The Effect of Physical Training and Shuttlecock Shot Practice on Smash Power in Badminton

Ricardo Ricardo
Ph.D Student, Universiti Kebangsaan Malaysia, Malaysia, email: p86769@siswa.ukm.edu.my

Corresponding Author: Ricardo Ricaro

Abstract: This article discusses the effect of physical training and shuttlecock hitting practice on smash power in badminton. The object of this research is every individual who often plays badminton, especially for those students who specifically play badminton. The purpose of this study was to determine the effect of physical training and shuttlecock practice on smash strength either partially or simultaneously. The method used is quantitative with path analysis tools. The population is 125 authors with a sample of 50 authors. The type of sampling used is accidental sampling. The data analysis tool used path analysis and IBM SPSS version 27. The data analysis technique used was R square analysis, t test and f test. Questionnaires have been tested for validity and reliability, and classical assumption tests have been carried out and all of them are eligible to continue analysis with path analysis. The result is that physical training and shuttlecock hitting practice have a significant and positive effect on smash power in badminton both partially and simultaneously.

Keyword: Smash Power, Physical Training, Shuttlecock Shot Practice

INTRODUCTION

Badminton is a sport with the second most fans in the world after football. With so many fans of badminton, making this sport promises good prospects, both in terms of achievement opportunities to competition events. With so many emerging badminton clubs and schools which focus on producing youth who are experts in playing badminton. In addition they focus on championships and training outside of academics. Those who go to badminton school or join a badminton training club will attend all kinds of training that support them in playing badminton. Besides that, the health, endurance and performance of those who attend badminton schools are always considered. Intake of food, vitamins, protein, until bedtime is always a concern in addition to the training provided. The training in badminton schools is focused on building the athlete's physique and endurance to compete. The training provided can be in the form of physical exercise, leg agility training, endurance training and Smash hitting practice in Badminton Sports.
Based on the background of the problems above, the research objectives were determined as follows: 1) To find out whether physical training has an effect on smash strength?; 2) Does the practice of hitting the shuttlecock affect the strength of the smash; and 3) Do physical training and shuttlecock hitting practice affect the strength of the smash simultaneously?

LITERATURE REVIEW
Smash Power
Smash is a term often used in sports such as tennis, badminton and volleyball. Smash is a powerful attack in which the player hits a feather with great speed and great power, usually for the purpose of scoring points or ending the match (Syamsudin et al., 2022). The power of the smash is a fast punch, directed downwards with a strong and sharp edge towards the opponent's field (Kamaruddin, 2019). This shot is one of the strokes in badminton that often results in direct value in a match (Setiawan et al., 2020). The power of the smash is a strong blow that occurs because the hand is in full contact with the racket so that the ball slides steeply and at high speed which is influenced by a higher jump which will make the shuttlecock dive more sharply (Wea & Samri, 2022).

The indicators contained in the strength of the smash include: 1) The strength of the blow; 2) Punch speed; and 3) The sharpness of the shuttlecock dive (Sudiadharma & Rahman, 2023).

Physical Training
Physical exercise is an activity or activity carried out with the aim of improving one's physical fitness and health. Physical exercise usually involves active body movements and various types of sports or physical activities, such as running, swimming, lifting weights, cycling, yoga and several other physical exercises. (Anuar et al., 2021). Physical training focuses on exercising the body, which is useful for training one's muscles and endurance. Physical exercises that are usually done in the form of push ups, sit ups, jumping jacks, and cardio (Ni’mah & Melisa, 2022). Physical exercise is a form of physical activity that is planned, structured and sustainable by involving repeated body movements and is intended to improve physical fitness (Simanjuntak et al., 2016).

Meanwhile, physical activity is any body movement that increases the expenditure of energy and energy to burn calories (Laoli et al., 2021). The indicators contained in physical exercise include: 1) Duration: which consists of how long the physical exercise is carried out; 2) Frequency: how often the physical exercise is carried out; and 3) Intensity: where physical exercise is divided into light, moderate to heavy physical exercise (Pranata & Kumaat, 2022).

Shuttlecock Shot Practice
Strike practice is an exercise that aims to direct the shuttlecock as high as possible and far behind the opposing player (Primayanti & Isyani, 2021). The shuttlecock stroke exercise is an exercise carried out to control the direction and strength of the shuttlecock stroke (Wardani et al., 2022). Initial training in hitting the shuttlecock is usually in the form of basic training, then how to hold the racket until the body is in position when you want to hit the shuttlecock. The dimensions contained in the hitting drills are: 1) Lob shots; 2) Backhand shot; 3) Drop shot; and 4) Service shot (Yuzairi & Aguss, 2022).

