in the research of basketball games.

2. RESULTS AND ANALYSIS

2.1 Analysis on the Attack and Defensive Ability of the Top 8 Teams

This research chooses 15 indexes to evaluate the attack ability of one team. The total number of shots, total shooting percentage, the number of two-point shot, the two-point percentage, the number of three-point shot and the three-point percentage are in the 15 indexes. The defensive ability is decided by six indexes: defensive rebound, steal, block shot, fouls, mistake, and lost points which are owe to mistakes.

2.2 Analysis on the Attack Ability of the Top 8 Teams

From table 1, we get the ranks of the indexes which can show the attack ability of the top 8 teams. In the total shotting times, the Iran is first, it gets 57.1 times in average. In the total shotting percentage the South Korea is in the first place, the percentage is 51.4%, the

Jordan get 38.4% in average sit in the last place. The Japan shot the most two-point, 45 times in average, the North Korea is at last, it only gets 30.4 times. In the two-points percentage, the South Korea is also the highest., the percentage is 59.6% in average, the Jordan is 44.1%, own the lowest rank. The North Korea shot the most three-points, 35.2 in average, the Jordan, lowest, only gets 15.4. But in the three-point percentage, the China gets 40.6% is the highest in the top 8. The Jordan, hold the last position, only 22.3%. The Qatar did 26.9 times free-throw, the North Korea is only 18.9, the first and the last is their ranks. For the North Korea, the least free-throw the get, but they own the highest free-throw percentage, 74.9% in average, the last position, Jordan, only got 44.9%. In the offensive rebound, the Jordan got No.1, 15.8 times in average, the North Korea is the lowest which only got 8.9 times. The South Korea and the Qatar got No.1 and No.8 in the assist. The average times of assist is 18.9 and 7.8. The Japan has made the least mistake, only 10 times, Jordan has made most mistake, 17.8 times in average. The China got the highest points in average, 84.8. The Jordan is the least, only gets 64.1 points. But in the painted area, Jordan is very outstanding, it got 39.3 points in the painted area is the No.1 of the Top 8. China is the last, only gets 8.5 points. In the second attack Jordan held the No.1 position and got 16.5 while China is still the last which got 8.5 points. Iran got 6.1 points in average through fast break is the highest. The North Korea is the lowest, only got 2 points in average.

Table1
The RSR on the Attack Ability of the Top 8 Teams

Team	Ranking	Total Shotting		Total Percentage		Two-point Shotting		Two-point Percentage		Three-point Shotting		Three-point Percentage		Free-throw		Free-throw Percentage	
		Number	Rank	%	Rank	Number	Rank	%	Rank	Number	Rank	%	Rank	Number	Rank	%	Rank
China	1	65.4	5	46.3	7	40.5	4	49.1	6	24.9	6	40.6	8	23.9	7	56.9	2
North Korea	2	61.5	3	51.4	8	39.1	3	59.6	8	22.4	4	37.5	7	18.9	2	67.3	6
Iran	3	57.1	1	42.6	6	30.8	2	55.1	7	26.4	7	28.8	4	23.3	6	65.3	5
Japan	4	65.5	6	39.0	2	45.0	7	45.3	2	20.5	3	26.0	2	19.6	4	70.5	7
Qatar	5	60.8	2	41.5	4	43.3	6	48.3	5	17.5	2	26.9	3	26.9	8	63.8	4
Philippines	6	67.9	8	42.0	5	42.2	5	47.9	4	22.8	5	30.0	5	19.6	3	62.3	3
Jordan	7	64.9	4	38.4	1	49.5	8	44.1	1	15.4	1	22.3	1	23.1	5	44.9	1
North Korea	8	65.7	7	40.1	3	30.4	1	47.2	3	35.2	8	34.0	6	13.9	1	74.9	8

Team	Ranking	Offensive Rebound		Assist		Mistake		Score		Scoring in the painted area		Second Attack		Fast Break	
		Number	Rank	Number	Rank	Number	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank
China	1	11.1	4	14.3	6	11.4	7	84.8	8	26.3	1	8.5	1	6.0	7
North Korea	2	10.4	3	18.9	8	14.4	5	84.4	7	32.7	6	9.8	2	4.3	3
Iran	3	11.5	5	17.5	7	15.4	3	70.8	4	27.8	2	11.6	4	6.1	8
Japan	4	10.3	2	11.3	3	10.0	8	70.1	3	32.0	4	12.0	6	5.0	6
Qatar	5	12.9	7	7.8	1	13.3	6	72.3	5	35.5	6	15.3	7	4.8	5
Philippines	6	12.8	6	11.3	4	14.6	4	67.2	2	32.2	5	11.4	3	3.3	2
Jordan	7	15.8	8	10.3	2	17.8	1	64.1	1	39.3	8	16.1	8	4.5	4
North Korea	8	8.9	1	13.3	5	16.7	2	74.8	6	28.2	3	11.9	5	2.0	1

