



The Relationship Between Concentration And Top Serve Accuracy And Bottom Serve In Volleyball

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Keywords

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Abstract

The game of Volleyball is one of the sports that is widely taught in schools and developed competitively. One of the basic techniques that plays an important role in the game of volleyball is serve, which consists of an upper serve and a lower serve. Concentration is a psychological factor that is suspected to affect the accuracy of the serve because the player must be able to coordinate body movements, regulate the power of the shot, and direct the ball to the target precisely. This study aims to determine the relationship between concentration and the accuracy of the upper serve and the bottom serve in the game of volleyball. This study uses a quantitative descriptive method with a correlational design. The research sample consisted of 15 extracurricular volleyball male athletes of SMAN 10 Bandung who were selected using purposive sampling techniques. The instruments used are the Grid Concentration Test (GCT) to measure concentration and AAHPER Serving Accuracy Test to measure service accuracy. The data was analyzed using the Pearson Product Moment correlation test. The results showed that the relationship between concentration and bottom service accuracy was very low and insignificant ($r = 0.125$; $p = 0.657$). Meanwhile, the association between concentration and upper serve accuracy showed a stronger, but also less statistically significant correlation ($r = 0.480$; $p = 0.070$). The determination coefficient ($R^2 = 0.231$) showed that concentration contributed 23.1% to the variation in service accuracy. It was concluded that concentration tends to have a greater role in the upper serve than the lower serve due to its higher complexity of motion. However, no statistically significant relationship was found between concentration and service accuracy in this study sample.

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INTRODUCTION

The preface The game of volleyball is one of the sports that is widely taught in schools and developed competitively in various sports clubs. The game of volleyball is one of the team sports that requires technical skills, physical strength, and mental readiness of the players. Volleyball is a sport played by two teams on each court separated by a net. One of the basic technical elements in volleyball that has a very important role is serve (Quiroga et al., 2012). In the game of volleyball, serving is a basic technique that has a very important role because it is the beginning of the start of the rally and has the potential to immediately generate points if done correctly and accurately. Service technique is one of the most important techniques that must be mastered by players, because to start a game in playing volleyball, you must start with service (Silva et al., 2014). Serves are usually the main attack to destroy the opponent's attack strategy or can even score points. In volleyball, there are two types of serves, namely the top serve and the bottom serve. In the context of the modern game, the top serve has become the top preference of elite athletes because it provides advantage significant tactical (Puspita et al., 2025).

Although serve has a very important role, the reality is that there are still many volleyball players who have difficulty in serving correctly, both the top serve and the bottom serve. Research by Gabriel Alexandru (2021), shows that more than 40% of mistakes in student-level volleyball games come from service errors, such as balls going out of the court, hitting the net, or not on target. The problem of service inaccuracy is not only caused by technical factors and physical conditions, but also influenced by psychological factors, one of which is concentration. Concentration is the ability of individuals to concentrate fully on a certain task and ignore other irrelevant stimuli (Teng et al., 2014). In line with the statement of Zarei & Roozbahani, (2015), it states that concentration is the ability to maintain focus on relevant tasks and ignore unnecessary distractions. In the context of volleyball games, concentration is needed when serving because players must coordinate body movements, manage the power of the shot, and direct the ball to the specified target. Some studies show that low levels of concentration can have a direct impact on the decline in the accuracy of basic techniques in some sports, including serving in volleyball. Oudejans et al., (2011), stated that a decrease in athletes' concentration often occurs due to match pressure, physical fatigue, and environmental disturbances, which ultimately increases the risk of technical errors of athletes who have low concentration tend to make mistakes that should have been avoided. Research by Alhossin Alali et al., (2013), shows that the ability to concentrate is significantly related to the performance of technical skills in sports, especially skills that require precision and precision such as serving. This reinforces the assumption that concentration affects the effectiveness of technique in the game of volleyball.

Research conducted by Kurniawan et al., (2021), found that there was a significant relationship between concentration level and volleyball serving accuracy, with a correlation coefficient value of $r = 0.675$, suggesting that concentration contributed significantly to the success of the serve. The results of Maulana et al., (2017), research also stated that concentration contributed 34.8% to the accuracy of serving volleyballs, which confirms the importance of the psychological aspect in sports engineering skills.