METHOD
Researchers use quantitative methods and path analysis. With the sampling technique, namely Accidental Sampling assisted by the SPSS 27 application to test the hypothesis. This research was conducted to individuals who like to do badminton and to individuals who are...
carrying out badminton sports education, by filling out a questionnaire through the Google Form. The population of this study is 125 authors with a sample of 50 authors. The tests carried out in this study were the t test, f test and the coefficient of determination r-square test. Where the questionnaire has been tested for validity and reliability, and the classic assumption test has been carried out and all of them are eligible to continue analysis with path analysis (Ali & Nandan, 2013).

Based on the background, the conceptual framework is as shown in the picture 1.

![Conceptual Framework](image)

**Picture 1. Conceptual Framework**

Based on the conceptual framework, determine the research hypothesis as follows:
1) H1: Physical training affects the smash power
2) H2: Shuttlecock shot practice affects the smash power
3) H3: Physical training and shuttlecock shot practice affects the smash power

**RESULTS AND DISCUSSION**

**Results**

**T Test**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>10.994</td>
<td>3.011</td>
<td>4.012</td>
</tr>
<tr>
<td>P.T</td>
<td>.189</td>
<td>.094</td>
<td>.339</td>
<td>2.577</td>
</tr>
<tr>
<td>S.P</td>
<td>.573</td>
<td>.082</td>
<td>.744</td>
<td>7.326</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Smash Power
b. Source: Output SPSS 27

The t test uses a significance value of alpha (α) = 5%. The measurement results based on the output of SPSS version 27, obtained the value of t-table = (0.05/2) = 0.025 and df = n-k-1 = (n-3-1) = (50-4-1), so the result of the t-table is 2.013.

1) Physical training partially affects the smash power partially. This is based on t-count > t-table (2.577 > 2.013) and the significance value of alpha (α) is 0.021 (<) 0.05.
2) Shuttlecock shot practice has an effect on the smash power partially. This is based on t-count > t-table (7.326 > 2.013) and the significance value of alpha (α) is 0.000 (<) 0.05.
F Test

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>3</td>
<td>201,304</td>
<td>28.933</td>
<td>.000a</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>46</td>
<td>7.931</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Dependent Variable: Smash Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Predictors: (Constant), Physical Training, Shuttlecock Shot Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the significance value is <0.05, the independent variable has a significant effect on the dependent variable. Based on the results of the table above, a significance value is obtained of 0.000 <0.05. So the independent variable has a significant effect on the dependent variable simultaneously. This means that physical training and shuttlecock shot practice have a positive and significant effect on the smash power simultaneously. Based on the SPSS 27 output above, an F value of 28.933 > 10.00 is obtained. So physical training and shuttlecock shot practice have a positive and significant effect on the smash power simultaneously.

Coefficient of Determination R Square

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.722a</td>
<td>.734</td>
<td>.711</td>
<td>1.958</td>
</tr>
<tr>
<td>a. Predictors: (Constant), PT_X1, SP_X2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Variabel Dependent: Smash Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the model summary table above, an r-square value of 0.734 or (73.4%) is obtained. This shows the percentage of influence of the independent variable, namely physical exercise and hitting practice on the dependent variable, namely smash strength of 73.4%. This means that 1 – 0.734 = 0.266 or 26.6% is influenced by other variables not examined in this study, including:
1) Practice Consistency: (Amni et al., 2022), (Mubarok, 2019), (Subekti et al., 2020).
2) Arm Muscle Strength: (Suarsana & Baan, 2013), (Gustaman, 2019), (Cahyono et al., 2018).

Discussion

Based on the results of the study, the discussion of the influence between variables is as follows:
1. Physical Training affects the smash power

Physical exercise is exercise that focuses on one's body strength, endurance and physique. Physical exercise is a strenuous exercise compared to other exercises, because of the form of exercise that utilizes the muscles.

The principles of physical exercise according to Leny Pintowari (2021) reveal 4 principles of physical training, which include: 1) Good: where good physical exercise is when started early, meaning as early as possible that each person can do; 2) Correct: means doing physical exercise correctly, starting with a pre-exercise warm-up of around 5 to 15 minutes. Then you can do stretching exercises and can be continued with light to heavy physical
exercises; 3) Measured: means measuring exercise intensity, one of which is exercise pulse; and 4) Regularly: where it is recommended to do it more than 3 times to 5 times per week.