The Chinese team is the champion of this game. There is a good performance in attack. From the table, the China gets good ranks in total shooting percentage, three-point percentage, two-point percentage, free-throw times, assist, mistake, score and fast break. It said that the basic trainings of shooting have been strengthened. In the high-intensity combat training, the players can make better use of their skills, the mistake have been reduced, more assist have been done, the fast break can be finished more easily. The characters of Chinese team—fast, accurate and flexible—have been fully displayed in this game. But there are also some indexes seems bad. The Chinese team gets some unsatisfactory ranks in free-throw percentage, offensive rebound, scoring in the painted area and the second attack. It shows that the shortage of the interior-line attack, the weak in the offensive rebound. In this Asia Games, the absention of Yao Ming and Yi Jianliang have some bearing on the interior-line attack ability of the Chinese team. The other players in the interior-line can not undertake the task. So in this game, the outer area offense and the fast break is the main patterns attack. The patterns make the Chinese team win the game. Meanwhile, we should strengthen the scoring ability of the interior-line players, improve the judgement and snatching ability in the offensive rebound, make better use of the rebound skills, and the training on the free-throw is also necessary.

The Jordan have had good performance in this Asia Games. We can see from in the table, the Jordan gets the highest ranks of the offensive rebound ,interior-line attack and second attack. It said that the Jordan has a strong power in the interior-line attack and is very good at offensive rebound. This is the advantage of the Jordan, we can get lots of things from its advantage.

The South Korea has get the second place in this game. The attack ability decided this rank. In the table, we can find the South Korea gets a very beautiful data, except the offensive rebound ,the second attack and the fast break. It means that the South Korea should improve the offensive rebound, by this way strengthen the second attack ability, meanwhile do more training in the stealing and organizing, make the fast break more easily.

By the research, coaches can amend their training plans according to the ranks of the attack indexes collected in this Asia Game, find out important problems, discover advantages, and provide guidance in the tactical design and the skill training .

2.3 The Analysis on the Defence Ability of the Top 8 Teams

From table 2, we can see the defence indexes and ranks of the top 8 teams. The higher RSR means the higher level in the defence ability. In the defensive rebound, the South Korea is the highest, 26.75 times in average, the North Korea is the lowest, 21.11 times. The Chinese teams steal 11.75 times in each game, the Jordan only have 6.75 times. In the block data, the Qatar is the No.1, 3.56 in average, the North Korea is the worst only gets 0.22. The Qatar have the least fouls actions, only 16.62 times in average, the North Korea get highest number in this index, the number is 24.88 times. Comparing the losing points, the Chinese team is the best, losing 57.6 points in average. the North Korea drops 84.33 points in average, at the last position, The losing caused by mistake, the Japan is only 9.25 points, get the first, the North Korea lose 14.22 points per game by the mistake, hold the last position.

The Chinese team is the champion of this game. We can see that the they got highest position in ranks of the steal and losing points. But in the defence rebound and losing points caused by mistake, the China get get a lower position. It said that the Chinese players have a good personal ability in defence, can do many steals.The team can do very well in the overall defence, our players have good help defence ability, can do well in the filling-in, holding opponents' scoring. There are also many problems in the defence, such as the defence rebound,and the mistake appeared in the game. The losing points caused by mistake should be take care. The incomplete passing, dribbling mistakes, unsuitable using of skills all may provide opponents good opportunities. The mistake cause point losing, may affect the morale. So in the training, we should improve the suitable using of the skills, the clutch play and so on.

Table2
The RSR on the Defence Ability of the Top 8 Teams

Team	Ranking	Defence Rebound		Steal		Block		Fouls		Losing Score		Losing Caused by mistake	
		Number	Rank	Times	Rank	Number	Rank	Times	Rank	Point	Rank	Point	Rank
China	1	22.38	2	11.75	8	2.88	5	19.13	5	57.50	8	13.63	2
North Korea	2	26.75	8	7.6	4	3.13	6	17.75	3	63.13	6	12.10	6
Iran	3	24.00	6	9.75	7	2.62	3	19.62	6	57.87	7	12.50	3
Japan	4	23.75	5	7.5	3	1.75	2	20.25	7	65.12	5	9.25	8
Qatar	5	23.50	4	8.625	6	3.56	8	16.62	1	72.12	3	12.25	4
Philippines	6	24.77	7	6.77	2	2.66	4	18.55	4	68.44	4	12.00	5
Jordan	7	22.75	3	6.75	1	3.50	7	17.12	2	75.50	2	9.62	7
North Korea	8	21.11	1	7.88	5	0.22	1	24.88	8	84.33	1	14.22	1

The South Korea win the second position in this game, the good defence ability have made a great contribution. The North Korea get higher positions in all the index expect the steal times. The steal time only gets the fourth position. In the whole game, the South Korea is indomitable, they never give up, use defence to gain the initiative.

The North Korea is the first time appears in the Basketball Competition of the Asia Games. They have little chance to face the high level competitions. So in the games, the performance is unsatisfactory. All the defence index is very bad. It is also a reference for other teams.