However, most previous studies have focused on only one type of serve, particularly the top serve, and there are limited studies that examine the relationship between concentration and accuracy of the upper and lower serves simultaneously. This is an important research gap because the two differ substantially in their biomechanical demands. Bottom serves are characterized by a relatively stable movement pattern and low throws that rely on simpler motor sequences and are generally easier to perform consistently, making them a basic skill commonly taught to novice players. In contrast, overhand serves require more complex air coordination, including ball throw control, temporal synchronization between throws and arm swings, rod rotation, and precise ball contact at higher positions (Reeser et al., 2010). Therefore, the successful execution of overhand serves depends on the integration of multiple movement components and greater neuromuscular coordination compared to underhand serves. These biomechanical differences suggest that the cognitive demands imposed on athletes may also differ between the two service techniques. According to (Moran, 2012),

concentration plays an important role in sports situations that require precise timing, movement regulation, and attention control. Because overhand serves involve greater movement complexity and temporal precision than underhand serves, athletes may require a higher level of concentration to execute skills accurately. Therefore, investigating the relationship between concentration and accuracy of overhand and underhand serve simultaneously provides an important psychological perspective for understanding how attention focus contributes to volleyball skill performance among high school athletes. The findings can assist trainers in designing training programs that integrate technical and psychological components according to the specific demands of each presentation technique. Based on this description, it can be concluded that volleyball service accuracy remains an important issue that needs attention, and concentration is thought to have a significant relationship with the success of both overhand and underhand serves. Therefore, the researcher is interested in conducting a study entitled "The Relationship Between Concentration and Upper Serve Accuracy and Lower Service Accuracy in Volleyball Games" in an effort to contribute scientifically to the development of coaching and improvement of volleyball performance at the high school level.

METHODS

The research was carried out on the extracurricular Volleyball of SMAN 10 Bandung with a sample of 15 people with the criteria of mastering the ability of the lower and upper servings maturely. In this study, the sample determination technique used the purposive sampling technique. Purposive sampling is a non-random sampling technique because the objects and subjects are chosen based on certain considerations (Setiawan, 2019). This study uses a significance level of 0.05 which means that the researcher's decision to reject or support the zero hypothesis has a probability of error of 5%.

The independent variable of this study is concentration and the instrument or measuring tool used, namely the Concentration Grid Test (GTC) which has been validated and reliably adopted from Harris and Bette L. Harris p.189 (Leisure Press, 1984, p.2) in the research of Purnama, (2021) entitled "The Relationship between Physical Fitness and Concentration Ability and Cortisol Response" which conducted a study to analyze the relationship between physical fitness and the ability to concentrate and cortisol response as a biomolecular marker in students whether they are under stress or not. Here are the instruments Grid Test Concentration (GTC) :

The Concentration Grid Test is a concentration measurement tool in the form of a table that contains the numbers 00 to 99 randomly. Here are the tools and facilities needed:

1. Indoor room
2. Grid concentration test and tap5 test drawing sheet
3. Pen
4. Stopwatch

The steps to conduct the Concentration Grid Test are as follows:

1. The sample warmed up 10-15 minutes before performing the test.
2. After that, the sample sits comfortably and relaxes in the place that has been provided with a distance of at least 2 meters from each sample.
3. The sample fills in the biodata that has been provided.
4. Each sample sorts the numbers from the smallest to the largest by ticking the number boxes available on the concentration grid sheet (see table 3.2).
5. The time given to fill is one minute.

The steps for implementing this concentration test are as follows:

1. The test has 10 x 10 boxes, each of which contains a two-digit number ranging from 00 to 99.
2. To perform this test, the sample only needs to connect the smallest to largest numbers with lines either horizontally or vertically on the number box they found within one minute (see figure).
3. The assessment is determined by the number of numbers they find in order.

4. In the implementation of this test, the sample sits in the place that has been provided with a distance of one meter from each sample. Next, the sample worked on the available questions according to the instructions given. The sample was given a time of 60 seconds to complete this test.

84	27	51	78	59	52	13	85	61	55
28	60	92	04	97	90	31	57	29	33
32	96	65	39	80	77	49	86	18	70
76	87	71	95	98	81	01	46	88	00
48	82	89	47	35	17	10	42	62	34
44	67	93	11	07	43	72	94	69	56
53	79	05	22	54	74	58	14	91	02
06	68	99	75	26	15	41	66	20	40
50	09	64	08	38	30	36	45	83	24
03	73	21	23	16	37	25	19	12	63

Figure 1. Instruments Grid Test Concentration (GTC)

The research was And here are the assessment criteria in the GTC instrument :

Table 1. Concentration Grid Test (CGT) Assessment Criteria

Category	Value
21 to the top	Excellent
16 – 20	Good
11 – 15	Enough
6 – 10	Less
5 and below	Very less

Meanwhile, the dependent variables of this study are the accuracy of the upper serve and the lower serve. The instrument to measure the accuracy of the upper and lower servicing in this study uses the AAHPER Serving Accuracy Test developed by Ricard H 1980. The instrument to measure the accuracy of upper and lower servicing in this study uses the AAHPER Serving Accuracy Test, which is a way to carry out the test with each child performing the upper and lower servings 10 times.