Good physical exercise must be in accordance with the health conditions of each individual. Therefore, it is recommended for everyone before doing physical exercise to check the condition and health of his body. Due to the strenuous form of the exercise, it is recommended to know the condition of the body in order to avoid injury or other things that are not desirable. Good physical exercise is characterized by the following 3 things, namely: 1) Gaining fitness: where the body is able to adjust the physical load obtained by physical exercise; 2) Gaining muscle strength: meaning that physical exercise will form muscle mass; and 3) Improving body posture: where body posture can be in the form of height.

If a person does physical exercise well in the form of achieving fitness, gaining muscle strength and improving body posture, it will affect the strength of the badminton smash which includes: 1) Punch power: whereby the formation of muscle mass will increase one's strength in holding the racket and hitting the shuttlecock; and 2) Punch speed: where good posture and strong muscles will provide a boost of energy when they want to smash the shuttlecock, so that the resulting punch will have a strong speed.

Physical training has an effect on smash strength, this is in line with research conducted by: (Hariadi & Mardela, 2020), (Prayadi & Rachman, 2013), (Anggara & Yudi, 2019).

The results of t-count > t-table (2.577 > 2.013) and the significance value of alpha (α) is 0.021 (<) 0.05. So physical training has a partial effect on smash power in badminton (H1 Accepted).

2. Shuttlecock Shot Practice affects the smash power

The shuttlecock strike exercise is an exercise aimed at training and controlling the strokes given by the racket to the shuttlecock. Shot practice is useful for directing the shuttlecock to the opponent's area well so that you get points.

The principles of hitting practice according to the Health Hero 16 Theme Module (2020), namely: 1) Speed in hitting the shuttlecock given by the opponent and responding to the opponent's punch; 2) Strength in hitting the shuttlecock and being able to reach every shuttlecock given by the opponent; and 3) Accuracy in hitting the shuttlecock, so that the opponent has difficulty returning the shuttlecock.

If someone has speed in hitting the shuttlecock, strength in hitting and returning as well as accuracy in returning the shuttlecock, it will affect the power of the smash which includes: 1) Sharpness of the shuttlecock dive: where a punch that is accompanied by a jump shot or jump smash will give the shuttlecock a dive; and 2) Difficulty in returning the shuttlecock by the opponent.

Punch training has an effect on smash power, this is in line with research conducted by: (Limbong, 2021), (Juliansyah et al., 2017), (Jusran, 2021).

The results of t-count > t-table (7.326 > 2.013) and the significance value of alpha (α) is 0.000 (<) 0.05. So hitting practice has an effect on smash power in badminton partially (H2 Accepted).

3. Physical Training and Shuttlecock Shot Practice affect the smash power

Physical training and hitting drills are exercises that are often done for athletes or someone when they want to play sports, especially badminton. Physical exercise is aimed at building muscle mass, strength and endurance while playing badminton. Shot drills are aimed at getting a good shot and creating points when playing badminton.

Someone who always runs or does physical exercise certainly has good body resistance, strength and better muscle mass, so that he has an advantage when playing
badminton. Hitting practice does not only focus on hitting power, but accuracy in placing the shuttlecock in the opponent's area. Physical exercise that is closely related to the power of the smash is jumping jacks. The exercise is relevant to the sport of badminton.

Physical training and hitting practice have an effect on smash power, this is in line with research conducted by: (Prayadi & Rachman, 2013), (Munadi et al., 2018), (Sudiadharma & Ishak, 2020).

The results of f-count > f-table (28.933 > 10.00) and the significance value of alpha (α) is 0.000 (<) 0.05. So physical training and hitting practice affect the strength of the smash in badminton simultaneously (H3 Accepted).

CONCLUSION

Based on the literature review and discussion above, the researcher draws the following conclusions: 1) Physical exercise has a positive and significant effect on smash strength partially, where physical exercise will build muscles, endurance and strength when playing; 2) Hitting practice has a positive and significant effect on smash strength partially, where hitting practice can be in the form of smashes, lops, service and drop shots; 3) Physical training and hitting practice have a positive and significant effect on smash strength simultaneously.

REFERENSI