From the research, the coaches can amend their training plan according to the ranks of the defence indexes collected in this Asia Game., find the important problem, see the advantage, provide a guidance in the tactical design and the skill training.

2.4 The Comprehensive Evaluation on the Offensive and Defence Ability of the Top 8 Teams

We put the 15 indexes (total shooting, total shooting percentage, two-point shooting, two-point percentage, three-point shooting, three-point percentage and so on) in table 1 into the RSR function, we can get the attack RSR. Putting the 6 indexes (defence rebound, steal, block, mistake and so on) in table 2 into the RSR function, we get the defence RSR. We can see the attack and defence RSR in the table

From the table: the attack RSR: the China is the highest, 0.6584; the Jordan is the lowest, 0.4417. The defence RSR, the North Korea is the highest, 0.6875, the South is the lowest, 0.3542. Putting the ranks of attack RSR and defence RSR into the RSR function, we can get a comprehensive RSR contains attack and defence ability. The comprehensive RSR is also in table 3, the North Korea is the highest, 0.6563; the South is the lowest, 0.4271. The coaches may make a targeted training plan according to the comprehensive RSR.

Table 3
The Comprehensive RSR on the Attack and Defence Ability of the Top 8 Teams

Team	Ranking	Attack		Defence		Comprehensive	
		RSR	Rank	RSR	Rank	RSR	Rank
China	1	0.6584	1	0.625	3.5	0.6417	2
North Korea	2	0.625	2	0.6875	1	0.6563	1
Iran	3	0.5917	3.5	0.6667	2	0.6292	3
Japan	4	0.5417	5	0.6250	3.5	0.5834	4
Qatar	5	0.5917	3.5	0.5417	5.5	0.5667	5
Philippines	6	0.5334	6	0.5417	5.5	0.5376	6
Jordan	7	0.4417	8	0.4584	7	0.4501	7
North Korea	8	0.5	7	0.3542	8	0.4271	8

2.5 The RSR Distribution List of the Top 8 Teams

Table 4
The Comprehensive RSR Distribution List of the TOP 8 Teams

Team	Ranking	RSR	f	$\sum f$	R	\bar{R}	$(\bar{R}/n)*100\%$	Probit
China	8	0.4271	1	1	1	1	12.50%	3.84
North Korea	7	0.4501	1	2	2	2	25%	4.33
Iran	6	0.5376	1	3	3	3	37.50%	4.67
Japan	5	0.5667	1	4	4	4	50%	5.00
Qatar	4	0.5834	1	5	5	5	62.50%	5.31
Philippines	3	0.6292	1	6	6	6	75%	5.76
Jordan	2	0.6563	1	7	7	7	87.50%	6.14
North Korea	1	0.6417	1	8=n	8	8	96.87%	6.87

※ $(1-1/4 \times n) \times 100\%$ 估计

The distribution of the comprehensive RSR means a down cumulative frequency which can be found in the Probit.

2.6 The Calculation of Regression Equation

The Probit is independent variable, the RSR is dependent variable. We can get a Regression Equation: $RSR=a+b \times Probit$. The a and b come from table 3 and

through the analysis of variance we can get the function which can have a statistical significance.

$$RSR=-0.802+0.929*Probit (F=37.911, P=0.001).$$

2.7 Orders and Classes of the RSR

We can order and sort the Top 8 teams according to the RSR base on the u, Px and the Probit. On the basis of the RSR got from the regression equation, we can have table 5.

Table 5
The Classes and Orders of the Top 8 Teams Divided by the Comprehensive Ability

Class	Px	Probit	RSR	Results
C	<P15.866	<4	<3.2206	South Korea
B	P15.866~	4~	3.2206~	Jordan the Philippines, Qatar, Japan and Iran
A	P84.134~	6~	>4.9021	China and North Korea

In the table, the Top 8 teams can be divided into 3 classes by the attack and defence ability. China and North Korea is among the A level owning the outstanding attack and defence ability. The South Korea is a C level team which ability is weak. The Jordan, Philippines, Qatar, Japan and Iran are B level teams that are in the middle. According the ranks, the teams can make a better training plan, strengthen the attack ability, lessen the distance between each teams.

3. THE RESULTS AND SUGGESTIONS

The offensive ability RSR level of the top 8 teams: the China is the highest; the Jordan is the lowest.

The defence ability RSR level of the top 8 teams: the North Korea is the highest; the South Korea is the lowest.

The comprehensive RSR level of the top 8 teams: he North Korea is the highest; the South Korea is the lowest.

The Top 8 teams can be divided into 3 classes by the attack and defence ability. The China and the North Korea is the A level, own the outstanding attack and defence ability. The South Korea is the C level team, the ability is weak. The Jordan, the Philippines, the Qatar, the Japan and the Iran are the B level teams, they are in the middle.

The Rank-sum Ratio used in this paper to analysis the

indexes of basketball games is responsibly. The results can objectively report the offensive and defence ability of each team.

Coaches can amend their training plans from the indexes and ranks in this paper. It provides a guidance in the training.

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