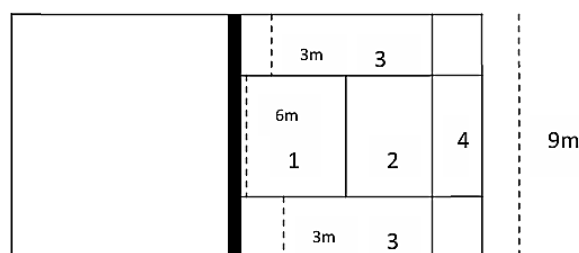


Figure 2. AAHPER Serving Accuracy Test Instrument.

Meanwhile, The tools needed in this test include:

1. 10 volleyballs
2. Soccer field and net
3. Stationery
4. Blank test scores

How to Perform the Test: Testi stands behind the court line (service area) then performs the top and bottom serves alternately 10 times. The balls that fall on the field are then calculated based on the score in each square. The counters count the balls that are on target.

Rating: Each ball that falls onto the field is calculated based on the score in each square. If the ball goes out of the field or out then the score is declared zero.

Data analysis techniques are a method used in conducting data analysis in research, data analysis will and can be carried out if all the necessary data has been obtained or obtained completely (Wajdi et al., 2024). The data collected will be tested for normality to find out whether the data is normal or not. After normalization, the data will be analyzed using Pearson Product Moment correlation to find out if there is a relationship between concentration and bottom serve accuracy and top serve in volleyball and a determination coefficient test to find out how much contribution there is between variables.

RESULTS AND DISCUSSION

Description of Research Data

Based on the description that has been collected previously, in this chapter an analysis of the discussion obtained in the research will be presented. The results of this research will be described according to the objectives and hypotheses that will be submitted previously. This study was conducted on 15 students who actively participated in volleyball extracurriculars at SMAN 10 Bandung with predetermined criteria. The following is a table of data from the three variables obtained from the sample

Table 2. Concentration, Top Service Accuracy Results and Bottom Service Sample Data

Results		
Concentration	Top Service	Bottom Service
6	21	16
6	32	18
8	29	22
5	22	28
8	32	28
17	34	34
6	19	29
14	19	18
8	24	16
8	36	22
12	30	34
14	22	32
8	28	30
14	24	30
12	34	36

Descriptive Statistics

The results of the measurement of concentration, top serve and bottom serve of volleyball can be seen and summarized in the table described as follows:

Table 2. Concentration, Top Service Accuracy Results and Bottom Service Sample Data

Results					
Remarks	Average	Sd	Var	Max	Min
Concentration	9.73	3.750	14.067	17	5
Bottom Service Accuracy	27.06	5.824	33.924	36	19
Top Servicing Accuracy	26.20	6.930	48.029	36	16

From the results of the table, it can be described as follows:

- From 15 samples that conducted the concentration test, an average score of 9.73, standard deviation of 3,750, variant 14,067, minimum score of 5, maximum score of 17 and all samples were categorized as valid or normal.
- From the 15 samples that conducted the lower service accuracy test, an average score of 27.06, standard deviation of 5.824, variant 33,924, minimum score of 19, maximum score of 36 and all samples were categorized as valid or normal.
- From the 15 samples that conducted the upper service accuracy test, an average score of 26.20, standard deviation of 6,930, variant 48,029, minimum score of 16, maximum score of 36 and all samples were categorized as valid or normal.

Normality Test Result

The Normality Test is a test that is carried out with the aim of assessing the distribution of data on a data group or variable, whether the distribution of data is normally distributed or not (Wang et al., 2013). The normality test is carried out to find out whether the data to be correlated is normally distributed or not. This research uses analytical techniques Shapiro Wilk Test to find out the normality of the data. The following are the results of the normality test of the data that has been analyzed:

Table 3. Normality Test Result

Test	Sig.	Remarks
Concentration Level	0,060	Normally Distributed Data
Bottom Service Accuracy	0,213	Normally Distributed Data
Top Servicing Accuracy	0,124	Normally Distributed Data

In The results of the data normality test above show that the three data tested are normal.

- The concentration test results of the normality test $p = 0.060 > 0.05$, then the concentration test data is normally distributed.
- The bottom service accuracy test results $p = 0.213 > 0.05$, then the upper service test data is normally distributed.
- The service accuracy test on the normality test results $p = 0.124 > 0.05$, then the upper service test data is normally distributed.

Correlation Test Result

The Normality Correlation test is a term used to measure the strength of relationships between variables. A correlational test is a way to find out whether there is a relationship between two or more variables. The correlation test is used to find out if there is a relationship between two or three variables, namely the concentration with the accuracy of the top serve and the accuracy of the bottom serve of the volleyball. The type of correlation used in this study is Pearson correlation because both variables are numerical and the data tested are normally distributed.

The correlation coefficient criteria to provide interpretation of the correlation coefficient value are as follows:

Table 4. Correlation Coefficient Criteria

The Magnitude Of The Value Relationship	Interpretation Relationships
0,80 – 1,00	Height
0,06 – 0,80	Enough
0,40 – 0,60	Relatively low
0,20 – 0,40	Low
0,00 – 0,20	Very low

After the data passes the normality test stage, it can be found that the data is distributed normally. If it is distributed normally, using the pearson product moment correlation, the following are the results of the correlation test obtained from the correlated variables:

Table 5. Correlations Test Result

	Test	Bottom Service	Top Service
Concentration	Pearson Correlation	.125	.480
	Sig.	.657	.070

Based To see whether the relationship between the three variables is significant or not, here are the test steps:

- Determining the Hypothesis of the steps
 H0 : There was no significant relationship between concentration and the result of upper serve accuracy in volleyball.
 H1 : There is a significant relationship between concentration and the result of top serve accuracy in volleyball
- Defining the Decision-Making Policy
 If the Significance > 0.05, then H0 is accepted,
 If the Significance < 0.05, then H0 is rejected,
- Making a Decision It can be seen that the significance value (p) < 0.05, then H0 is rejected. It can be seen from the results of the data analysis in **table 4.5** that the significance value of the concentration with the lower serve is 0.657 > 0.05, then H1 is rejected and the significance value of the concentration with the upper serve is 0.070 > 0.05, then H1 is rejected. So it can be concluded that "There is no significant relationship between the concentration and accuracy of the bottom serve and the top serve in volleyball" with a lower service correlation value of 0.125 which has a high correlation rate and a service correlation value of 0.480 which has a high correlation rate.

Determination Coefficient Test Result

The determination coefficient test aims to measure how far the model's ability to explain the variation of dependent variables and corroborate the results of the correlation test which proves that there is a relationship between concentration and the accuracy of the bottom serve and the top serve in the game of volleyball. The value used is R Square (because the independent variable is more than one). The Coefficient of Determination (r^2) test is a way to determine the amount of contribution of an independent variable to a bound variable. The following are the results of the calculation of the determination coefficient results of the three variables:

Table 6. Determination Coefficient Test Result

R	R Square	Adjusted R Square	Std. Error of the Estimate
.480 ^a	.231	.103	3.55287

Based on **table 4.6** above, it is known that the value of R is 0.480. This means that the correlation between variable X and variables Y1 and Y2 is 0.480. This means that there is a close relationship between the three variables. It can also be explained that the value of R² (R Square) is 0.231 or 23.1%. This shows that the percentage of simultaneous influence of the X variable, namely the concentration of the dependent variables Y1, Y2 of upper service accuracy and lower service accuracy is 23.1% while the remaining 76.9% is influenced by other variables that are not included in this study.

Discussion of Research Findings

In this discussion, the researcher will present the findings that emerged during the study of the relationship between concentration and the accuracy of the bottom serve and the top serve in the game of volleyball. This research has produced several new things that can

complement previous research. This study aims to determine the relationship between concentration and lower serve accuracy and upper serve in high school volleyball athletes. The results of the study show that there is a difference in the relationship pattern between the two types of services. The correlation between concentration and bottom serve accuracy showed very low values ($r = 0.125$) and not statistically significant ($p = 0.657 > 0.05$). Meanwhile, the correlation between concentration and upper serve accuracy showed a stronger relationship ($r = 0.480$), although it still did not reach the level of statistical significance at 0.05 ($p = 0.070 > 0.05$).

The absence of a significant relationship between concentration and bottom serving accuracy can be explained by the characteristics of the bottom serving technique itself. Biomechanically, bottom serve is a basic skill in volleyball that has a relatively simple, stable movement pattern, and uses low ball bounce. This technique is generally taught first time to beginner players because it is easier to learn and perform consistently. After being repeated in the training process, the lower serve movement tends to be an automatic movement so that its execution depends more on motor habits and mastery of technique than on high concentration ability. Therefore, the difference in concentration levels between athletes in this study did not have a significant effect on the accuracy of the lower serve.

In contrast to the bottom serve, the results showed that concentration had a stronger relationship with the accuracy of the upper serve ($r = 0.480$). Although the relationship is not statistically significant, the correlation values obtained suggest a tendency that athletes with better levels of concentration have more accurate top-serve abilities. These findings can be explained by the higher biomechanical complexity of the upper service than the lower serving. In performing the top serve, players must control the ball bounce, manage the time between the bounce and arm swing, coordinate the overall body movements, and make contact with the ball at the right point. According to (Reeser et al., 2010), upper serve involves complex coordination of motion and requires synchronization of various body segments to produce effective and accurate strokes.

From the point of view of sports psychology, skills that have a high level of movement complexity and precision demands require greater attention control and concentration (Moran, 2012). Therefore, concentration tends to have a more important role in the implementation of the upper serve than the lower serve. Athletes who are able to maintain a good focus of attention will find it easier to control complex sequences of movements, so the chances of producing accurate serve are greater. In addition, the insignificance of the results of this study can also be influenced by the relatively small number of samples, which are only 15 athletes. Small sample sizes can lead to low statistical strength so that the actual relationships in the population become significantly difficult to detect. This condition may explain why the correlation between concentration and upper serving accuracy shows moderate values ($r = 0.480$), but has not yet reached the required level of statistical significance.

Overall, the results of this study show that concentration appears to have a greater role in top serve accuracy than bottom serve in high school volleyball athletes. These findings reinforce the view that psychological factors, particularly concentration, will become increasingly important as the biomechanical complexity of a sports skill increases. In every sport, athletes must have good concentration skills in order to improve their expected performance, just as other sports must have athletes who have the ability to concentrate well. This as stated by Nasution in Maulana et al. (2017), articulates the idea that "in the realm of physical activity, especially in the context of sport, concentration training takes on an important important role. If a person's capacity for concentration becomes impaired or impaired during the performance of physical movements associated with sports activities, whether in the context of a rigorous training session or during competitive matches, this disruption inevitably leads to the emergence of many potential problems and challenges". Concentration also plays a very important role in volleyball, especially when serving. In volleyball, the service shot is one of the most influential shots in the course of the game; A service shot that is difficult for the opponent will greatly benefit the team, especially if the service shot cannot be returned or accepted by the opponent. Gustria (2020), states that "the

goal of modern volleyball serving techniques is to be the main attack in starting the volleyball game, and the ball is hit hard and directed". There are several important things in serving in volleyball, including arm strength, good technique and concentration as conveyed by Isnaini in Kurniawan et al. (2021), "Good concentration and maintenance will help players perform good technique". From the two relevant studies above, it is concluded that concentration has an important role in performing the bottom serve and the top serve in volleyball. Thus, it can be interpreted that the higher the concentration level of the participants, the higher the accuracy of the services they perform. Therefore, the training program given to athletes should not only focus on mastering technique, but also developing the ability to concentrate, especially on upper serve exercises that have higher demands on coordination and precision.

CONCLUSION

Based on the findings of this study, several recommendations can be proposed. For volleyball athletes and coaches, technical training should remain a primary focus in improving serve accuracy. However, coaches are encouraged to integrate mental focus and concentration training specifically during overhand serve practice sessions. The results of this study indicate that concentration has a stronger relationship with overhand serve accuracy than with underhand serve accuracy. Therefore, psychological training methods such as visualization, attentional focus exercises, self-regulation strategies, and match-pressure simulations may be incorporated into overhand serve training to enhance performance.

For schools and sports development programs, support should be provided for training approaches that combine technical, physical, and psychological components. Developing athletes' concentration skills may be particularly beneficial for volleyball techniques that involve higher levels of coordination and movement complexity.

For future researchers, it is recommended to use a larger sample size to increase the statistical power of the study and improve the ability to detect significant relationships between variables. Increasing the sample size is particularly important in addressing the high p-value observed in the relationship between concentration and underhand serve accuracy ($p = 0.657$). Future studies are also encouraged to investigate additional factors that may influence serve accuracy, such as self-confidence, anxiety, hand-eye coordination, playing experience, and physical condition, in order to provide a more comprehensive understanding of volleyball performance.

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